SLR-TC – 429

Seat No.	

Set **P**

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figures to **right** indicate **full** marks.*

*4) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) $L\{t\, e^{-t}\}$ is

a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

2) $L^{-1}\left\{\frac{s-4}{(s-4)^2+5^2}\right\} =$

a) $e^{4t}\sin 5t$ b) $e^{-4t}\sin 5t$ c) $e^{4t}\cos 5t$ d) $e^{-4t}\cos 5t$

3) $L^{-1}\left\{\frac{1}{3s-1}\right\} =$

a) e^{t} b) $\frac{e^{t/3}}{3}$ c) $\frac{e^{t}}{3}$ d) $\frac{e^{-t/3}}{3}$

4) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

a) $\Phi\left(\frac{s}{a}\right)$ b) $\frac{1}{s}\Phi\left(\frac{s}{a}\right)$ c) $\frac{1}{a}\Phi\left(\frac{s}{a}\right)$ d) $\Phi'\left(\frac{s}{a}\right)$

5) Cauchy-Riemann equations for f(z) to be analytic are

a) $u_x = v_x$, $u_y = -v_y$ b) $u_x = v_y$, $u_y = -v_x$
c) $u_x = -v_x$, $u_y = v_y$ d) $u_x = -v_y$, $u_y = v_x$

P.T.O.

6) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if
   a) $\nabla\Phi = 0$ b) $\nabla\Phi \neq 0$
   c) $\nabla^2\Phi = 0$ d) $\nabla^2\Phi \neq 0$

7) The mapping $w = f(z)$ is conformal if
   a) $f(z)$ is analytic and $f'(z) = 0$
   b) $f(z)$ is analytic and $f'(z) \neq 0$
   c) $f(z)$ is not analytic and $f'(z) \neq 0$
   d) None of these

8) Fourier expansion of an even function in the range $(-\pi, \pi)$ has
   a) Only sine terms
   b) Only cosine terms
   c) Both sine and cosine terms
   d) None

9) If $f(x) = x^4$ in $(-1, 1)$, then the Fourier coefficient b_n is equal to
   a) 1 b) π
   c) 0 d) None

10) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .
   a) k b) 2k
   c) 0 d) –k

11) In the mapping $w = \frac{1}{z}$ the interior of the unit circle $|z| = 1$ is mapped onto
   a) The interior of the unit circle b) The boundary of the unit circle
   c) On the x-axis d) On the exterior of the unit circle

12) The value of integration, $\int_c \frac{\sin z}{z} dz$, C : $|z| = 1$ is
   a) 0 b) πi
   c) $-\pi i$ d) $-2\pi i$

13) If $f(z) = \bar{z}$, then $f'(z)$
   a) equal to 1 b) equal to 0
   c) does not exist d) equal to –1

14) In the mapping $w = 4z$, the region $x = 0$, $y = 0$, $x + y = 1$ is transformed into
   a) a square b) a circle
   c) a triangle d) none of these

SLR-TC – 429

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

3) Find the $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+2^2}{s^2+3^2}\right)\right\}$.

4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0)=0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

Set P

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

   2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

   3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

   4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

   5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

   1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

   2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

   $$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

   3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

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SLR-TC – 429

Seat No.	

Set **Q**

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

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*3) Figures to **right** indicate **full** marks.*

*4) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Fourier expansion of an even function in the range $(-\pi, \pi)$ has
   a) Only sine terms
   b) Only cosine terms
   c) Both sine and cosine terms
   d) None

2) If $f(x) = x^4$ in $(-1, 1)$, then the Fourier coefficient b_n is equal to
   a) 1 b) π
   c) 0 d) None

3) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .
   a) k b) 2k
   c) 0 d) –k

4) In the mapping $w = \frac{1}{z}$ the interior of the unit circle $|z| = 1$ is mapped onto
   a) The interior of the unit circle b) The boundary of the unit circle
   c) On the x-axis d) On the exterior of the unit circle

5) The value of integration, $\int_c \frac{\sin z}{z} dz$, C : $|z| = 1$ is
   a) 0 b) πi c) $-\pi i$ d) $-2\pi i$

P.T.O.

6) If $f(z) = \bar{z}$, then $f'(z)$

a) equal to 1
b) equal to 0
c) does not exist
d) equal to –1

7) In the mapping w = 4z, the region x = 0, y = 0, x + y = 1 is transformed into

a) a square
b) a circle
c) a triangle
d) none of these

8) $L\{t\, e^{-t}\}$ is

a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

9) $L^{-1}\left\{\frac{s-4}{(s-4)^2+5^2}\right\} =$

a) $e^{4t} \sin 5t$ b) $e^{-4t} \sin 5t$ c) $e^{4t} \cos 5t$ d) $e^{-4t} \cos 5t$

10) $L^{-1}\left\{\frac{1}{3s-1}\right\} =$

a) e^t b) $\frac{e^{t/3}}{3}$ c) $\frac{e^t}{3}$ d) $\frac{e^{-t/3}}{3}$

11) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

a) $\Phi\left(\frac{s}{a}\right)$ b) $\frac{1}{s}\Phi\left(\frac{s}{a}\right)$ c) $\frac{1}{a}\Phi\left(\frac{s}{a}\right)$ d) $\Phi'\left(\frac{s}{a}\right)$

12) Cauchy-Riemann equations for f(z) to be analytic are

a) $u_x = v_x$, $u_y = -v_y$
b) $u_x = v_y$, $u_y = -v_x$
c) $u_x = -v_x$, $u_y = v_y$
d) $u_x = -v_y$, $u_y = v_x$

13) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if

a) $\nabla\Phi = 0$
b) $\nabla\Phi \neq 0$
c) $\nabla^2\Phi = 0$
d) $\nabla^2\Phi \neq 0$

14) The mapping w = f(z) is conformal if

a) f(z) is analytic and $f'(z) = 0$
b) f(z) is analytic and $f'(z) \neq 0$
c) f(z) is not analytic and $f'(z) \neq 0$
d) None of these

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SLR-TC – 429

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

3) Find the $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+2^2}{s^2+3^2}\right)\right\}$.

4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0) = 0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

Set Q

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

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SLR-TC – 429

Seat No.	

Set **R**

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

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*3) Figures to **right** indicate **full** marks.*

*4) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Cauchy-Riemann equations for f(z) to be analytic are
   a) $u_x = v_x$, $u_y = -v_y$ b) $u_x = v_y$, $u_y = -v_x$
   c) $u_x = -v_x$, $u_y = v_y$ d) $u_x = -v_y$, $u_y = v_x$

2) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if
   a) $\nabla\Phi = 0$ b) $\nabla\Phi \neq 0$
   c) $\nabla^2\Phi = 0$ d) $\nabla^2\Phi \neq 0$

3) The mapping w = f(z) is conformal if
   a) f(z) is analytic and $f'(z) = 0$
   b) f(z) is analytic and $f'(z) \neq 0$
   c) f(z) is not analytic and $f'(z) \neq 0$
   d) None of these

4) Fourier expansion of an even function in the range $(-\pi, \pi)$ has
   a) Only sine terms
   b) Only cosine terms
   c) Both sine and cosine terms
   d) None

5) If $f(x) = x^4$ in (–1, 1), then the Fourier coefficient b_n is equal to
   a) 1 b) π
   c) 0 d) None

P.T.O.

6) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .

a) k b) 2k
c) 0 d) –k

7) In the mapping $w = \frac{1}{z}$ the interior of the unit circle |z| = 1 is mapped onto

a) The interior of the unit circle b) The boundary of the unit circle
c) On the x-axis d) On the exterior of the unit circle

8) The value of integration, $\int_c \frac{\sin z}{z} dz$, C : |z| = 1 is

a) 0 b) π i
c) $-\pi i$ d) $-2\pi i$

9) If $f(z) = \bar{z}$, then $f'(z)$

a) equal to 1 b) equal to 0
c) does not exist d) equal to –1

10) In the mapping w = 4z, the region x = 0, y = 0, x + y = 1 is transformed into

a) a square b) a circle
c) a triangle d) none of these

11) $L\{t\, e^{-t}\}$ is

a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

12) $L^{-1}\left\{\frac{s-4}{(s-4)^2+5^2}\right\} =$

a) $e^{4t} \sin 5t$ b) $e^{-4t} \sin 5t$ c) $e^{4t} \cos 5t$ d) $e^{-4t} \cos 5t$

13) $L^{-1}\left\{\frac{1}{3s-1}\right\} =$

a) e^t b) $\frac{e^{t/3}}{3}$ c) $\frac{e^t}{3}$ d) $\frac{e^{-t/3}}{3}$

14) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

a) $\Phi\left(\frac{s}{a}\right)$ b) $\frac{1}{s}\Phi\left(\frac{s}{a}\right)$ c) $\frac{1}{a}\Phi\left(\frac{s}{a}\right)$ d) $\Phi'\left(\frac{s}{a}\right)$

SLR-TC – 429

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

3) Find the $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+2^2}{s^2+3^2}\right)\right\}$.

4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0) = 0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

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SLR-TC – 429

Seat No.	

Set **S**

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

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*3) Figures to **right** indicate **full** marks.*

*4) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .

a) k b) 2k
c) 0 d) –k

2) In the mapping $w = \frac{1}{z}$ the interior of the unit circle |z| = 1 is mapped onto

a) The interior of the unit circle b) The boundary of the unit circle
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3) The value of integration, $\int_c \frac{\sin z}{z} dz$, C : |z| = 1 is

a) 0 b) π i
c) $-\pi i$ d) $-2\pi i$

4) If $f(z) = \bar{z}$, then $f'(z)$

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P.T.O.

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a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

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9) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

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10) Cauchy-Riemann equations for f(z) to be analytic are

a) $u_x = v_x$, $u_y = -v_y$ b) $u_x = v_y$, $u_y = -v_x$
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11) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if

a) $\nabla\Phi = 0$ b) $\nabla\Phi \neq 0$
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12) The mapping w = f(z) is conformal if

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d) None of these

13) Fourier expansion of an even function in the range $(-\pi, \pi)$ has

a) Only sine terms
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14) If $f(x) = x^4$ in (–1, 1), then the Fourier coefficient b_n is equal to

a) 1 b) π
c) 0 d) None

SLR-TC – 429

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (New CBCS) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

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4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0) = 0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

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SLR-TC – 430

Seat No.	

Set P

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ allows air to pass into the lungs.
a) Trachea b) Aorta c) Pancreas d) Larynx

2) Thoracic and abdominal cavities are separated by the
a) pleura b) diaphragm
c) lumbar d) spleen

3) _____ is the structural, fibrous protein found in the dermis.
a) Collagen b) Heparin c) Sebum d) Melanin

4) _____ is the flexible connective tissues that is attached to bones at the joints.
a) Adipose b) Cartilage c) Muscle d) Nerve

5) _____ is a point at which an impulse is transmitted from one neuron to another neuron.
a) Synapse b) Terminal plate
c) Dendrite d) Nerve center

6) _____ is the body cavity that contains the pituitary gland.
a) Abdominal b) Cranial
c) Spinal d) Thoracic

P.T.O.

7) _____ controls body temperature, sleep and appetite.
   a) Adrenal gland b) Hypothalamus
   c) Pancreas d) Thalamus

8) Saliva contains an enzyme that acts upon _____ of the following nutrients.
   a) starches b) proteins
   c) fats d) minerals

9) _____ is the master gland of endocrine system.
   a) Adrenal b) Pancreas
   c) Thyroid d) Pituitary

10) Sinu atrial node is located at
   a) Right atrium b) Right ventricle
   c) Left atrium d) Left ventricle

11) The circulatory system that supplies O_2 and nutrients to the cells of the body is called
   a) diffusion b) systemic circulation
   c) coagulation d) pulmonary circulation

12) The right lung consists of _____ lobes and left lung has _____ lobes.
   a) 3, 2 b) 2, 3 c) 2, 2 d) 3, 1

13) Afferent peripheral nerves that brings information into CNS are called
   a) Motor nerves b) Sensory nerves
   c) Gray matter d) White matter

14) The formed elements of the blood are made up of all the following except
   a) RBC's b) WBC's
   c) Plasma d) Platelets

_____

SLR-TC – 430

Seat No.	

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Define inhalation and expiration process in detail.
   2) Draw microscopic structure of human cell and define any 4 components of it.
   3) Explain the structure and any four function of skin.
   4) Define Einthoveris triangle and mention the significance of ECG waveforms.
   5) Draw respiratory system and mention each organ of it.

3. Attempt **any two** : **(6×2=12)**
   1) Explain conduction system of heart with neat figure.
   2) Write a short note on :
      a) Liver – structure and functions
      b) Small intestine – structure and functions
   3) Write a short note on :
      a) Blood groups
      b) Blood composition

SECTION – II

4. Attempt **any 4** : **(4×4=16)**
   1) List any two each type of glands for endocrine and exocrine glands and mention their each of 2 functions.
   2) Draw structure of cochlea with correct namings.

3) Define sympathetic and para sympathetic nervous system and explain their significance and functions.

4) Explain the process of image formation on the retina with necessary diagram.

5) List various endocrine glands and explain any two with their functions.

5. Attempt **any 2** : **(6×2=12)**

1) Write a short note on :
   a) Oestrogens and progesterone.
   b) Reflex action and reflex arcs.

2) Explain the process of urine formation with necessary diagram.

3) Explain process of hearing mechanism with necessary diagram.

SLR-TC – 430

Seat No.	

Set Q

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Saliva contains an enzyme that acts upon _____ of the following nutrients.

a) starches b) proteins
c) fats d) minerals

2) _____ is the master gland of endocrine system.

a) Adrenal b) Pancreas
c) Thyroid d) Pituitary

3) Sinu atrial node is located at

a) Right atrium b) Right ventricle
c) Left atrium d) Left ventricle

4) The circulatory system that supplies O_2 and nutrients to the cells of the body is called

a) diffusion b) systemic circulation
c) coagulation d) pulmonary circulation

5) The right lung consists of _____ lobes and left lung has _____ lobes.

a) 3, 2 b) 2, 3 c) 2, 2 d) 3, 1

P.T.O.

6) Afferent peripheral nerves that brings information into CNS are called
   a) Motor nerves b) Sensory nerves
   c) Gray matter d) White matter

7) The formed elements of the blood are made up of all the following except
   a) RBC's b) WBC's
   c) Plasma d) Platelets

8) _____ allows air to pass into the lungs.
   a) Trachea b) Aorta c) Pancreas d) Larynx

9) Thoracic and abdominal cavities are separated by the
   a) pleura b) diaphragm
   c) lumbar d) spleen

10) _____ is the structural, fibrous protein found in the dermis.
   a) Collagen b) Heparin c) Sebum d) Melanin

11) _____ is the flexible connective tissues that is attached to bones at the joints.
   a) Adipose b) Cartilage c) Muscle d) Nerve

12) _____ is a point at which an impulse is transmitted from one neuron to another neuron.
   a) Synapse b) Terminal plate
   c) Dendrite d) Nerve center

13) _____ is the body cavity that contains the pituitary gland.
   a) Abdominal b) Cranial
   c) Spinal d) Thoracic

14) _____ controls body temperature, sleep and appetite.
   a) Adrenal gland b) Hypothalamus
   c) Pancreas d) Thalamus

_____

SLR-TC – 430

Seat No.	

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Define inhalation and expiration process in detail.
   2) Draw microscopic structure of human cell and define any 4 components of it.
   3) Explain the structure and any four function of skin.
   4) Define Einthoveris triangle and mention the significance of ECG waveforms.
   5) Draw respiratory system and mention each organ of it.

3. Attempt **any two** : **(6×2=12)**
   1) Explain conduction system of heart with neat figure.
   2) Write a short note on :
      a) Liver – structure and functions
      b) Small intestine – structure and functions
   3) Write a short note on :
      a) Blood groups
      b) Blood composition

SECTION – II

4. Attempt **any 4** : **(4×4=16)**
   1) List any two each type of glands for endocrine and exocrine glands and mention their each of 2 functions.
   2) Draw structure of cochlea with correct namings.

3) Define sympathetic and para sympathetic nervous system and explain their significance and functions.

4) Explain the process of image formation on the retina with necessary diagram.

5) List various endocrine glands and explain any two with their functions.

5. Attempt **any 2** : **(6×2=12)**

1) Write a short note on :

a) Oestrogens and progesterone.

b) Reflex action and reflex arcs.

2) Explain the process of urine formation with necessary diagram.

3) Explain process of hearing mechanism with necessary diagram.

SLR-TC – 430

Seat No.	

Set R

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ is a point at which an impulse is transmitted from one neuron to another neuron.

a) Synapse b) Terminal plate
c) Dendrite d) Nerve center

2) _____ is the body cavity that contains the pituitary gland.

a) Abdominal b) Cranial
c) Spinal d) Thoracic

3) _____ controls body temperature, sleep and appetite.

a) Adrenal gland b) Hypothalamus
c) Pancreas d) Thalamus

4) Saliva contains an enzyme that acts upon _____ of the following nutrients.

a) starches b) proteins
c) fats d) minerals

5) _____ is the master gland of endocrine system.

a) Adrenal b) Pancreas
c) Thyroid d) Pituitary

P.T.O.

6) Sinu atrial node is located at
   a) Right atrium b) Right ventricle
   c) Left atrium d) Left ventricle

7) The circulatory system that supplies O_2 and nutrients to the cells of the body is called
   a) diffusion b) systemic circulation
   c) coagulation d) pulmonary circulation

8) The right lung consists of _____ lobes and left lung has _____ lobes.
   a) 3, 2 b) 2, 3 c) 2, 2 d) 3, 1

9) Afferent peripheral nerves that brings information into CNS are called
   a) Motor nerves b) Sensory nerves
   c) Gray matter d) White matter

10) The formed elements of the blood are made up of all the following except
   a) RBC's b) WBC's
   c) Plasma d) Platelets

11) _____ allows air to pass into the lungs.
   a) Trachea b) Aorta c) Pancreas d) Larynx

12) Thoracic and abdominal cavities are separated by the
   a) pleura b) diaphragm
   c) lumbar d) spleen

13) _____ is the structural, fibrous protein found in the dermis.
   a) Collagen b) Heparin c) Sebum d) Melanin

14) _____ is the flexible connective tissues that is attached to bones at the joints.
   a) Adipose b) Cartilage c) Muscle d) Nerve

_____

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Seat No.	

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Define inhalation and expiration process in detail.
   2) Draw microscopic structure of human cell and define any 4 components of it.
   3) Explain the structure and any four function of skin.
   4) Define Einthoveris triangle and mention the significance of ECG waveforms.
   5) Draw respiratory system and mention each organ of it.

3. Attempt **any two** : **(6×2=12)**
   1) Explain conduction system of heart with neat figure.
   2) Write a short note on :
      a) Liver – structure and functions
      b) Small intestine – structure and functions
   3) Write a short note on :
      a) Blood groups
      b) Blood composition

SECTION – II

4. Attempt **any 4** : **(4×4=16)**
   1) List any two each type of glands for endocrine and exocrine glands and mention their each of 2 functions.
   2) Draw structure of cochlea with correct namings.

Set R

3) Define sympathetic and para sympathetic nervous system and explain their significance and functions.

4) Explain the process of image formation on the retina with necessary diagram.

5) List various endocrine glands and explain any two with their functions.

5. Attempt **any 2** : **(6×2=12)**

1) Write a short note on :
   a) Oestrogens and progesterone.
   b) Reflex action and reflex arcs.

2) Explain the process of urine formation with necessary diagram.

3) Explain process of hearing mechanism with necessary diagram.

SLR-TC – 430

Seat No.	

Set S

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Sinu atrial node is located at
   a) Right atrium b) Right ventricle
   c) Left atrium d) Left ventricle

2) The circulatory system that supplies O_2 and nutrients to the cells of the body is called
   a) diffusion b) systemic circulation
   c) coagulation d) pulmonary circulation

3) The right lung consists of _____ lobes and left lung has _____ lobes.
   a) 3, 2 b) 2, 3 c) 2, 2 d) 3, 1

4) Afferent peripheral nerves that brings information into CNS are called
   a) Motor nerves b) Sensory nerves
   c) Gray matter d) White matter

5) The formed elements of the blood are made up of all the following except
   a) RBC's b) WBC's
   c) Plasma d) Platelets

P.T.O.

6) _____ allows air to pass into the lungs.
a) Trachea b) Aorta c) Pancreas d) Larynx

7) Thoracic and abdominal cavities are separated by the
a) pleura b) diaphragm
c) lumbar d) spleen

8) _____ is the structural, fibrous protein found in the dermis.
a) Collagen b) Heparin c) Sebum d) Melanin

9) _____ is the flexible connective tissues that is attached to bones at the joints.
a) Adipose b) Cartilage c) Muscle d) Nerve

10) _____ is a point at which an impulse is transmitted from one neuron to another neuron.
a) Synapse b) Terminal plate
c) Dendrite d) Nerve center

11) _____ is the body cavity that contains the pituitary gland.
a) Abdominal b) Cranial
c) Spinal d) Thoracic

12) _____ controls body temperature, sleep and appetite.
a) Adrenal gland b) Hypothalamus
c) Pancreas d) Thalamus

13) Saliva contains an enzyme that acts upon _____ of the following nutrients.
a) starches b) proteins
c) fats d) minerals

14) _____ is the master gland of endocrine system.
a) Adrenal b) Pancreas
c) Thyroid d) Pituitary

_____

SLR-TC – 430

Seat No.	

S.E. (Biomedical) (Part – I) (New CBCS) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Define inhalation and expiration process in detail.
   2) Draw microscopic structure of human cell and define any 4 components of it.
   3) Explain the structure and any four function of skin.
   4) Define Einthoveris triangle and mention the significance of ECG waveforms.
   5) Draw respiratory system and mention each organ of it.

3. Attempt **any two** : **(6×2=12)**
   1) Explain conduction system of heart with neat figure.
   2) Write a short note on :
      a) Liver – structure and functions
      b) Small intestine – structure and functions
   3) Write a short note on :
      a) Blood groups
      b) Blood composition

SECTION – II

4. Attempt **any 4** : **(4×4=16)**
   1) List any two each type of glands for endocrine and exocrine glands and mention their each of 2 functions.
   2) Draw structure of cochlea with correct namings.

3) Define sympathetic and para sympathetic nervous system and explain their significance and functions.

4) Explain the process of image formation on the retina with necessary diagram.

5) List various endocrine glands and explain any two with their functions.

5. Attempt **any 2** : **(6×2=12)**

1) Write a short note on :
   a) Oestrogens and progesterone.
   b) Reflex action and reflex arcs.

2) Explain the process of urine formation with necessary diagram.

3) Explain process of hearing mechanism with necessary diagram.

SLR-TC – 431

Seat No.	

Set P

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) Figures to the ***right*** *indicate* ***full*** *marks.*

4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Biosensors are used in

a) medical field b) agricultural field

c) pollution monitoring d) all of the above

2) Restorative biomaterials are designed to recover the shape and the function of the

a) teeth b) bone c) tissue d) none of above

3) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.

a) Glasses b) Fiber c) Metal d) Polymer

4) Polycrystalline ceramics have no _____ components.

a) glassy b) liquid c) solid d) crystal

5) _____ is the ability of a material to perform with an appropriate host response in a specific application.

a) Reduction b) Biocompatibility

c) Oxidation d) None of above

P.T.O.

6) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
   b) Slippage of molecular chains
   c) Straightening of molecular chains
   d) Severe of covalent bonds

7) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

8) Polymers are _____ in nature.
   a) organic b) inorganic c) both a and b d) none

9) _____ polymers cannot be recycled.
   a) Thermoplasts b) Thermosets c) Elastomers d) All polymers

10) _____ types of biomaterials are used as bridges between human tissues and metals.
   a) Polymeric b) Ceramic c) Metallic d) All of these

11) Which of the following statements is true ?
   a) Ceramic materials have low melting point
   b) Porcelain is used as insulating material in spark plugs
   c) Graphite is viscoelastic in nature
   d) Compacting iron oxide powder ceramic tools are prepared

12) _____ materials can be used to manufacture elastomers.
   a) Limestone b) Petroleum c) Alcohol d) All of the above

13) Malleability means
   a) Metals undergo plastic deformation under compressive stresses
   b) Metals can be drawn into wires
   c) Both a and b
   d) None of the above

14) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

SLR-TC – 431

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Classify biomaterial in detail.
   2) Explain applications of stainless steel.
   3) Explain applications of PTFE.
   4) Explain classification of bioceramics and mention its any 2 applications.
   5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**
   1) Explain biocompatibility test performed on Cobalt based alloy.
   2) Explain various applications of composite biomaterials.
   3) Write a short note on (structure, applications) :
      a) Silicon rubber
      b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain which material is suited as bone cement ? Mention its specifications.
   2) Explain materials can be protected from corrosion.
   3) Which materials are used for soft tissue replacement ? Discuss their properties.

Set P

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

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SLR-TC – 431

Seat No.	

Set Q

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) Figures to the ***right*** *indicate* ***full*** *marks.*

4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Polymers are _____ in nature.
   a) organic b) inorganic c) both a and b d) none

2) _____ polymers cannot be recycled.
   a) Thermoplasts b) Thermosets c) Elastomers d) All polymers

3) _____ types of biomaterials are used as bridges between human tissues and metals.
   a) Polymeric b) Ceramic c) Metallic d) All of these

4) Which of the following statements is true ?
   a) Ceramic materials have low melting point
   b) Porcelain is used as insulating material in spark plugs
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   a) Limestone b) Petroleum c) Alcohol d) All of the above

6) Malleability means
   a) Metals undergo plastic deformation under compressive stresses
   b) Metals can be drawn into wires
   c) Both a and b
   d) None of the above

7) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

8) Biosensors are used in
   a) medical field b) agricultural field
   c) pollution monitoring d) all of the above

9) Restorative biomaterials are designed to recover the shape and the function of the
   a) teeth b) bone c) tissue d) none of above

10) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.
   a) Glasses b) Fiber c) Metal d) Polymer

11) Polycrystalline ceramics have no _____ components.
   a) glassy b) liquid c) solid d) crystal

12) _____ is the ability of a material to perform with an appropriate host response in a specific application.
   a) Reduction b) Biocompatibility
   c) Oxidation d) None of above

13) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
   b) Slippage of molecular chains
   c) Straightening of molecular chains
   d) Severe of covalent bonds

14) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

_____

SLR-TC – 431

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Classify biomaterial in detail.
   2) Explain applications of stainless steel.
   3) Explain applications of PTFE.
   4) Explain classification of bioceramics and mention its any 2 applications.
   5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**
   1) Explain biocompatibility test performed on Cobalt based alloy.
   2) Explain various applications of composite biomaterials.
   3) Write a short note on (structure, applications) :
      a) Silicon rubber
      b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain which material is suited as bone cement ? Mention its specifications.
   2) Explain materials can be protected from corrosion.
   3) Which materials are used for soft tissue replacement ? Discuss their properties.

Set Q

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

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SLR-TC – 431

Seat No.	

Set R

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) Figures to the ***right*** *indicate* ***full*** *marks.*

4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ is the ability of a material to perform with an appropriate host response in a specific application.
   a) Reduction b) Biocompatibility
   c) Oxidation d) None of above

2) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
   b) Slippage of molecular chains
   c) Straightening of molecular chains
   d) Severe of covalent bonds

3) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

4) Polymers are _____ in nature.
   a) organic b) inorganic c) both a and b d) none

5) _____ polymers cannot be recycled.
   a) Thermoplasts b) Thermosets c) Elastomers d) All polymers

P.T.O.

6) _____ types of biomaterials are used as bridges between human tissues and metals.
   a) Polymeric b) Ceramic c) Metallic d) All of these

7) Which of the following statements is true ?
   a) Ceramic materials have low melting point
   b) Porcelain is used as insulating material in spark plugs
   c) Graphite is viscoelastic in nature
   d) Compacting iron oxide powder ceramic tools are prepared

8) _____ materials can be used to manufacture elastomers.
   a) Limestone b) Petroleum c) Alcohol d) All of the above

9) Malleability means
   a) Metals undergo plastic deformation under compressive stresses
   b) Metals can be drawn into wires
   c) Both a and b
   d) None of the above

10) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

11) Biosensors are used in
   a) medical field b) agricultural field
   c) pollution monitoring d) all of the above

12) Restorative biomaterials are designed to recover the shape and the function of the
   a) teeth b) bone c) tissue d) none of above

13) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.
   a) Glasses b) Fiber c) Metal d) Polymer

14) Polycrystalline ceramics have no _____ components.
   a) glassy b) liquid c) solid d) crystal

_____

SLR-TC – 431

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Classify biomaterial in detail.
   2) Explain applications of stainless steel.
   3) Explain applications of PTFE.
   4) Explain classification of bioceramics and mention its any 2 applications.
   5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**
   1) Explain biocompatibility test performed on Cobalt based alloy.
   2) Explain various applications of composite biomaterials.
   3) Write a short note on (structure, applications) :
      a) Silicon rubber
      b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain which material is suited as bone cement ? Mention its specifications.
   2) Explain materials can be protected from corrosion.
   3) Which materials are used for soft tissue replacement ? Discuss their properties.

Set R

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

———————

SLR-TC – 431

Seat No.	

Set S

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ types of biomaterials are used as bridges between human tissues and metals.
a) Polymeric b) Ceramic c) Metallic d) All of these

2) Which of the following statements is true ?
a) Ceramic materials have low melting point
b) Porcelain is used as insulating material in spark plugs
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3) _____ materials can be used to manufacture elastomers.
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a) Metals undergo plastic deformation under compressive stresses
b) Metals can be drawn into wires
c) Both a and b
d) None of the above

P.T.O.

5) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

6) Biosensors are used in
   a) medical field b) agricultural field
   c) pollution monitoring d) all of the above

7) Restorative biomaterials are designed to recover the shape and the function of the
   a) teeth b) bone c) tissue d) none of above

8) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.
   a) Glasses b) Fiber c) Metal d) Polymer

9) Polycrystalline ceramics have no _____ components.
   a) glassy b) liquid c) solid d) crystal

10) _____ is the ability of a material to perform with an appropriate host response in a specific application.
   a) Reduction b) Biocompatibility
   c) Oxidation d) None of above

11) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
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   c) Straightening of molecular chains
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12) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

13) Polymers are _____ in nature.
   a) organic b) inorganic c) both a and b d) none

14) _____ polymers cannot be recycled.
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_____

SLR-TC – 431

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Classify biomaterial in detail.
   2) Explain applications of stainless steel.
   3) Explain applications of PTFE.
   4) Explain classification of bioceramics and mention its any 2 applications.
   5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**
   1) Explain biocompatibility test performed on Cobalt based alloy.
   2) Explain various applications of composite biomaterials.
   3) Write a short note on (structure, applications) :
      a) Silicon rubber
      b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain which material is suited as bone cement ? Mention its specifications.
   2) Explain materials can be protected from corrosion.
   3) Which materials are used for soft tissue replacement ? Discuss their properties.

Set S

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

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SLR-TC – 432

Seat No.	

Set **P**

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Shunting the ac component away from the load is the task of a _____
   a) transformer b) filter c) regulator d) rectifier

2) With a 12 V supply, a silicon diode and a 370 Ω resistor in series, _____ voltage will be dropped across the diode.
   a) 0.3 V b) 0.7 V c) 0.9 V d) 1.4 V

3) The base of a transistor is _____ doped.
   a) heavily b) moderately
   c) lightly d) none of the above

4) The input impedance of a transistor is ____
   a) high b) low c) very high d) almost zero

5) The value of α of a transistor is
   a) more than 1 b) less than 1
   c) 1 d) none of the above

6) The relation between β and α is
   a) $\beta = 1/(1 - \alpha)$ b) $\beta = (1 - \alpha)/\alpha$
   c) $\beta = \alpha/(1 - \alpha)$ d) $\beta = \alpha/(1 + \alpha)$

7) $IC = \beta I_B +$ _____
   a) I_{CBO} b) I_C c) αI_{CEO} d) αI_E

P.T.O.

8) A JFET is also called as _____ transistor.
   a) unipolar b) bipolar
   c) unijunction d) none of the above

9) _____ has the lowest noise level.
   a) MOSFET b) Diode
   c) Zener diode d) JFET

10) A certain p channel E-MOSFET has $V_{GS(th)} = -2V$. If $V_{GS} = 0$ V, then I_D is _____
   a) 0 mA b) $I_{D\ (on)}$ c) Maximum d) I_{DSS}

11) IGBT is a modern power semiconductor device that combine the characteristic of _____
   a) BJT b) BJT and MOSFET
   c) MOSFET and SCR d) SCR

12) _____ semiconductor device acts like a diode and 2 transistors.
   a) UJT b) Diac c) Triac d) SCR

13) The _____ is defined as the time output is active divided by the total period of the output signal.
   a) on time b) off time
   c) duty cycle d) active ratio

14) _____ controls the output pulse width of a one shot.
   a) The clock frequency b) Width of clock pulse
   c) RL time constant d) RC time constant

_____

SLR-TC – 432

Seat No.	

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date Monday, 7-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

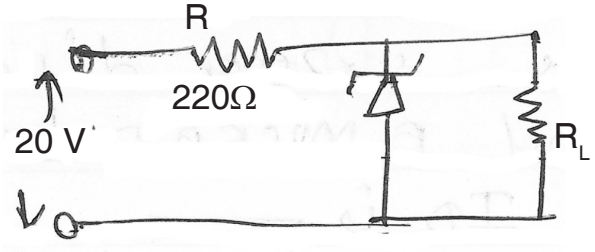
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) A dc voltage with peak ripple voltage not exceeding 5 V is required to supply a 500 Ω load. Determine following if inductor filter and full wave rectifier is used.
   a) Inductance required
   b) Input voltage required.

2) Define following performance parameter of a voltage regulator :
   a) Line and load regulation.
   b) Ripple rejection.

3) Determine V_L, I_L, I_Z and I_R for network below :



Given ,
$V_Z = 20$ V
$P_Z = 400$ mw
$R_L = 400\ \Omega$

4) Explain working of emitter follower regulator with necessary diagram.

5) Explain need of biasing of BJT and describe stability factor.

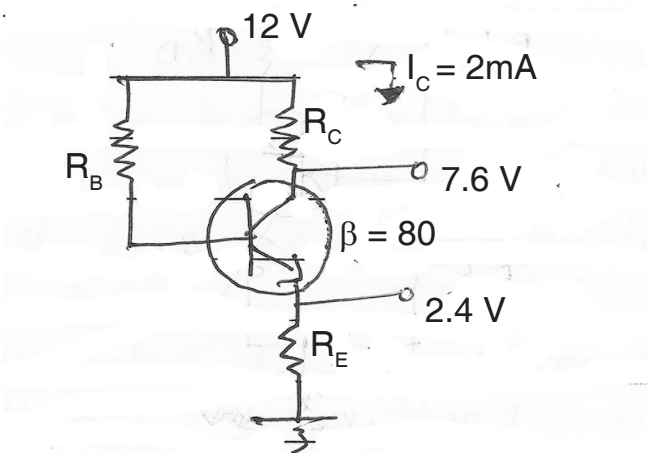
3. Attempt **any 2** questions : **(6×2=12)**

1) Design a zener voltage regulator for following specification.
   $V_{in} = 20 \pm 2V$, $V_o = 6V$, $I_C = 50$ mA, $I_z = 5$ mA, $P_Z = 0.5$ W.

2) State the expressions for ripple factor of a capacitor input filter with half wave and full wave rectifier and explain its significance.

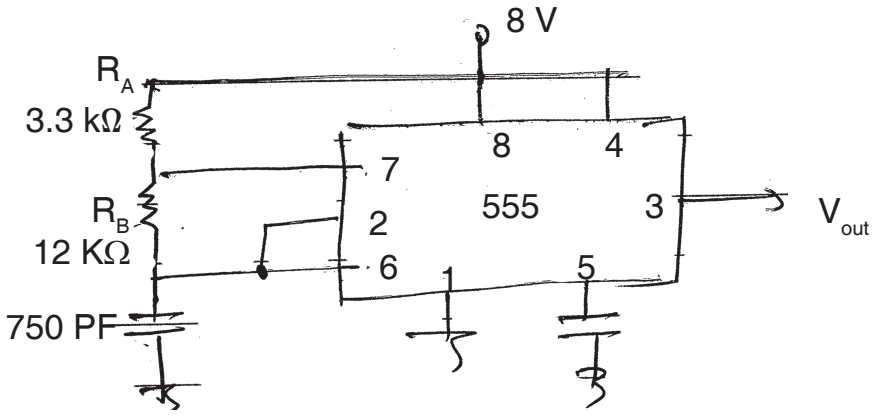
Set P

3) Determine R_C, R_E, R_B, V_{CE} and V_B for given bias circuit.



SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Explain BJT as a switch with the help of proper circuit and waveform.
   2) Explain various methods of biasing JFET and MOSFET.
   3) Differentiate between DIAC and TRIAC.
   4) What is the duty cycle of the waveform at the output of the circuit given below.

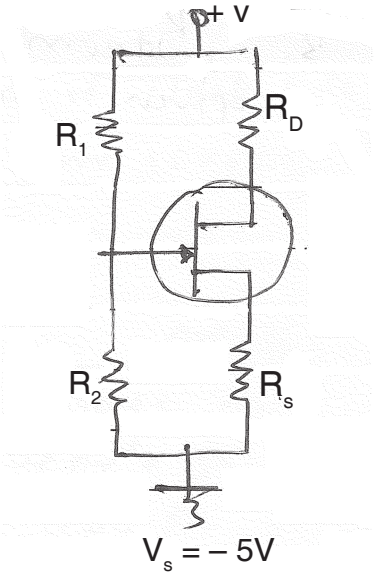


   5) Draw and explain V-I characteristic of MOSFET.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design JFET circuit with voltage divider biasing as shown.

Given : I_{DSS} = 12 mA, V_p = –3.5 V, λ = 0, $R_1 + R_2$ = 100 kΩ, I_{DSQ} = 5 mA, V_{DSQ} = 5 V.



2) Define following designing specification for single stage CE amplifier.
   a) Band width
   b) Voltage gain
   c) Bias stability and emitter voltage.

3) Draw and explain working of pulse generator circuit using IC 74121 with waveform.

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SLR-TC – 432

Seat No.	

Set Q

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) A JFET is also called as _____ transistor.
   a) unipolar b) bipolar
   c) unijunction d) none of the above

2) _____ has the lowest noise level.
   a) MOSFET b) Diode
   c) Zener diode d) JFET

3) A certain p channel E-MOSFET has $V_{GS(th)} = -2V$. If $V_{GS} = 0$ V, then I_D is _____
   a) 0mA b) $I_{D(on)}$ c) Maximum d) I_{DSS}

4) IGBT is a modern power semiconductor device that combine the characteristic of _____
   a) BJT b) BJT and MOSFET
   c) MOSFET and SCR d) SCR

P.T.O.

5) _____ semiconductor device acts like a diode and 2 transistors.
   a) UJT b) Diac c) Triac d) SCR

6) The _____ is defined as the time output is active divided by the total period of the output signal.
   a) on time b) off time
   c) duty cycle d) active ratio

7) _____ controls the output pulse width of a one shot.
   a) The clock frequency b) Width of clock pulse
   c) RL time constant d) RC time constant

8) Shunting the ac component away from the load is the task of a _____
   a) transformer b) filter c) regulator d) rectifier

9) With a 12 V supply, a silicon diode and a 370 Ω resistor in series, _____ voltage will be dropped across the diode.
   a) 0.3 V b) 0.7 V c) 0.9 V d) 1.4 V

10) The base of a transistor is _____ doped.
   a) heavily b) moderately
   c) lightly d) none of the above

11) The input impedance of a transistor is ____
   a) high b) low c) very high d) almost zero

12) The value of α of a transistor is
   a) more than 1 b) less than 1
   c) 1 d) none of the above

13) The relation between β and α is
   a) $\beta = 1/(1 - \alpha)$ b) $\beta = (1 - \alpha)/\alpha$
   c) $\beta = \alpha/(1 - \alpha)$ d) $\beta = \alpha/(1 + \alpha)$

14) $IC = \beta I_B +$ _____
   a) I_{CBO} b) I_C c) αI_{CEO} d) αI_E

_____

SLR-TC – 432

Seat No.	

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date Monday, 7-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

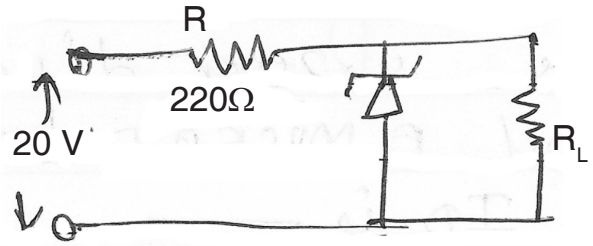
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) A dc voltage with peak ripple voltage not exceeding 5 V is required to supply a 500 Ω load. Determine following if inductor filter and full wave rectifier is used.
   a) Inductance required
   b) Input voltage required.

2) Define following performance parameter of a voltage regulator :
   a) Line and load regulation.
   b) Ripple rejection.

3) Determine V_L, I_L, I_Z and I_R for network below :



Given ,

$V_Z = 20$ V

$P_Z = 400$ mw

$R_L = 400\ \Omega$

4) Explain working of emitter follower regulator with necessary diagram.

5) Explain need of biasing of BJT and describe stability factor.

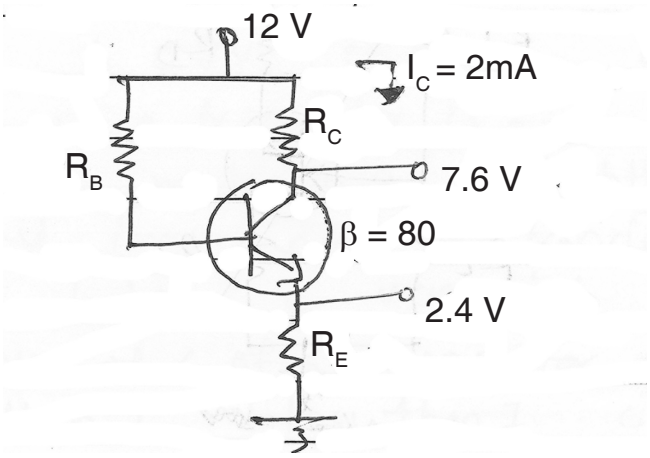
3. Attempt **any 2** questions : **(6×2=12)**

1) Design a zener voltage regulator for following specification.
   $V_{in} = 20 \pm 2V$, $V_o = 6V$, $I_C = 50$ mA, $I_z = 5$ mA, $P_Z = 0.5$ W.

2) State the expressions for ripple factor of a capacitor input filter with half wave and full wave rectifier and explain its significance.

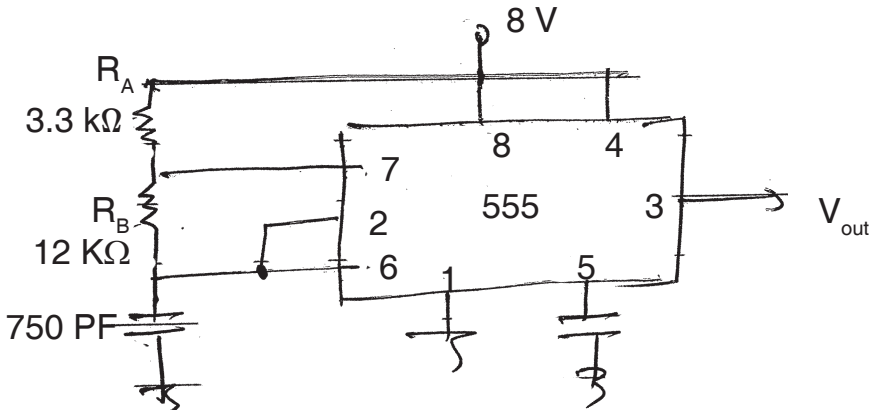
Set Q

3) Determine R_C, R_E, R_B, V_{CE} and V_B for given bias circuit.



SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Explain BJT as a switch with the help of proper circuit and waveform.
   2) Explain various methods of biasing JFET and MOSFET.
   3) Differentiate between DIAC and TRIAC.
   4) What is the duty cycle of the waveform at the output of the circuit given below.

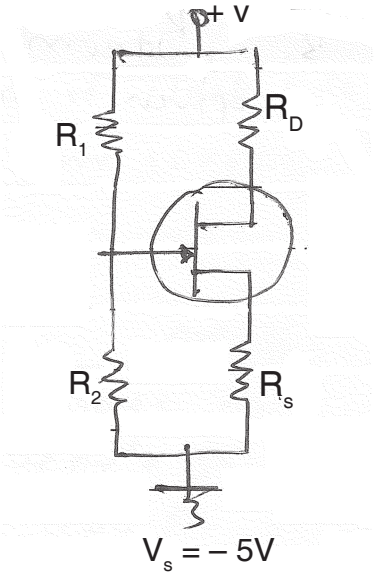


   5) Draw and explain V-I characteristic of MOSFET.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design JFET circuit with voltage divider biasing as shown.

Given : I_{DSS} = 12 mA, V_p = –3.5 V, λ = 0, $R_1 + R_2$ = 100 kΩ, I_{DSQ} = 5 mA, V_{DSQ} = 5 V.



2) Define following designing specification for single stage CE amplifier.
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   b) Voltage gain
   c) Bias stability and emitter voltage.

3) Draw and explain working of pulse generator circuit using IC 74121 with waveform.

SLR-TC – 432

Seat No.	

Set **R**

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The value of α of a transistor is
   a) more than 1 b) less than 1
   c) 1 d) none of the above

2) The relation between β and α is
   a) $\beta = 1/(1 - \alpha)$ b) $\beta = (1 - \alpha)/\alpha$
   c) $\beta = \alpha/(1 - \alpha)$ d) $\beta = \alpha/(1 + \alpha)$

3) $IC = \beta I_B +$ _____
   a) I_{CBO} b) I_C c) αI_{CEO} d) αI_E

4) A JFET is also called as _____ transistor.
   a) unipolar b) bipolar
   c) unijunction d) none of the above

5) _____ has the lowest noise level.
   a) MOSFET b) Diode
   c) Zener diode d) JFET

6) A certain p channel E-MOSFET has $V_{GS(th)} = -2V$. If $V_{GS} = 0$ V, then I_D is _____
   a) 0 mA b) $I_{D\,(on)}$ c) Maximum d) I_{DSS}

P.T.O.

7) IGBT is a modern power semiconductor device that combine the characteristic of _____
   a) BJT b) BJT and MOSFET
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8) _____ semiconductor device acts like a diode and 2 transistors.
   a) UJT b) Diac c) Triac d) SCR

9) The _____ is defined as the time output is active divided by the total period of the output signal.
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10) _____ controls the output pulse width of a one shot.
   a) The clock frequency b) Width of clock pulse
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11) Shunting the ac component away from the load is the task of a _____
   a) transformer b) filter c) regulator d) rectifier

12) With a 12 V supply, a silicon diode and a 370 Ω resistor in series, _____ voltage will be dropped across the diode.
   a) 0.3 V b) 0.7 V c) 0.9 V d) 1.4 V

13) The base of a transistor is _____ doped.
   a) heavily b) moderately
   c) lightly d) none of the above

14) The input impedance of a transistor is ____
   a) high b) low c) very high d) almost zero

_____

SLR-TC – 432

Seat No.	

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date Monday, 7-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) A dc voltage with peak ripple voltage not exceeding 5 V is required to supply a 500 Ω load. Determine following if inductor filter and full wave rectifier is used.
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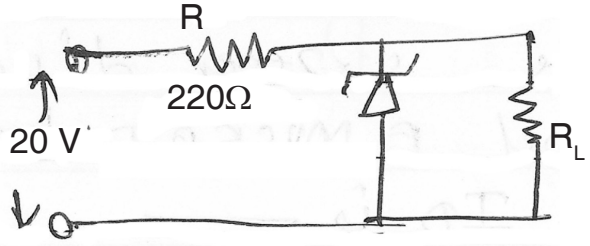
   b) Ripple rejection.

3) Determine V_L, I_L, I_Z and I_R for network below :



Given ,
V_Z = 20 V
P_Z = 400 mw
R_L = 400 Ω .

4) Explain working of emitter follower regulator with necessary diagram.

5) Explain need of biasing of BJT and describe stability factor.

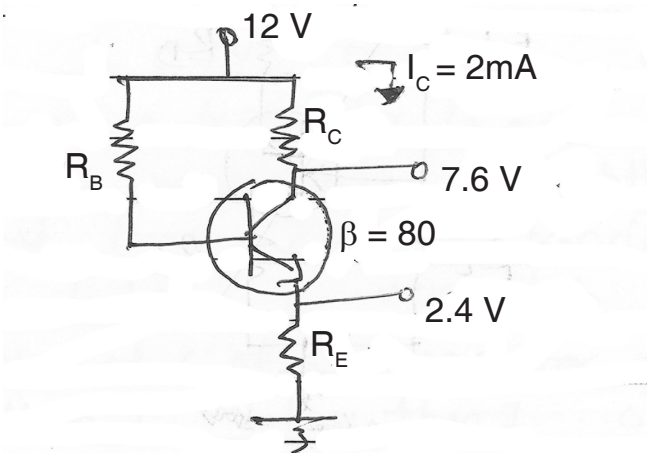
3. Attempt **any 2** questions : **(6×2=12)**

1) Design a zener voltage regulator for following specification.
   V_{in} = 20 ± 2V, V_o = 6V, I_C = 50 mA, I_z = 5 mA, P_Z = 0.5 W.

2) State the expressions for ripple factor of a capacitor input filter with half wave and full wave rectifier and explain its significance.

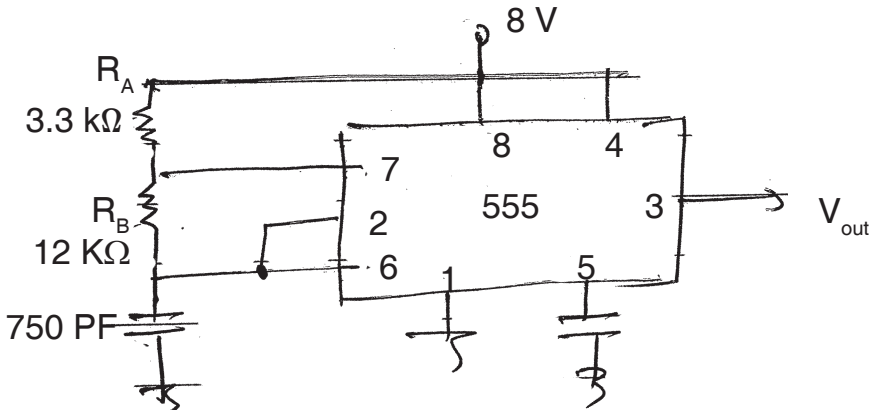
Set R

3) Determine R_C, R_E, R_B, V_{CE} and V_B for given bias circuit.



SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Explain BJT as a switch with the help of proper circuit and waveform.
   2) Explain various methods of biasing JFET and MOSFET.
   3) Differentiate between DIAC and TRIAC.
   4) What is the duty cycle of the waveform at the output of the circuit given below.

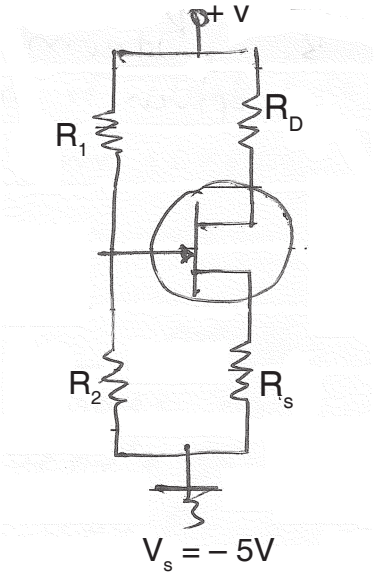


   5) Draw and explain V-I characteristic of MOSFET.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design JFET circuit with voltage divider biasing as shown.

Given : I_{DSS} = 12 mA, V_p = –3.5 V, λ = 0, $R_1 + R_2$ = 100 kΩ, I_{DSQ} = 5 mA, V_{DSQ} = 5 V.



2) Define following designing specification for single stage CE amplifier.
   a) Band width
   b) Voltage gain
   c) Bias stability and emitter voltage.

3) Draw and explain working of pulse generator circuit using IC 74121 with waveform.

———————

SLR-TC – 432

Seat No.	

Set S

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) A certain p channel E-MOSFET has $V_{GS(th)} = -2V$. If $V_{GS} = 0$ V, then I_D is _____
a) 0 mA b) $I_{D\ (on)}$ c) Maximum d) I_{DSS}

2) IGBT is a modern power semiconductor device that combine the characteristic of _____
a) BJT b) BJT and MOSFET
c) MOSFET and SCR d) SCR

3) _____ semiconductor device acts like a diode and 2 transistors.
a) UJT b) Diac c) Triac d) SCR

4) The _____ is defined as the time output is active divided by the total period of the output signal.
a) on time b) off time
c) duty cycle d) active ratio

5) _____ controls the output pulse width of a one shot.
a) The clock frequency b) Width of clock pulse
c) RL time constant d) RC time constant

6) Shunting the ac component away from the load is the task of a _____
a) transformer b) filter c) regulator d) rectifier

P.T.O.

7) With a 12 V supply, a silicon diode and a 370 Ω resistor in series, _____ voltage will be dropped across the diode.
   a) 0.3 V b) 0.7 V c) 0.9 V d) 1.4 V

8) The base of a transistor is _____ doped.
   a) heavily b) moderately
   c) lightly d) none of the above

9) The input impedance of a transistor is ____
   a) high b) low c) very high d) almost zero

10) The value of α of a transistor is
   a) more than 1 b) less than 1
   c) 1 d) none of the above

11) The relation between β and α is
   a) $\beta = 1/(1 - \alpha)$ b) $\beta = (1 - \alpha)/\alpha$
   c) $\beta = \alpha/(1 - \alpha)$ d) $\beta = \alpha/(1 + \alpha)$

12) $IC = \beta I_B +$ _____
   a) I_{CBO} b) I_C c) αI_{CEO} d) αI_E

13) A JFET is also called as _____ transistor.
   a) unipolar b) bipolar
   c) unijunction d) none of the above

14) _____ has the lowest noise level.
   a) MOSFET b) Diode
   c) Zener diode d) JFET

_____

SLR-TC – 432

Seat No.	

S.E. (Biomedical Engg.) (New CBCS) (Part – I) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date Monday, 7-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

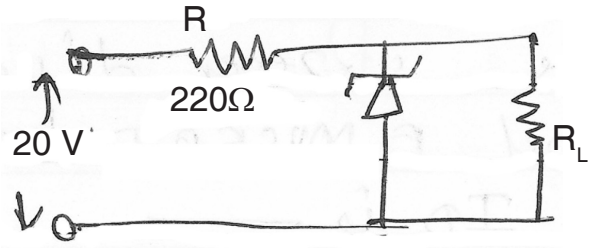
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) A dc voltage with peak ripple voltage not exceeding 5 V is required to supply a 500 Ω load. Determine following if inductor filter and full wave rectifier is used.
   a) Inductance required
   b) Input voltage required.

2) Define following performance parameter of a voltage regulator :
   a) Line and load regulation.
   b) Ripple rejection.

3) Determine V_L, I_L, I_Z and I_R for network below :



Given ,
$V_Z = 20$ V
$P_Z = 400$ mw
$R_L = 400\ \Omega$.

4) Explain working of emitter follower regulator with necessary diagram.

5) Explain need of biasing of BJT and describe stability factor.

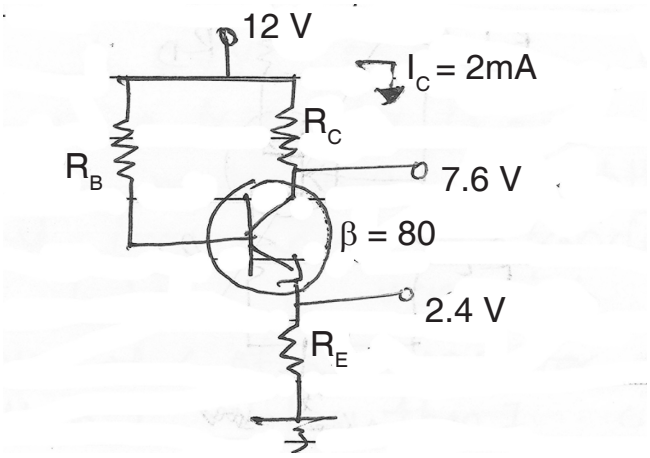
3. Attempt **any 2** questions : **(6×2=12)**

1) Design a zener voltage regulator for following specification.
   $V_{in} = 20 \pm 2V$, $V_o = 6V$, $I_C = 50$ mA, $I_z = 5$ mA, $P_Z = 0.5$ W.

2) State the expressions for ripple factor of a capacitor input filter with half wave and full wave rectifier and explain its significance.

Set S

3) Determine R_C, R_E, R_B, V_{CE} and V_B for given bias circuit.



SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Explain BJT as a switch with the help of proper circuit and waveform.
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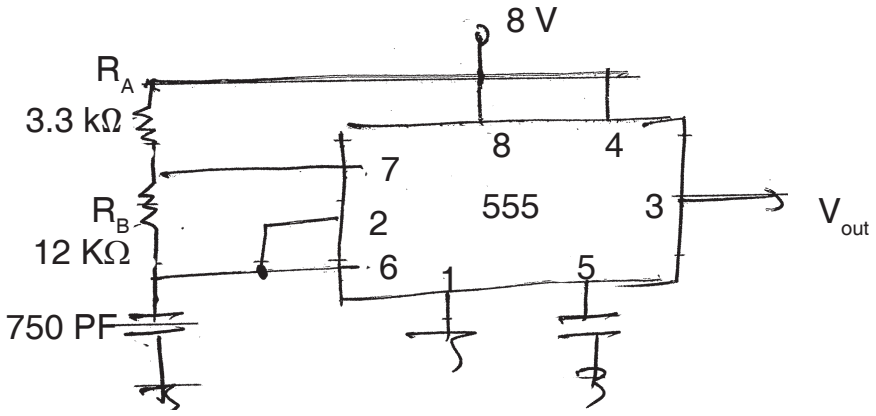
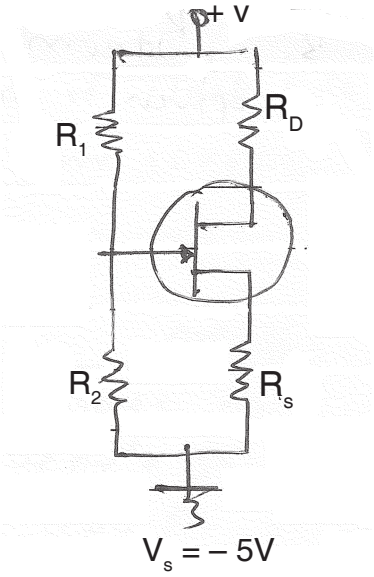


   5) Draw and explain V-I characteristic of MOSFET.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design JFET circuit with voltage divider biasing as shown.

Given : I_{DSS} = 12 mA, V_p = –3.5 V, λ = 0, $R_1 + R_2$ = 100 kΩ, I_{DSQ} = 5 mA, V_{DSQ} = 5 V.



2) Define following designing specification for single stage CE amplifier.
   a) Band width
   b) Voltage gain
   c) Bias stability and emitter voltage.

3) Draw and explain working of pulse generator circuit using IC 74121 with waveform.

———————

SLR-TC – 433

Seat No.	

Set P

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ is not a bilateral.
a) Resistor b) Diode c) Capacitor d) Inductor

2) In active filter, _____ element is absent.
a) Inductor b) Capacitor
c) Both a) and b) d) Resistor

3) Reactive power drawn by a pure resistor is _____
a) 0 b) Minimum
c) Maximum d) Average

4) Under resonance condition, the power factor of a system is _____
a) Unity b) Lagging c) Leading d) Any of above

5) In an AC circuit containing pure inductance, the voltage applied is 120V, 50Hz, while the current is 10A. The value of inductance will be _____
a) 35 mH b) 34 mH c) 30 mH d) 38 mH

6) In 2 port network, $Z_{12} = Z_{21}$ indicates _____ property.
a) Unilateral b) Bilateral c) Linear d) Non-linear

P.T.O.

7) Advantage of active filter is _____
   a) Do not offer again
   b) Easy to tune
   c) Both a) and b)
   d) Derive high impedance load

8) Number of an ideal value of attenuation for the frequencies in pass band especially for cascade configuration is _____
   a) Zero
   b) Unity
   c) Infinity
   d) Unpredictable

9) A 2 port network is driven by a source V_s = 100V in series with 5Ω and terminated in a 25Ω resistor. The impedance parameters are _____
   a) $\begin{bmatrix} 20 & 2 \\ 40 & 10 \end{bmatrix}$
   b) $\begin{bmatrix} 20 & 40 \\ 2 & 10 \end{bmatrix}$
   c) $\begin{bmatrix} 10 & 40 \\ 10 & 20 \end{bmatrix}$
   d) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$

10) In series R – L circuit, power factor can be defined as _____
   a) R/Z
   b) P/S
   c) V_r / V
   d) All above

11) Superposition theorem is not applicable for
   a) Current calculation
   b) Voltage calculation
   c) Power calculation
   d) Energy calculation

12) A circuit with a resistor, inductor and capacitor in series is resonant at f_0 Hz. If all the components values are now doubled, the new resonant frequency is _____
   a) $2f_0$
   b) f_0
   c) $f_0/4$
   d) $f_0/2$

13) In a series R-L-C circuit, R = 2kΩ, L = 1H, C = 1/400 μf. The resonant frequency is _____
   a) 2×10^4 Hz
   b) $\frac{1}{\pi} \times 10^4$ Hz
   c) 10^4Hz
   d) $2\pi \times 10^4$ Hz

14) A network contains only an independent current source and resistors. If the values of all resistors are doubled. The value of the node voltages will _____
   a) Becomes half
   b) Remain unchanged
   c) Becomes double
   d) None of the above

_____

SLR-TC – 433

Seat No.	

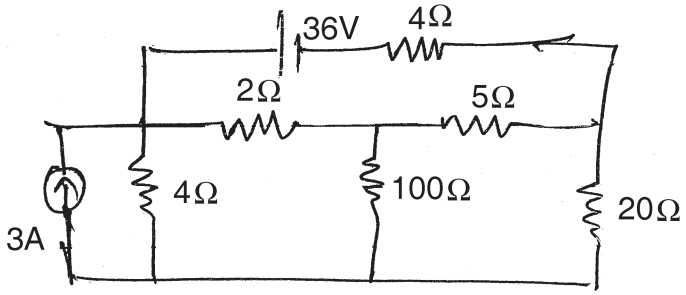
S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

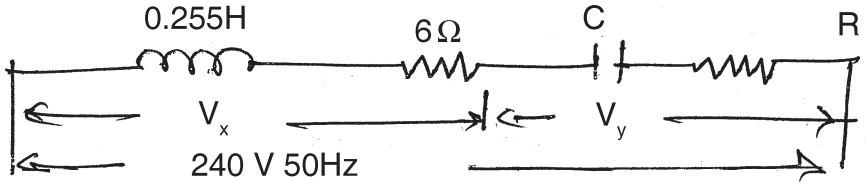
2. Attempt **any 4** questions : **(4×4=16)**

1) Determine the current through the 5Ω resistor using nodal analysis.



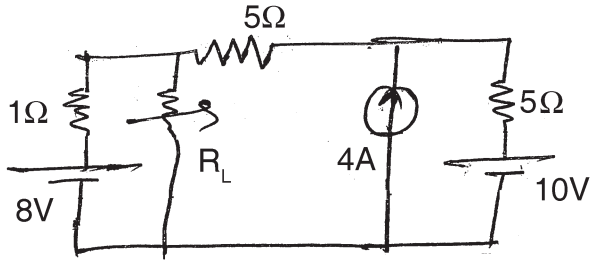
2) State and explain superposition theorem.

3) Find the values of R and C, so that $V_x = 3V_y$, V_x and V_y are in quadrature.



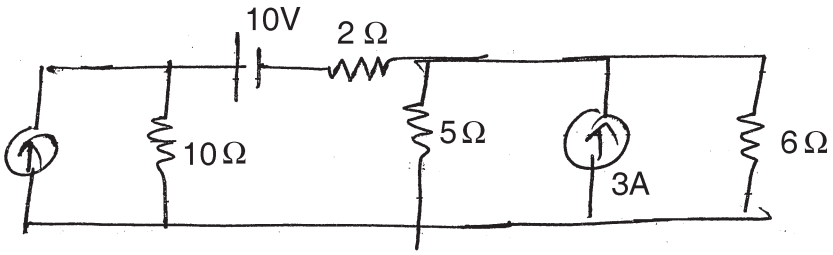
4) Compare between Thevenin's theorem and Norton's theorem.

5) For the circuit shown, find the value of resistance R_L for maximum power and calculate maximum power.

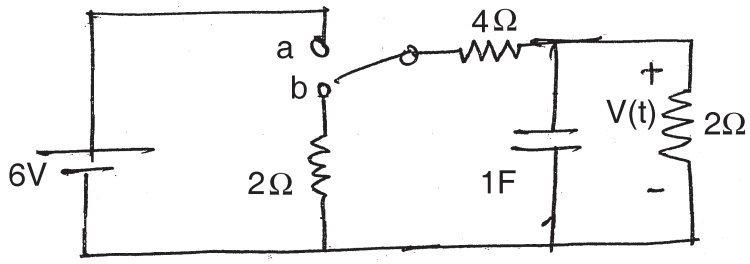


3. Attempt **any two** questions : **(6×2=12)**

1) Using Thevenin's theorem, find the current through the 6Ω resistor.



2) For the network shown below, the switch is moved from 'a' to 'b' at t = 0, find V(t).



3) Write a short note on :

a) Mesh and Nodal analysis.

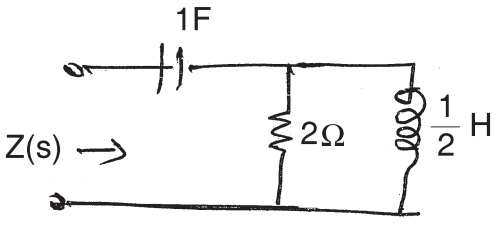
b) Current and voltage source transformation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

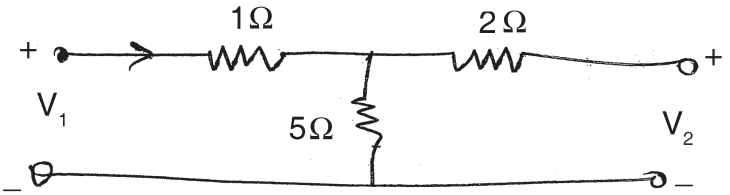
1) With the help of neat diagram, explain working of band pass and band reject filter.

2) Find poles and zeros of the impedance of the following network and plot them on S-plane.



3) Derive condition for reciprocity for open circuit impedance parameter.

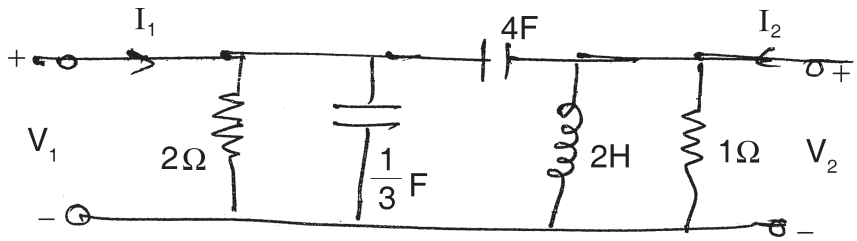
4) Find the transmission parameter for the network shown.



5) Explain how 2 port network can be represented by an equivalent T network.

5. Attempt **any 2** questions : **(6×2=12)**

1) Find Y parameter for shown network.



2) Draw and explain concept of notch filtering using RC and RL circuits.

3) Write a short note on :

a) ABCD parameter in term of Z parameter.

b) ABCD parameter in term of Y parameter.

Set P

SLR-TC – 433

Seat No.	

Set Q

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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2) A 2 port network is driven by a source V_s = 100V in series with 5Ω and terminated in a 25Ω resistor. The impedance parameters are _____

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3) In series R – L circuit, power factor can be defined as _____

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a) Current calculation b) Voltage calculation

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5) A circuit with a resistor, inductor and capacitor in series is resonant at f_0 Hz. If all the components values are now doubled, the new resonant frequency is _____

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P.T.O.

6) In a series R-L-C circuit, R = 2kΩ, L = 1H, C = 1/400 μf. The resonant frequency is _____

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7) A network contains only an independent current source and resistors. If the values of all resistors are doubled. The value of the node voltages will _____

a) Becomes half b) Remain unchanged
c) Becomes double d) None of the above

8) _____ is not a bilateral.

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9) In active filter, _____ element is absent.

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_____

SLR-TC – 433

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

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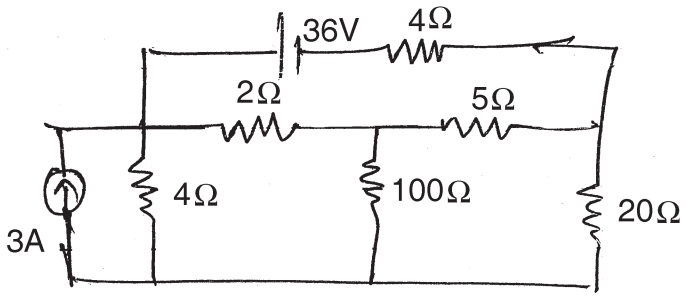
1) Determine the current through the 5Ω resistor using nodal analysis.



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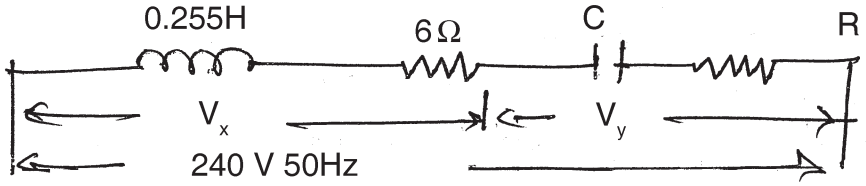
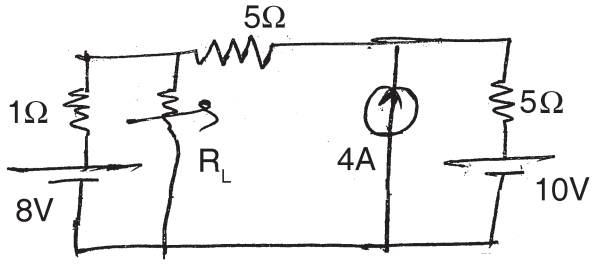


4) Compare between Thevenin's theorem and Norton's theorem.

5) For the circuit shown, find the value of resistance R_L for maximum power and calculate maximum power.



Set Q

3. Attempt **any two** questions : **(6×2=12)**

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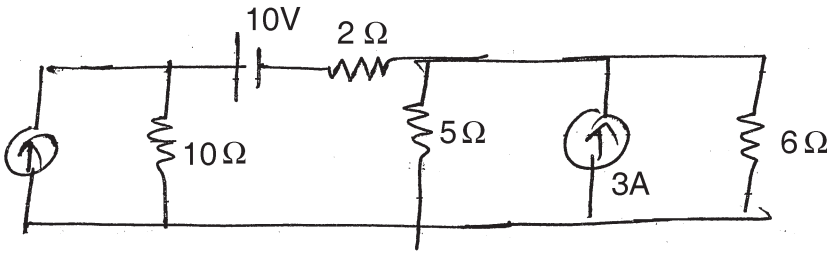

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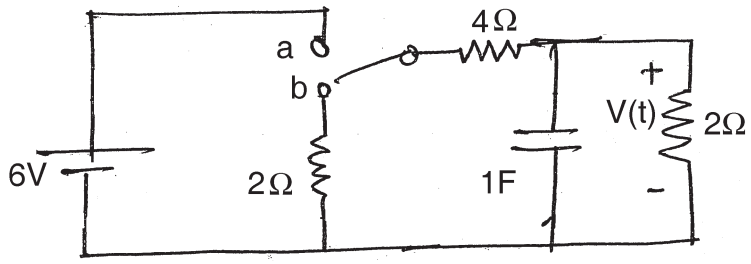

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SECTION – II

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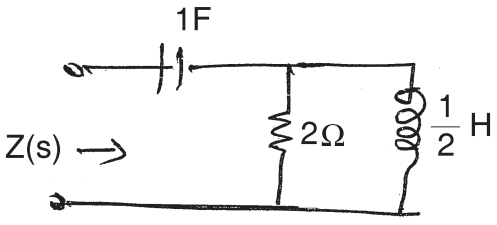

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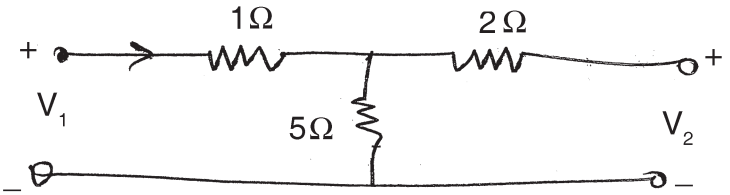

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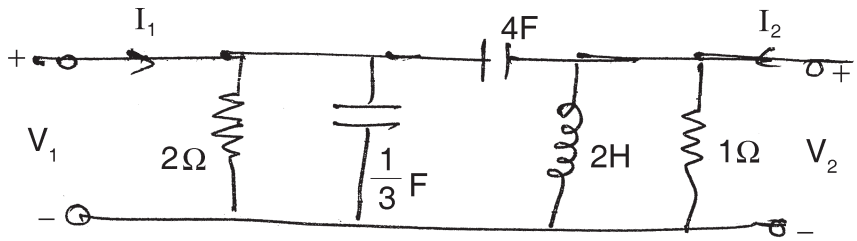


2) Draw and explain concept of notch filtering using RC and RL circuits.

3) Write a short note on :

a) ABCD parameter in term of Z parameter.

b) ABCD parameter in term of Y parameter.

Set Q

SLR-TC – 433

Seat No.	

Set R

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In an AC circuit containing pure inductance, the voltage applied is 120V, 50Hz, while the current is 10A. The value of inductance will be _____

a) 35 mH b) 34 mH c) 30 mH d) 38 mH

2) In 2 port network, $Z_{12} = Z_{21}$ indicates _____ property.

a) Unilateral b) Bilateral c) Linear d) Non-linear

3) Advantage of active filter is _____

a) Do not offer again b) Easy to tune

c) Both a) and b) d) Derive high impedance load

4) Number of an ideal value of attenuation for the frequencies in pass band especially for cascade configuration is _____

a) Zero b) Unity c) Infinity d) Unpredictable

5) A 2 port network is driven by a source V_s = 100V in series with 5Ω and terminated in a 25Ω resistor. The impedance parameters are _____

a) $\begin{bmatrix} 20 & 2 \\ 40 & 10 \end{bmatrix}$ b) $\begin{bmatrix} 20 & 40 \\ 2 & 10 \end{bmatrix}$ c) $\begin{bmatrix} 10 & 40 \\ 10 & 20 \end{bmatrix}$ d) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$

P.T.O.

6) In series R – L circuit, power factor can be defined as _____
   a) R/Z b) P/S c) V_r/V d) All above

7) Superposition theorem is not applicable for
   a) Current calculation b) Voltage calculation
   c) Power calculation d) Energy calculation

8) A circuit with a resistor, inductor and capacitor in series is resonant at f_0 Hz. If all the components values are now doubled, the new resonant frequency is _____
   a) $2f_0$ b) f_0 c) $f_0/4$ d) $f_0/2$

9) In a series R-L-C circuit, R = 2kΩ, L = 1H, C = 1/400 μf. The resonant frequency is _____
   a) 2×10^4 Hz b) $\frac{1}{\pi} \times 10^4$Hz c) 10^4Hz d) $2\pi \times 10^4$ Hz

10) A network contains only an independent current source and resistors. If the values of all resistors are doubled. The value of the node voltages will _____
   a) Becomes half b) Remain unchanged
   c) Becomes double d) None of the above

11) _____ is not a bilateral.
   a) Resistor b) Diode c) Capacitor d) Inductor

12) In active filter, _____ element is absent.
   a) Inductor b) Capacitor
   c) Both a) and b) d) Resistor

13) Reactive power drawn by a pure resistor is _____
   a) 0 b) Minimum
   c) Maximum d) Average

14) Under resonance condition, the power factor of a system is _____
   a) Unity b) Lagging c) Leading d) Any of above

_____

SLR-TC – 433

Seat No.	

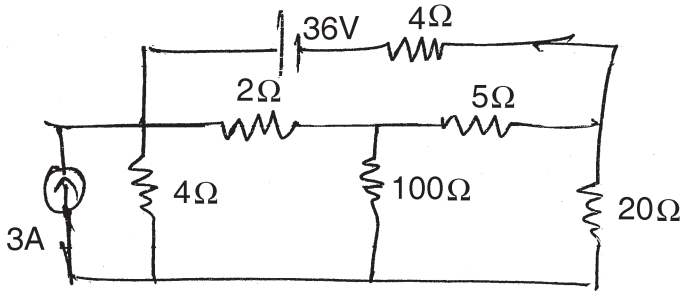
S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

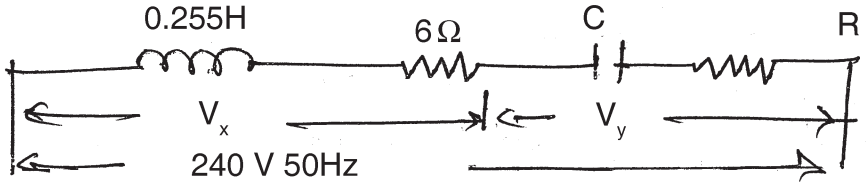
2. Attempt **any 4** questions : **(4×4=16)**

1) Determine the current through the 5Ω resistor using nodal analysis.



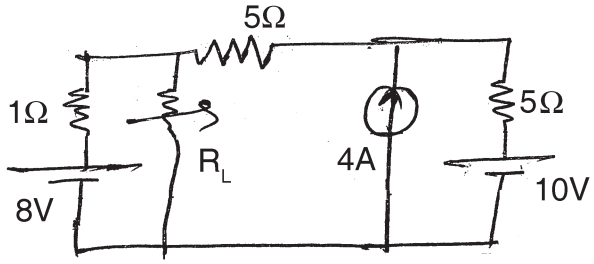
2) State and explain superposition theorem.

3) Find the values of R and C, so that $V_x = 3V_y$, V_x and V_y are in quadrature.



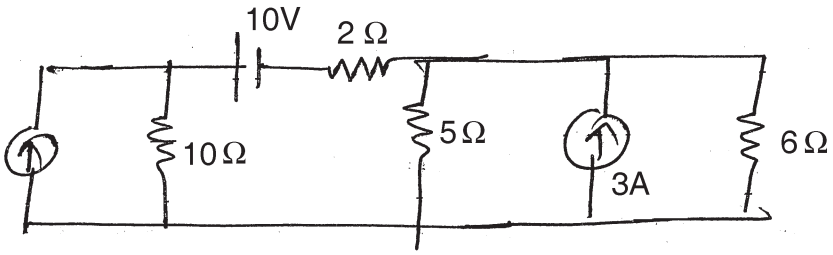
4) Compare between Thevenin's theorem and Norton's theorem.

5) For the circuit shown, find the value of resistance R_L for maximum power and calculate maximum power.

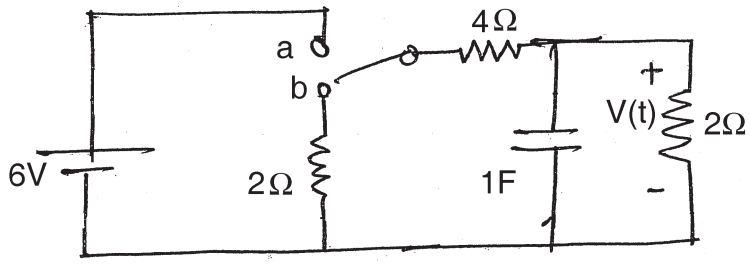


3. Attempt **any two** questions : **(6×2=12)**

1) Using Thevenin's theorem, find the current through the 6Ω resistor.



2) For the network shown below, the switch is moved from 'a' to 'b' at t = 0, find V(t).



3) Write a short note on :

a) Mesh and Nodal analysis.

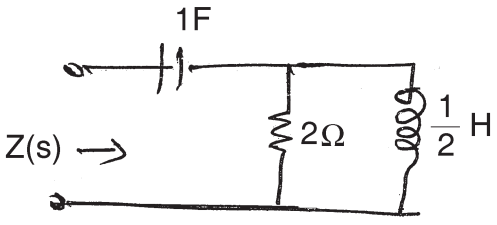
b) Current and voltage source transformation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

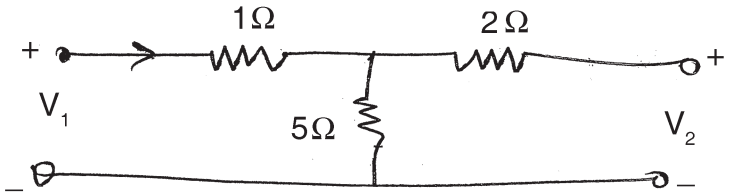
1) With the help of neat diagram, explain working of band pass and band reject filter.

2) Find poles and zeros of the impedance of the following network and plot them on S-plane.



3) Derive condition for reciprocity for open circuit impedance parameter.

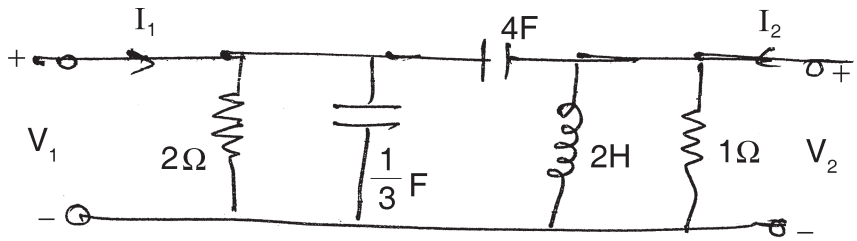
4) Find the transmission parameter for the network shown.



5) Explain how 2 port network can be represented by an equivalent T network.

5. Attempt **any 2** questions : **(6×2=12)**

1) Find Y parameter for shown network.



2) Draw and explain concept of notch filtering using RC and RL circuits.

3) Write a short note on :

a) ABCD parameter in term of Z parameter.

b) ABCD parameter in term of Y parameter.

Set R

SLR-TC – 433

Seat No.	

Set S

S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In series R – L circuit, power factor can be defined as _____

a) R/Z b) P/S c) V_r/V d) All above

2) Superposition theorem is not applicable for

a) Current calculation b) Voltage calculation

c) Power calculation d) Energy calculation

3) A circuit with a resistor, inductor and capacitor in series is resonant at f_0 Hz. If all the components values are now doubled, the new resonant frequency is _____

a) $2f_0$ b) f_0 c) $f_0/4$ d) $f_0/2$

4) In a series R-L-C circuit, R = 2kΩ, L = 1H, C = 1/400 μf. The resonant frequency is _____

a) 2×10^4 Hz b) $\frac{1}{\pi} \times 10^4$ Hz c) 10^4Hz d) $2\pi \times 10^4$ Hz

5) A network contains only an independent current source and resistors. If the values of all resistors are doubled. The value of the node voltages will _____

a) Becomes half b) Remain unchanged

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P.T.O.

6) _____ is not a bilateral.
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7) In active filter, _____ element is absent.
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   c) Both a) and b) d) Resistor

8) Reactive power drawn by a pure resistor is _____
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11) In 2 port network, $Z_{12} = Z_{21}$ indicates _____ property.
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14) A 2 port network is driven by a source $V_s = 100V$ in series with 5Ω and terminated in a 25Ω resistor. The impedance parameters are _____
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_____

SLR-TC – 433

Seat No.	

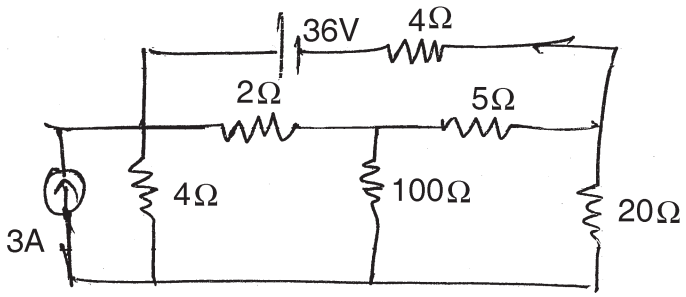
S.E. (Biomedical Engg.) (Part – I) (New CBCS) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

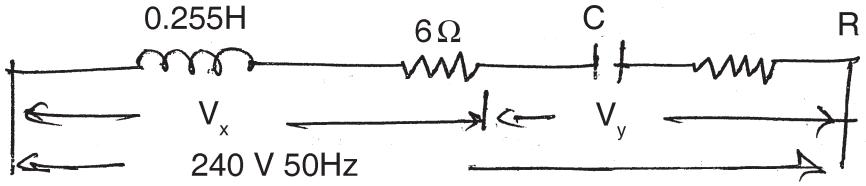
2. Attempt **any 4** questions : **(4×4=16)**

1) Determine the current through the 5Ω resistor using nodal analysis.



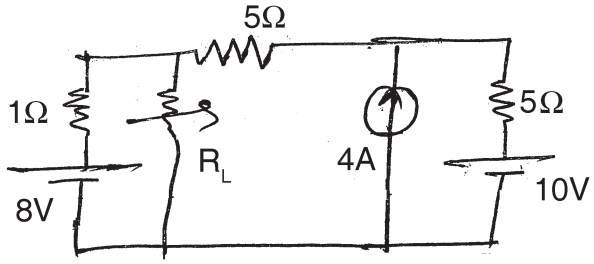
2) State and explain superposition theorem.

3) Find the values of R and C, so that $V_x = 3V_y$, V_x and V_y are in quadrature.



4) Compare between Thevenin's theorem and Norton's theorem.

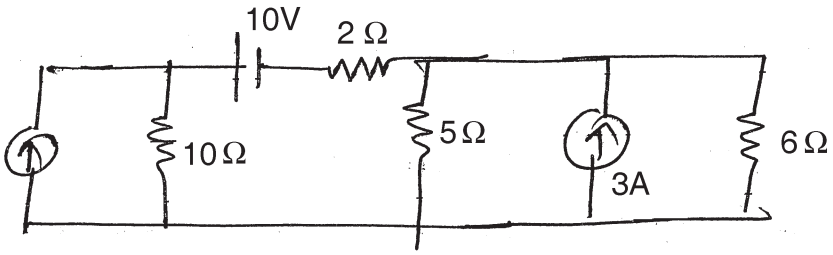
5) For the circuit shown, find the value of resistance R_L for maximum power and calculate maximum power.



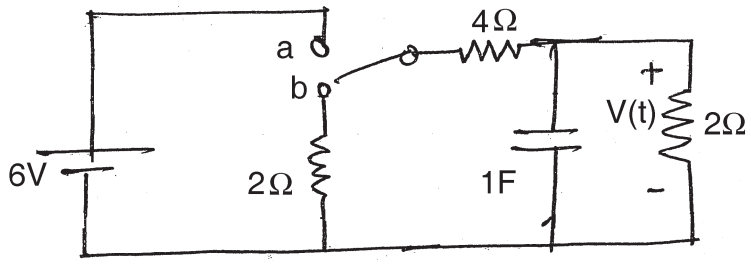
Set S

3. Attempt **any two** questions : **(6×2=12)**

1) Using Thevenin's theorem, find the current through the 6Ω resistor.



2) For the network shown below, the switch is moved from 'a' to 'b' at t = 0, find V(t).



3) Write a short note on :

a) Mesh and Nodal analysis.

b) Current and voltage source transformation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) With the help of neat diagram, explain working of band pass and band reject filter.

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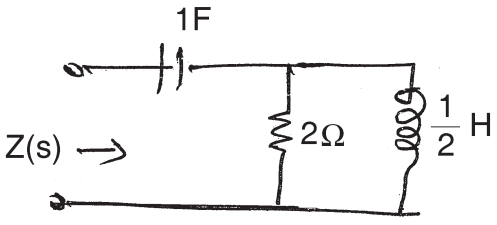
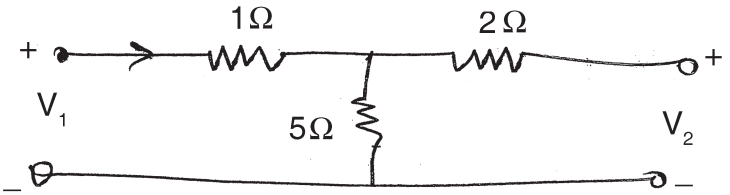


3) Derive condition for reciprocity for open circuit impedance parameter.

4) Find the transmission parameter for the network shown.



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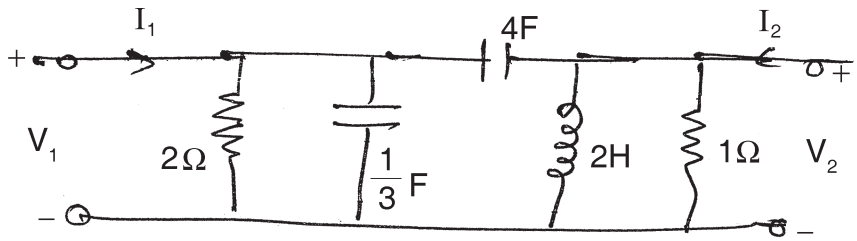
5. Attempt **any 2** questions : **(6×2=12)**

1) Find Y parameter for shown network.



2) Draw and explain concept of notch filtering using RC and RL circuits.

3) Write a short note on :

a) ABCD parameter in term of Z parameter.

b) ABCD parameter in term of Y parameter.

Set S

SLR-TC – 434

Seat No.	

Set **P**

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figures to **right** indicate **full** marks.*

*4) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) $L\{t\, e^{-t}\}$ is

a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

2) $L^{-1}\left\{\frac{s-4}{(s-4)^2+5^2}\right\} =$

a) $e^{4t}\sin 5t$ b) $e^{-4t}\sin 5t$ c) $e^{4t}\cos 5t$ d) $e^{-4t}\cos 5t$

3) $L^{-1}\left\{\frac{1}{3s-1}\right\} =$

a) e^{t} b) $\frac{e^{t/3}}{3}$ c) $\frac{e^{t}}{3}$ d) $\frac{e^{-t/3}}{3}$

4) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

a) $\Phi\left(\frac{s}{a}\right)$ b) $\frac{1}{s}\Phi\left(\frac{s}{a}\right)$ c) $\frac{1}{a}\Phi\left(\frac{s}{a}\right)$ d) $\Phi'\left(\frac{s}{a}\right)$

5) Cauchy-Riemann equations for f(z) to be analytic are

a) $u_x = v_x$, $u_y = -v_y$ b) $u_x = v_y$, $u_y = -v_x$
c) $u_x = -v_x$, $u_y = v_y$ d) $u_x = -v_y$, $u_y = v_x$

P.T.O.

6) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if
   a) $\nabla\Phi = 0$ b) $\nabla\Phi \neq 0$
   c) $\nabla^2\Phi = 0$ d) $\nabla^2\Phi \neq 0$

7) The mapping $w = f(z)$ is conformal if
   a) $f(z)$ is analytic and $f'(z) = 0$
   b) $f(z)$ is analytic and $f'(z) \neq 0$
   c) $f(z)$ is not analytic and $f'(z) \neq 0$
   d) None of these

8) Fourier expansion of an even function in the range $(-\pi, \pi)$ has
   a) Only sine terms
   b) Only cosine terms
   c) Both sine and cosine terms
   d) None

9) If $f(x) = x^4$ in $(-1, 1)$, then the Fourier coefficient b_n is equal to
   a) 1 b) π
   c) 0 d) None

10) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .
   a) k b) 2k
   c) 0 d) –k

11) In the mapping $w = \frac{1}{z}$ the interior of the unit circle $|z| = 1$ is mapped onto
   a) The interior of the unit circle b) The boundary of the unit circle
   c) On the x-axis d) On the exterior of the unit circle

12) The value of integration, $\int_c \frac{\sin z}{z} dz$, C : $|z| = 1$ is
   a) 0 b) πi
   c) $-\pi i$ d) $-2\pi i$

13) If $f(z) = \bar{z}$, then $f'(z)$
   a) equal to 1 b) equal to 0
   c) does not exist d) equal to –1

14) In the mapping $w = 4z$, the region $x = 0$, $y = 0$, $x + y = 1$ is transformed into
   a) a square b) a circle
   c) a triangle d) none of these

SLR-TC – 434

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

3) Find the $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+2^2}{s^2+3^2}\right)\right\}$.

4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0) = 0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

Set P

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

   2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

   3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

   4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

   5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

   1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

   2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

   $$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

   3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

———————

SLR-TC – 434

Seat No.	

Set **Q**

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Fourier expansion of an even function in the range $(-\pi, \pi)$ has
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3) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .
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P.T.O.

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d) none of these

8) $L\{t\, e^{-t}\}$ is

a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

9) $L^{-1}\left\{\frac{s-4}{(s-4)^2+5^2}\right\} =$

a) $e^{4t} \sin 5t$ b) $e^{-4t} \sin 5t$ c) $e^{4t} \cos 5t$ d) $e^{-4t} \cos 5t$

10) $L^{-1}\left\{\frac{1}{3s-1}\right\} =$

a) e^{t} b) $\frac{e^{t/3}}{3}$ c) $\frac{e^{t}}{3}$ d) $\frac{e^{-t/3}}{3}$

11) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

a) $\Phi\left(\frac{s}{a}\right)$ b) $\frac{1}{s}\Phi\left(\frac{s}{a}\right)$ c) $\frac{1}{a}\Phi\left(\frac{s}{a}\right)$ d) $\Phi'\left(\frac{s}{a}\right)$

12) Cauchy-Riemann equations for f(z) to be analytic are

a) $u_x = v_x$, $u_y = -v_y$
b) $u_x = v_y$, $u_y = -v_x$
c) $u_x = -v_x$, $u_y = v_y$
d) $u_x = -v_y$, $u_y = v_x$

13) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if

a) $\nabla\Phi = 0$
b) $\nabla\Phi \neq 0$
c) $\nabla^2\Phi = 0$
d) $\nabla^2\Phi \neq 0$

14) The mapping w = f(z) is conformal if

a) f(z) is analytic and $f'(z) = 0$
b) f(z) is analytic and $f'(z) \neq 0$
c) f(z) is not analytic and $f'(z) \neq 0$
d) None of these

SLR-TC – 434

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

3) Find the $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+2^2}{s^2+3^2}\right)\right\}$.

4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0) = 0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

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SLR-TC – 434

Seat No.	

Set **R**

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figures to **right** indicate **full** marks.*

*4) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Cauchy-Riemann equations for f(z) to be analytic are
   a) $u_x = v_x$, $u_y = -v_y$ b) $u_x = v_y$, $u_y = -v_x$
   c) $u_x = -v_x$, $u_y = v_y$ d) $u_x = -v_y$, $u_y = v_x$

2) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if
   a) $\nabla\Phi = 0$ b) $\nabla\Phi \neq 0$
   c) $\nabla^2\Phi = 0$ d) $\nabla^2\Phi \neq 0$

3) The mapping w = f(z) is conformal if
   a) f(z) is analytic and $f'(z) = 0$
   b) f(z) is analytic and $f'(z) \neq 0$
   c) f(z) is not analytic and $f'(z) \neq 0$
   d) None of these

4) Fourier expansion of an even function in the range $(-\pi, \pi)$ has
   a) Only sine terms
   b) Only cosine terms
   c) Both sine and cosine terms
   d) None

5) If $f(x) = x^4$ in (–1, 1), then the Fourier coefficient b_n is equal to
   a) 1 b) π
   c) 0 d) None

P.T.O.

6) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .

a) k b) 2k
c) 0 d) –k

7) In the mapping $w = \frac{1}{z}$ the interior of the unit circle |z| = 1 is mapped onto

a) The interior of the unit circle b) The boundary of the unit circle
c) On the x-axis d) On the exterior of the unit circle

8) The value of integration, $\int_c \frac{\sin z}{z} dz$, C : |z| = 1 is

a) 0 b) π i
c) $-\pi i$ d) $-2\pi i$

9) If $f(z) = \bar{z}$, then $f'(z)$

a) equal to 1 b) equal to 0
c) does not exist d) equal to –1

10) In the mapping w = 4z, the region x = 0, y = 0, x + y = 1 is transformed into

a) a square b) a circle
c) a triangle d) none of these

11) $L\{t\, e^{-t}\}$ is

a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

12) $L^{-1}\left\{\frac{s-4}{(s-4)^2+5^2}\right\} =$

a) $e^{4t} \sin 5t$ b) $e^{-4t} \sin 5t$ c) $e^{4t} \cos 5t$ d) $e^{-4t} \cos 5t$

13) $L^{-1}\left\{\frac{1}{3s-1}\right\} =$

a) e^t b) $\frac{e^{t/3}}{3}$ c) $\frac{e^t}{3}$ d) $\frac{e^{-t/3}}{3}$

14) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

a) $\Phi\left(\frac{s}{a}\right)$ b) $\frac{1}{s}\Phi\left(\frac{s}{a}\right)$ c) $\frac{1}{a}\Phi\left(\frac{s}{a}\right)$ d) $\Phi'\left(\frac{s}{a}\right)$

SLR-TC – 434

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

3) Find the $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+2^2}{s^2+3^2}\right)\right\}$.

4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0) = 0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

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SLR-TC – 434

Seat No.	

Set S

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figures to **right** indicate **full** marks.*

*4) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) For the function $f(x) = \begin{cases} -k, & -\pi < x < 0 \\ k, & 0 < x < \pi \end{cases}$ the value of a_0 in Fourier expansion will be . . .

a) k b) 2k
c) 0 d) –k

2) In the mapping $w = \frac{1}{z}$ the interior of the unit circle |z| = 1 is mapped onto

a) The interior of the unit circle b) The boundary of the unit circle
c) On the x-axis d) On the exterior of the unit circle

3) The value of integration, $\int_c \frac{\sin z}{z} dz$, C : |z| = 1 is

a) 0 b) π i
c) $-\pi i$ d) $-2\pi i$

4) If $f(z) = \bar{z}$, then $f'(z)$

a) equal to 1 b) equal to 0
c) does not exist d) equal to –1

5) In the mapping w = 4z, the region x = 0, y = 0, x + y = 1 is transformed into

a) a square b) a circle
c) a triangle d) none of these

P.T.O.

6) $L\{t\, e^{-t}\}$ is

a) $\frac{1}{(s+1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{s}{(s+1)^2}$ d) $-\frac{s}{(s+1)^2}$

7) $L^{-1}\left\{\frac{s-4}{(s-4)^2+5^2}\right\} =$

a) $e^{4t} \sin 5t$ b) $e^{-4t} \sin 5t$ c) $e^{4t} \cos 5t$ d) $e^{-4t} \cos 5t$

8) $L^{-1}\left\{\frac{1}{3s-1}\right\} =$

a) e^{t} b) $\frac{e^{t/3}}{3}$ c) $\frac{e^{t}}{3}$ d) $\frac{e^{-t/3}}{3}$

9) If $L\{f(t)\} = \Phi(s)$ then $L\{f(at)\}$ is

a) $\Phi\left(\frac{s}{a}\right)$ b) $\frac{1}{s}\Phi\left(\frac{s}{a}\right)$ c) $\frac{1}{a}\Phi\left(\frac{s}{a}\right)$ d) $\Phi'\left(\frac{s}{a}\right)$

10) Cauchy-Riemann equations for f(z) to be analytic are

a) $u_x = v_x$, $u_y = -v_y$ b) $u_x = v_y$, $u_y = -v_x$
c) $u_x = -v_x$, $u_y = v_y$ d) $u_x = -v_y$, $u_y = v_x$

11) A function $\Phi(x, y)$ having continuous partial derivatives of the first and second order is called harmonic function if

a) $\nabla\Phi = 0$ b) $\nabla\Phi \neq 0$
c) $\nabla^2\Phi = 0$ d) $\nabla^2\Phi \neq 0$

12) The mapping w = f(z) is conformal if

a) f(z) is analytic and $f'(z) = 0$
b) f(z) is analytic and $f'(z) \neq 0$
c) f(z) is not analytic and $f'(z) \neq 0$
d) None of these

13) Fourier expansion of an even function in the range $(-\pi, \pi)$ has

a) Only sine terms
b) Only cosine terms
c) Both sine and cosine terms
d) None

14) If $f(x) = x^4$ in (–1, 1), then the Fourier coefficient b_n is equal to

a) 1 b) π
c) 0 d) None

SLR-TC – 434

Seat No.	

S.E. (Bio-Medical Engineering) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Find the Laplace transform of $e^{4t}\sin^3 t$.

2) Find the Laplace transform of $f(t) = t^2$, $0 < t < 2$, where f(t) is a periodic function with period 2.

3) Find the $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+2^2}{s^2+3^2}\right)\right\}$.

4) Find k such that $\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\frac{kx}{y}$ is analytic.

5) Find the Laplace transform of $e^{-4t}\int_0^t u\sin 3u\,du$.

3. Attempt **any two** : **(6×2=12)**

1) Solve using Laplace transform $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+8y=1$, where $y(0) = 0$, $y'(0)=1$.

2) Find the orthogonal trajectories of the family of the curve $3x^2y - y^3 = c$.

3) Find $L^{-1}\left\{\frac{s^2}{\left(s^2+1\right)\left(s^2+4\right)}\right\}$ by convolution theorem.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Find the image of the circle $(x-3)^2 + y^2 = 2$ under the transformation $w = \frac{1}{z}$.

2) Obtain Fourier series of $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ with period 2.

3) Find half range fourier sine series of $f(x) = x(2-x)$ in $0 < x < 2$.

4) Evaluate $\int_0^{1+i} (x^2 - iy)dz$, along (i) the line $y = x$ (ii) the parabola $y = x^2$.

5) Evaluate $\oint_C \frac{z^2+z+1}{z-1} dz$, where C is contour (i) $z = 1$, (ii) $|z| = \frac{1}{2}$.

5. Attempt **any two** : **(6×2=12)**

1) Find the half range sine series for $f(x) = \begin{cases} \frac{1}{2} + x, & -\frac{1}{2} < x < 0 \\ \frac{1}{2} - x, & 0 < x < \frac{1}{2} \end{cases}$.

2) Find the Fourier series for $f(x) = \frac{\pi - x}{2}$ in the interval $(0, 2\pi)$. Also prove that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

3) Find the bilinear transformation which maps the points $z = 0, -i, -1$ onto the points $w = i, 1, 0$.

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SLR-TC – 435

Seat No.	

Set P

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*
*3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The anatomical name for the thigh bone is
a) Sternum b) Femur c) Clavicle d) Pelvis

2) Number of thoracic vertebrae in the human body are
a) 6 b) 8 c) 16 d) 12

3) _____ structure of nervous system detects changes in temperature.
a) Pons b) Thermoreceptors
c) Medulla d) Pituitary Gland

4) _____ is an example of a neurotransmitter.
a) Dophamine b) Norepinephrine
c) Acetylcholine d) All of the above

5) The dendrites normally conduct impulses towards the
a) axon b) pituitary gland
c) cell body d) synapse

6) Veins are _____ walls that carry deoxygenated blood towards heart.
a) Thin b) Thick c) Rigid d) Transparent

7) The bone that protects the _____ is called the cranium.
a) Sternum b) Brain c) Clavicle d) Pelvis

8) The thoracic cage is a structural unit important for which of the following functions ?
   a) Alimentation b) Menstruation
   c) Mentation d) Respiration

9) _____ allows gas exchange in the lungs.
   a) Alveoli b) Bronchi c) Bronchioles d) Capillaries

10) _____ structures are part of the small intestine.
   a) Ascending colon b) Cecum
   c) Ileum d) Sigmoid colon

11) _____ hormone does the pancreatic alpha cell secrete.
   a) Insulin b) Somatostatin
   c) Glucagon d) Somatotropin

12) The _____ serves as the source of the flagellum in sperm.
   a) Nucleus b) Cilia
   c) Cell membrane d) Centriole

13) _____ contains an enzyme that acts upon starches of the nutrients.
   a) saliva b) proteins c) fats d) minerals

14) Brain has _____ ventricles.
   a) 2 b) 3 c) 4 d) 5

_____

SLR-TC – 435

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Explain structure and functioning of heart walls.

2) List types and explain role of heart valves with necessary figure.

3) Explain various leads and their configurations in ECG measurement.

4) Draw respiratory system and indicate all naming.

5) List various secretions by alimentary system and mention each of significance.

3. Attempt **any 2** : **(6×2=12)**

1) Draw and explain pulmonary circulation system in detail.

2) Define heart rate, pulse rate, cardiac output and stroke volume.

3) List all organs of digestive system and explain structure and functions of any 2.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Draw microscopic structure of nephron and list its components.

2) Draw and explain structure of ear.

3) Draw and explain the process of impulse transmission in nervous system.

4) Define and differentiate endocrine and exocrine glands with each one example.

5) Explain generation of nerve conduction and action potential of nervous system.

5. Attempt **any two** : **(6×2=12)**

1) Explain the process of urine formation with neat figures.

2) Differentiate between male and female reproductive system in detail.

3) Draw and explain the structure of eye and process of forming image on the retina.

SLR-TC – 435

Seat No.	

Set Q

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*
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*4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The thoracic cage is a structural unit important for which of the following functions ?
a) Alimentation b) Menstruation
c) Mentation d) Respiration

2) _____ allows gas exchange in the lungs.
a) Alveoli b) Bronchi c) Bronchioles d) Capillaries

3) _____ structures are part of the small intestine.
a) Ascending colon b) Cecum
c) Ileum d) Sigmoid colon

4) _____ hormone does the pancreatic alpha cell secrete.
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c) Glucagon d) Somatotropin

5) The _____ serves as the source of the flagellum in sperm.
a) Nucleus b) Cilia
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6) _____ contains an enzyme that acts upon starches of the nutrients.
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7) Brain has _____ ventricles.
a) 2 b) 3 c) 4 d) 5

P.T.O.

8) The anatomical name for the thigh bone is
   a) Sternum b) Femur c) Clavicle d) Pelvis

9) Number of thoracic vertebrae in the human body are
   a) 6 b) 8 c) 16 d) 12

10) _____ structure of nervous system detects changes in temperature.
   a) Pons b) Thermoreceptors
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11) _____ is an example of a neurotransmitter.
   a) Dophamine b) Norepinephrine
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   a) axon b) pituitary gland
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13) Veins are _____ walls that carry deoxygenated blood towards heart.
   a) Thin b) Thick c) Rigid d) Transparent

14) The bone that protects the _____ is called the cranium.
   a) Sternum b) Brain c) Clavicle d) Pelvis

_____

SLR-TC – 435

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Explain structure and functioning of heart walls.

2) List types and explain role of heart valves with necessary figure.

3) Explain various leads and their configurations in ECG measurement.

4) Draw respiratory system and indicate all naming.

5) List various secretions by alimentary system and mention each of significance.

3. Attempt **any 2** : **(6×2=12)**

1) Draw and explain pulmonary circulation system in detail.

2) Define heart rate, pulse rate, cardiac output and stroke volume.

3) List all organs of digestive system and explain structure and functions of any 2.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Draw microscopic structure of nephron and list its components.

2) Draw and explain structure of ear.

Set Q

3) Draw and explain the process of impulse transmission in nervous system.

4) Define and differentiate endocrine and exocrine glands with each one example.

5) Explain generation of nerve conduction and action potential of nervous system.

5. Attempt **any two** : **(6×2=12)**

1) Explain the process of urine formation with neat figures.

2) Differentiate between male and female reproductive system in detail.

3) Draw and explain the structure of eye and process of forming image on the retina.

SLR-TC – 435

Seat No.	

Set R

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*
*3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The dendrites normally conduct impulses towards the
a) axon b) pituitary gland
c) cell body d) synapse

2) Veins are _____ walls that carry deoxygenated blood towards heart.
a) Thin b) Thick
c) Rigid d) Transparent

3) The bone that protects the _____ is called the cranium.
a) Sternum b) Brain c) Clavicle d) Pelvis

4) The thoracic cage is a structural unit important for which of the following functions ?
a) Alimentation b) Menstruation
c) Mentation d) Respiration

5) _____ allows gas exchange in the lungs.
a) Alveoli b) Bronchi
c) Bronchioles d) Capillaries

6) _____ structures are part of the small intestine.
a) Ascending colon b) Cecum
c) Ileum d) Sigmoid colon

P.T.O.

7) _____ hormone does the pancreatic alpha cell secrete.
   a) Insulin b) Somatostatin
   c) Glucagon d) Somatotropin

8) The _____ serves as the source of the flagellum in sperm.
   a) Nucleus b) Cilia
   c) Cell membrane d) Centriole

9) _____ contains an enzyme that acts upon starches of the nutrients.
   a) saliva b) proteins c) fats d) minerals

10) Brain has _____ ventricles.
   a) 2 b) 3 c) 4 d) 5

11) The anatomical name for the thigh bone is
   a) Sternum b) Femur c) Clavicle d) Pelvis

12) Number of thoracic vertebrae in the human body are
   a) 6 b) 8 c) 16 d) 12

13) _____ structure of nervous system detects changes in temperature.
   a) Pons b) Thermoreceptors
   c) Medulla d) Pituitary Gland

14) _____ is an example of a neurotransmitter.
   a) Dophamine b) Norepinephrine
   c) Acetylcholine d) All of the above

_____

SLR-TC – 435

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Explain structure and functioning of heart walls.

2) List types and explain role of heart valves with necessary figure.

3) Explain various leads and their configurations in ECG measurement.

4) Draw respiratory system and indicate all naming.

5) List various secretions by alimentary system and mention each of significance.

3. Attempt **any 2** : **(6×2=12)**

1) Draw and explain pulmonary circulation system in detail.

2) Define heart rate, pulse rate, cardiac output and stroke volume.

3) List all organs of digestive system and explain structure and functions of any 2.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Draw microscopic structure of nephron and list its components.

2) Draw and explain structure of ear.

Set R

3) Draw and explain the process of impulse transmission in nervous system.

4) Define and differentiate endocrine and exocrine glands with each one example.

5) Explain generation of nerve conduction and action potential of nervous system.

5. Attempt **any two** : **(6×2=12)**

1) Explain the process of urine formation with neat figures.

2) Differentiate between male and female reproductive system in detail.

3) Draw and explain the structure of eye and process of forming image on the retina.

SLR-TC – 435

Seat No.	

Set S

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*
*3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ structures are part of the small intestine.
a) Ascending colon b) Cecum
c) Ileum d) Sigmoid colon

2) _____ hormone does the pancreatic alpha cell secrete.
a) Insulin b) Somatostatin
c) Glucagon d) Somatotropin

3) The _____ serves as the source of the flagellum in sperm.
a) Nucleus b) Cilia
c) Cell membrane d) Centriole

4) _____ contains an enzyme that acts upon starches of the nutrients.
a) saliva b) proteins c) fats d) minerals

5) Brain has _____ ventricles.
a) 2 b) 3 c) 4 d) 5

6) The anatomical name for the thigh bone is
a) Sternum b) Femur c) Clavicle d) Pelvis

7) Number of thoracic vertebrae in the human body are
a) 6 b) 8 c) 16 d) 12

8) _____ structure of nervous system detects changes in temperature.
   a) Pons b) Thermoreceptors
   c) Medulla d) Pituitary Gland

9) _____ is an example of a neurotransmitter.
   a) Dophamine b) Norepinephrine
   c) Acetylcholine d) All of the above

10) The dendrites normally conduct impulses towards the
   a) axon b) pituitary gland
   c) cell body d) synapse

11) Veins are _____ walls that carry deoxygenated blood towards heart.
   a) Thin b) Thick c) Rigid d) Transparent

12) The bone that protects the _____ is called the cranium.
   a) Sternum b) Brain c) Clavicle d) Pelvis

13) The thoracic cage is a structural unit important for which of the following functions ?
   a) Alimentation b) Menstruation
   c) Mentation d) Respiration

14) _____ allows gas exchange in the lungs.
   a) Alveoli b) Bronchi c) Bronchioles d) Capillaries

_____

SLR-TC – 435

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume **suitable** data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Explain structure and functioning of heart walls.

2) List types and explain role of heart valves with necessary figure.

3) Explain various leads and their configurations in ECG measurement.

4) Draw respiratory system and indicate all naming.

5) List various secretions by alimentary system and mention each of significance.

3. Attempt **any 2** : **(6×2=12)**

1) Draw and explain pulmonary circulation system in detail.

2) Define heart rate, pulse rate, cardiac output and stroke volume.

3) List all organs of digestive system and explain structure and functions of any 2.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Draw microscopic structure of nephron and list its components.

2) Draw and explain structure of ear.

3) Draw and explain the process of impulse transmission in nervous system.

4) Define and differentiate endocrine and exocrine glands with each one example.

5) Explain generation of nerve conduction and action potential of nervous system.

5. Attempt **any two** : **(6×2=12)**

1) Explain the process of urine formation with neat figures.

2) Differentiate between male and female reproductive system in detail.

3) Draw and explain the structure of eye and process of forming image on the retina.

SLR-TC – 436

Seat No.	

Set P

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) Figures to the ***right*** *indicate* ***full*** *marks.*

4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Biosensors are used in

a) medical field b) agricultural field

c) pollution monitoring d) all of the above

2) Restorative biomaterials are designed to recover the shape and the function of the

a) teeth b) bone c) tissue d) none of above

3) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.

a) Glasses b) Fiber c) Metal d) Polymer

4) Polycrystalline ceramics have no _____ components.

a) glassy b) liquid c) solid d) crystal

5) _____ is the ability of a material to perform with an appropriate host response in a specific application.

a) Reduction b) Biocompatibility

c) Oxidation d) None of above

P.T.O.

6) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
   b) Slippage of molecular chains
   c) Straightening of molecular chains
   d) Severe of covalent bonds

7) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

8) Polymers are _____ in nature.
   a) organic b) inorganic c) both a and b d) none

9) _____ polymers cannot be recycled.
   a) Thermoplasts b) Thermosets c) Elastomers d) All polymers

10) _____ types of biomaterials are used as bridges between human tissues and metals.
   a) Polymeric b) Ceramic c) Metallic d) All of these

11) Which of the following statements is true ?
   a) Ceramic materials have low melting point
   b) Porcelain is used as insulating material in spark plugs
   c) Graphite is viscoelastic in nature
   d) Compacting iron oxide powder ceramic tools are prepared

12) _____ materials can be used to manufacture elastomers.
   a) Limestone b) Petroleum c) Alcohol d) All of the above

13) Malleability means
   a) Metals undergo plastic deformation under compressive stresses
   b) Metals can be drawn into wires
   c) Both a and b
   d) None of the above

14) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

SLR-TC – 436

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Classify biomaterial in detail.

2) Explain applications of stainless steel.

3) Explain applications of PTFE.

4) Explain classification of bioceramics and mention its any 2 applications.

5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**

1) Explain biocompatibility test performed on Cobalt based alloy.

2) Explain various applications of composite biomaterials.

3) Write a short note on (structure, applications) :

a) Silicon rubber

b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Explain which material is suited as bone cement ? Mention its specifications.

2) Explain materials can be protected from corrosion.

3) Which materials are used for soft tissue replacement ? Discuss their properties.

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

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SLR-TC – 436

Seat No.	

Set Q

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) Figures to the ***right*** *indicate* ***full*** *marks.*

4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Polymers are _____ in nature.

a) organic b) inorganic c) both a and b d) none

2) _____ polymers cannot be recycled.

a) Thermoplasts b) Thermosets c) Elastomers d) All polymers

3) _____ types of biomaterials are used as bridges between human tissues and metals.

a) Polymeric b) Ceramic c) Metallic d) All of these

4) Which of the following statements is true ?

a) Ceramic materials have low melting point

b) Porcelain is used as insulating material in spark plugs

c) Graphite is viscoelastic in nature

d) Compacting iron oxide powder ceramic tools are prepared

5) _____ materials can be used to manufacture elastomers.

a) Limestone b) Petroleum c) Alcohol d) All of the above

P.T.O.

6) Malleability means
   a) Metals undergo plastic deformation under compressive stresses
   b) Metals can be drawn into wires
   c) Both a and b
   d) None of the above

7) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

8) Biosensors are used in
   a) medical field b) agricultural field
   c) pollution monitoring d) all of the above

9) Restorative biomaterials are designed to recover the shape and the function of the
   a) teeth b) bone c) tissue d) none of above

10) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.
   a) Glasses b) Fiber c) Metal d) Polymer

11) Polycrystalline ceramics have no _____ components.
   a) glassy b) liquid c) solid d) crystal

12) _____ is the ability of a material to perform with an appropriate host response in a specific application.
   a) Reduction b) Biocompatibility
   c) Oxidation d) None of above

13) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
   b) Slippage of molecular chains
   c) Straightening of molecular chains
   d) Severe of covalent bonds

14) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

_____

SLR-TC – 436

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Classify biomaterial in detail.

2) Explain applications of stainless steel.

3) Explain applications of PTFE.

4) Explain classification of bioceramics and mention its any 2 applications.

5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**

1) Explain biocompatibility test performed on Cobalt based alloy.

2) Explain various applications of composite biomaterials.

3) Write a short note on (structure, applications) :

a) Silicon rubber

b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Explain which material is suited as bone cement ? Mention its specifications.

2) Explain materials can be protected from corrosion.

3) Which materials are used for soft tissue replacement ? Discuss their properties.

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

———————

SLR-TC – 436

Seat No.	

Set R

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) Figures to the ***right*** *indicate* ***full*** *marks.*

4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ is the ability of a material to perform with an appropriate host response in a specific application.
   a) Reduction b) Biocompatibility
   c) Oxidation d) None of above

2) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
   b) Slippage of molecular chains
   c) Straightening of molecular chains
   d) Severe of covalent bonds

3) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

4) Polymers are _____ in nature.
   a) organic b) inorganic c) both a and b d) none

5) _____ polymers cannot be recycled.
   a) Thermoplasts b) Thermosets c) Elastomers d) All polymers

P.T.O.

6) _____ types of biomaterials are used as bridges between human tissues and metals.
   a) Polymeric b) Ceramic c) Metallic d) All of these

7) Which of the following statements is true ?
   a) Ceramic materials have low melting point
   b) Porcelain is used as insulating material in spark plugs
   c) Graphite is viscoelastic in nature
   d) Compacting iron oxide powder ceramic tools are prepared

8) _____ materials can be used to manufacture elastomers.
   a) Limestone b) Petroleum c) Alcohol d) All of the above

9) Malleability means
   a) Metals undergo plastic deformation under compressive stresses
   b) Metals can be drawn into wires
   c) Both a and b
   d) None of the above

10) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

11) Biosensors are used in
   a) medical field b) agricultural field
   c) pollution monitoring d) all of the above

12) Restorative biomaterials are designed to recover the shape and the function of the
   a) teeth b) bone c) tissue d) none of above

13) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.
   a) Glasses b) Fiber c) Metal d) Polymer

14) Polycrystalline ceramics have no _____ components.
   a) glassy b) liquid c) solid d) crystal

_____

SLR-TC – 436

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Classify biomaterial in detail.

2) Explain applications of stainless steel.

3) Explain applications of PTFE.

4) Explain classification of bioceramics and mention its any 2 applications.

5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**

1) Explain biocompatibility test performed on Cobalt based alloy.

2) Explain various applications of composite biomaterials.

3) Write a short note on (structure, applications) :

a) Silicon rubber

b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Explain which material is suited as bone cement ? Mention its specifications.

2) Explain materials can be protected from corrosion.

3) Which materials are used for soft tissue replacement ? Discuss their properties.

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

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SLR-TC – 436

Seat No.	

Set S

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) Figures to the ***right*** *indicate* ***full*** *marks.*

4) Assume suitable data ***wherever*** *required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ types of biomaterials are used as bridges between human tissues and metals.

a) Polymeric b) Ceramic c) Metallic d) All of these

2) Which of the following statements is true ?

a) Ceramic materials have low melting point

b) Porcelain is used as insulating material in spark plugs

c) Graphite is viscoelastic in nature

d) Compacting iron oxide powder ceramic tools are prepared

3) _____ materials can be used to manufacture elastomers.

a) Limestone b) Petroleum c) Alcohol d) All of the above

4) Malleability means

a) Metals undergo plastic deformation under compressive stresses

b) Metals can be drawn into wires

c) Both a and b

d) None of the above

P.T.O.

5) Ductility means
   a) Metals can be drawn into sheets
   b) Metals undergo elastic deformation under tensile loads
   c) Metals undergo plastic deformation under tensile loads
   d) All of the above

6) Biosensors are used in
   a) medical field b) agricultural field
   c) pollution monitoring d) all of the above

7) Restorative biomaterials are designed to recover the shape and the function of the
   a) teeth b) bone c) tissue d) none of above

8) _____ are three-dimensional (3D) networks of atoms having no regular pattern to the spacing.
   a) Glasses b) Fiber c) Metal d) Polymer

9) Polycrystalline ceramics have no _____ components.
   a) glassy b) liquid c) solid d) crystal

10) _____ is the ability of a material to perform with an appropriate host response in a specific application.
   a) Reduction b) Biocompatibility
   c) Oxidation d) None of above

11) Elastic deformation in polymers is due to
   a) Slight adjust of molecular chains
   b) Slippage of molecular chains
   c) Straightening of molecular chains
   d) Severe of covalent bonds

12) One of characteristic properties of polymer material
   a) High temperature stability b) High mechanical strength
   c) High elongation d) Low hardness

13) Polymers are _____ in nature.
   a) organic b) inorganic c) both a and b d) none

14) _____ polymers cannot be recycled.
   a) Thermoplasts b) Thermosets c) Elastomers d) All polymers

_____

SLR-TC – 436

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
BIOMATERIALS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Classify biomaterial in detail.

2) Explain applications of stainless steel.

3) Explain applications of PTFE.

4) Explain classification of bioceramics and mention its any 2 applications.

5) What are bioglasses ? Mention its any 2 applications.

3. Attempt **any 2** : **(6×2=12)**

1) Explain biocompatibility test performed on Cobalt based alloy.

2) Explain various applications of composite biomaterials.

3) Write a short note on (structure, applications) :

a) Silicon rubber

b) Carbon implants

SECTION – II

4. Attempt **any four** : **(4×4=16)**

1) Explain which material is suited as bone cement ? Mention its specifications.

2) Explain materials can be protected from corrosion.

3) Which materials are used for soft tissue replacement ? Discuss their properties.

4) Define thermoplastic and thermosetting resins. Mention its any two applications.

5) Discuss the properties and types of materials used in breast implants.

5. Attempt **any 2** : **(6×2=12)**

1) Explain how surface properties of biomaterials are tested.

2) Write a short note on (structure and applications) :

a) Wood and leathers

b) Alumina and zirconia.

3) Explain any 2 methods of biological testing of biomaterials in short.

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SLR-TC – 437

Seat No.	

Set P

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ type of transformer is required to create 180 degree input to a rectifier.

a) Center tap secondary b) Step down secondary
c) Stepped up secondary d) Split winding primary

2) In a power supply diagram _____ block indicates a smooth dc output.

a) transformer b) filter c) rectifier d) regulator

3) A current ratio of I_C/I_E is usually less than one and is called _____

a) beta b) alpha c) omega d) theta

4) In a transistor collector current is controlled by _____

a) base current b) collector voltage
c) collector resistance d) all

5) What is the current gain for a common base configuration where I_E = 4.2 mA and I_C = 4.0 mA ?

a) 16.80 b) 1.05 c) 0.20 d) 0.95

P.T.O.

6) If a transistor operates at the middle of the dc load line, a decrease in the current gain will move the Q point _____

a) no where b) up c) down d) off the load line

7) In series regulator regulator circuit _____ component works as a controlling element.

a) load resistor b) zener diode c) transistor d) none of above

8) _____ type of regulator offers inherent short circuit protection.

a) shunt b) series c) three terminal d) switching

9) Determine the value of transconductance for N-channel JFET with I_{DSS} = 9mA, V_P = – 2V, V_{GS} = –1V.

a) 7.5 ms b) 6.5 ms c) 4.5 ms d) 5.5 ms

10) Maximum power loss in power devices occurs during _____ time.

a) delay b) rise c) spread d) all

11) Anode current in an SCR consists of _____

a) holes only b) electrons only

c) either electron or holes d) both electron and holes

12) _____ is a two terminal three layer device.

a) BJT b) power diode c) MOSFET d) none

13) _____ is not a power transistor.

a) IGBT b) COLMOS c) TRIAC d) DIAC

14) _____ mode of operation is being used when a 555 timer chip has 2 external resistor and an external capacitor.

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c) Schmidt trigger d) Astable

_____

SLR-TC – 437

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Explain working of positive clamper and negative clamper with necessary waveform.

   2) Design a fixed bias circuit. Using silicon transistor having h_{FE} = 100, V_{CC} = 12V and V_{CE} = 6V, I_C = 3mA, V_{BE} = 0.7V.

   3) Draw and explain working of center tap full wave rectifier with neat waveform.

   4) Define following term :

      a) thermal shut down

      b) short circuit protection.

   5) Explain and draw various modes of BJT operations.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Differentiate between common emitter common base and common collector of BJT configuration.

   2) Draw and explain working of voltage doubler circuit.

   3) Define following terms and mention their significance related to BJT :

      a) thermal runway

      b) stability factor

      c) transistor as a switch.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Define following parameter of FET :

a) transconductance

b) amplification factor

c) drain resistance

d) input resistance.

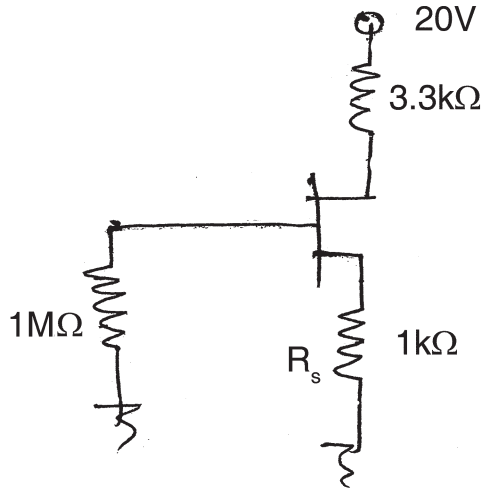
2) Differentiate between BJT and FET.

3) Determine the following for given network :

Given :

I_{DSS} = 8mA

V_P = – 6V



a) V_{GS}

b) I_D

c) V_{DS}

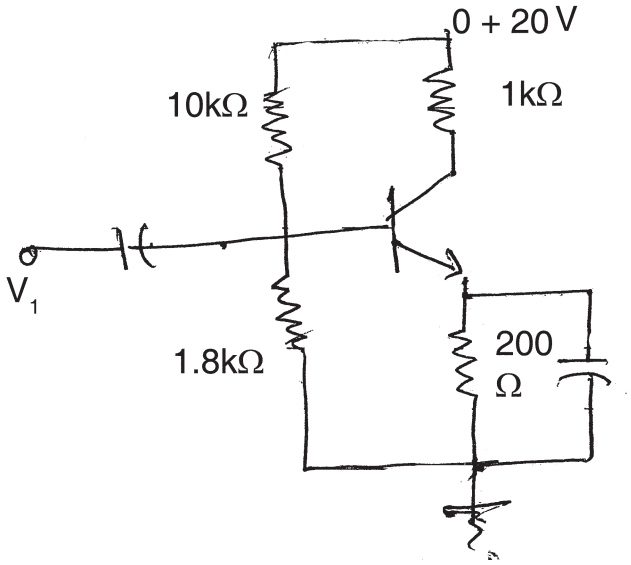
d) V_S.

4) Explain construction and working of DIAC power device.

5) Explain working of astable multivibrator using IC555. Draw necessary waveform.

5. Attempt **any 2** questions : **(6×2=12)**

1) For the circuit shown determine : I_{CQ}, I_{BQ}, V_{EQ} and stability factor $\beta = 80$.



2) Explain construction and working of power transistors and trial.

3) Draw and explain various configuration of MOSFET in short.

Set P

SLR-TC – 437

Seat No.	

Set Q

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ type of regulator offers inherent short circuit protection.
a) shunt b) series c) three terminal d) switching

2) Determine the value of transconductance for N-channel JFET with I_{DSS} = 9mA, V_P = – 2V, V_{GS} = –1V.
a) 7.5 ms b) 6.5 ms c) 4.5 ms d) 5.5 ms

3) Maximum power loss in power devices occurs during _____ time.
a) delay b) rise c) spread d) all

4) Anode current in an SCR consists of _____
a) holes only b) electrons only
c) either electron or holes d) both electron and holes

5) _____ is a two terminal three layer device.
a) BJT b) power diode c) MOSFET d) none

6) _____ is not a power transistor.
a) IGBT b) COLMOS c) TRIAC d) DIAC

P.T.O.

7) _____ mode of operation is being used when a 555 timer chip has 2 external resistor and an external capacitor.
   a) Monostable b) Pulse stretching
   c) Schmidt trigger d) Astable

8) _____ type of transformer is required to create 180 degree input to a rectifier.
   a) Center tap secondary b) Step down secondary
   c) Stepped up secondary d) Split winding primary

9) In a power supply diagram _____ block indicates a smooth dc output.
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10) A current ratio of I_C/I_E is usually less than one and is called _____
   a) beta b) alpha c) omega d) theta

11) In a transistor collector current is controlled by _____
   a) base current b) collector voltage
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12) What is the current gain for a common base configuration where I_E = 4.2 mA and I_C = 4.0 mA ?
   a) 16.80 b) 1.05 c) 0.20 d) 0.95

13) If a transistor operates at the middle of the dc load line, a decrease in the current gain will move the Q point _____
   a) no where b) up c) down d) off the load line

14) In series regulator regulator circuit _____ component works as a controlling element.
   a) load resistor b) zener diode c) transistor d) none of above

_____

SLR-TC – 437

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Explain working of positive clamper and negative clamper with necessary waveform.

   2) Design a fixed bias circuit. Using silicon transistor having h_{FE} = 100, V_{CC} = 12V and V_{CE} = 6V, I_C = 3mA, V_{BE} = 0.7V.

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   4) Define following term :

      a) thermal shut down

      b) short circuit protection.

   5) Explain and draw various modes of BJT operations.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Differentiate between common emitter common base and common collector of BJT configuration.

   2) Draw and explain working of voltage doubler circuit.

   3) Define following terms and mention their significance related to BJT :

      a) thermal runway

      b) stability factor

      c) transistor as a switch.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Define following parameter of FET :

a) transconductance

b) amplification factor

c) drain resistance

d) input resistance.

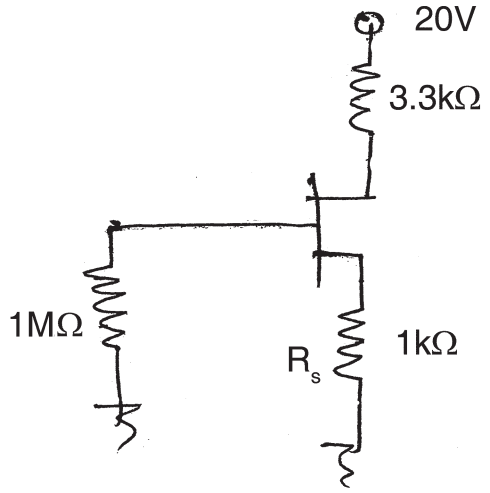
2) Differentiate between BJT and FET.

3) Determine the following for given network :

Given :

I_{DSS} = 8mA

V_P = – 6V



a) V_{GS}

b) I_D

c) V_{DS}

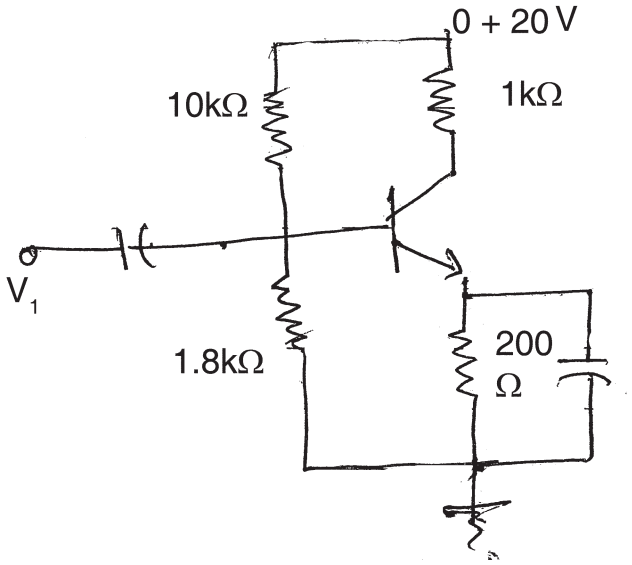
d) V_S.

4) Explain construction and working of DIAC power device.

5) Explain working of astable multivibrator using IC555. Draw necessary waveform.

5. Attempt **any 2** questions : **(6×2=12)**

1) For the circuit shown determine : I_{CQ}, I_{BQ}, V_{EQ} and stability factor $\beta = 80$.



2) Explain construction and working of power transistors and trial.

3) Draw and explain various configuration of MOSFET in short.

Set Q

SLR-TC – 437

Seat No.	

Set R

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) What is the current gain for a common base configuration where I_E = 4.2 mA and I_C = 4.0 mA ?

a) 16.80 b) 1.05 c) 0.20 d) 0.95

2) If a transistor operates at the middle of the dc load line, a decrease in the current gain will move the Q point _____

a) no where b) up c) down d) off the load line

3) In series regulator regulator circuit _____ component works as a controlling element.

a) load resistor b) zener diode c) transistor d) none of above

4) _____ type of regulator offers inherent short circuit protection.

a) shunt b) series c) three terminal d) switching

5) Determine the value of transconductance for N-channel JFET with I_{DSS} = 9mA, V_P = – 2V, V_{GS} = –1V.

a) 7.5 ms b) 6.5 ms c) 4.5 ms d) 5.5 ms

6) Maximum power loss in power devices occurs during _____ time.

a) delay b) rise c) spread d) all

P.T.O.

7) Anode current in an SCR consists of _____
   a) holes only
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11) _____ type of transformer is required to create 180 degree input to a rectifier.
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   c) collector resistance
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_____

SLR-TC – 437

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Explain working of positive clamper and negative clamper with necessary waveform.

   2) Design a fixed bias circuit. Using silicon transistor having h_{FE} = 100, V_{CC} = 12V and V_{CE} = 6V, I_C = 3mA, V_{BE} = 0.7V.

   3) Draw and explain working of center tap full wave rectifier with neat waveform.

   4) Define following term :

      a) thermal shut down

      b) short circuit protection.

   5) Explain and draw various modes of BJT operations.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Differentiate between common emitter common base and common collector of BJT configuration.

   2) Draw and explain working of voltage doubler circuit.

   3) Define following terms and mention their significance related to BJT :

      a) thermal runway

      b) stability factor

      c) transistor as a switch.

Set R

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Define following parameter of FET :

a) transconductance

b) amplification factor

c) drain resistance

d) input resistance.

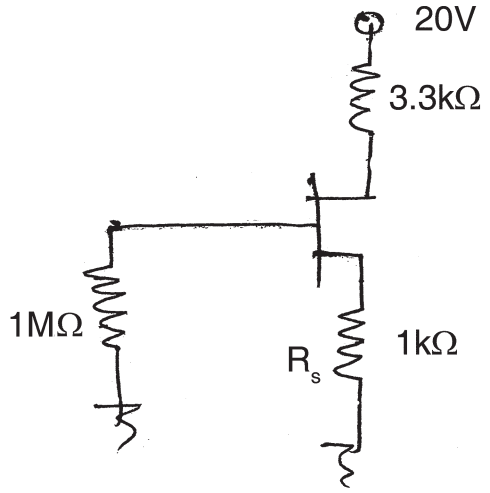
2) Differentiate between BJT and FET.

3) Determine the following for given network :

Given :

I_{DSS} = 8mA

V_P = – 6V



a) V_{GS}

b) I_D

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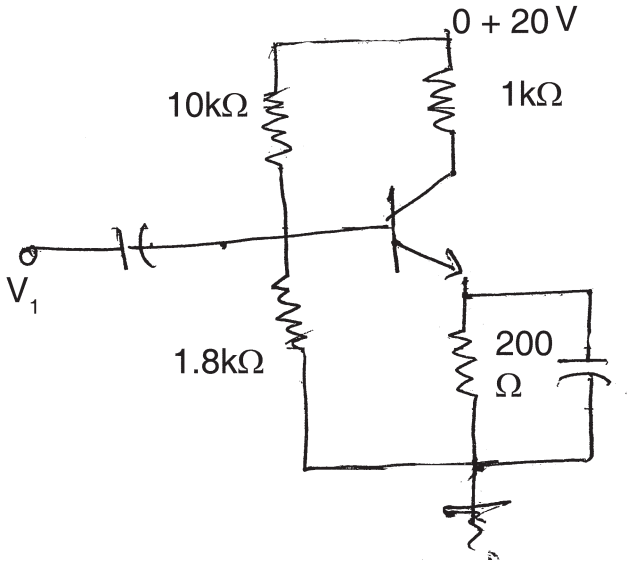
d) V_S.

4) Explain construction and working of DIAC power device.

5) Explain working of astable multivibrator using IC555. Draw necessary waveform.

5. Attempt **any 2** questions : **(6×2=12)**

1) For the circuit shown determine : I_{CQ}, I_{BQ}, V_{EQ} and stability factor $\beta = 80$.



2) Explain construction and working of power transistors and trial.

3) Draw and explain various configuration of MOSFET in short.

———————

Set R

SLR-TC – 437

Seat No.	

Set S

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Maximum power loss in power devices occurs during _____ time.
   a) delay b) rise c) spread d) all

2) Anode current in an SCR consists of _____
   a) holes only
   b) electrons only
   c) either electron or holes
   d) both electron and holes

3) _____ is a two terminal three layer device.
   a) BJT b) power diode c) MOSFET d) none

4) _____ is not a power transistor.
   a) IGBT b) COLMOS c) TRIAC d) DIAC

5) _____ mode of operation is being used when a 555 timer chip has 2 external resistor and an external capacitor.
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6) _____ type of transformer is required to create 180 degree input to a rectifier.
   a) Center tap secondary b) Step down secondary
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7) In a power supply diagram _____ block indicates a smooth dc output.
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14) Determine the value of transconductance for N-channel JFET with I_{DSS} = 9mA, V_P = – 2V, V_{GS} = –1V.
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_____

SLR-TC – 437

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I

Day and Date : Monday, 7-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Explain working of positive clamper and negative clamper with necessary waveform.

   2) Design a fixed bias circuit. Using silicon transistor having h_{FE} = 100, V_{CC} = 12V and V_{CE} = 6V, I_C = 3mA, V_{BE} = 0.7V.

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   4) Define following term :

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      b) short circuit protection.

   5) Explain and draw various modes of BJT operations.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Differentiate between common emitter common base and common collector of BJT configuration.

   2) Draw and explain working of voltage doubler circuit.

   3) Define following terms and mention their significance related to BJT :

      a) thermal runway

      b) stability factor

      c) transistor as a switch.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Define following parameter of FET :

a) transconductance

b) amplification factor

c) drain resistance

d) input resistance.

2) Differentiate between BJT and FET.

3) Determine the following for given network :

Given :

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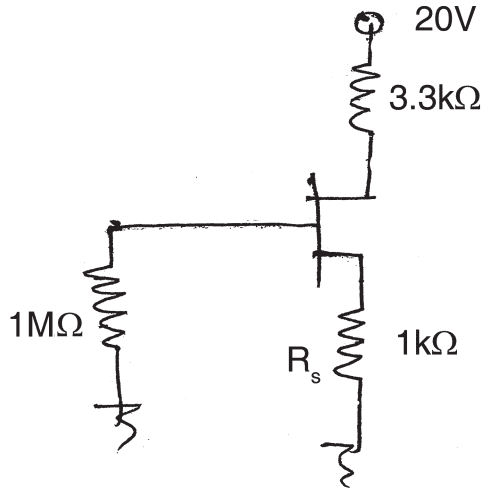
V_P = – 6V



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b) I_D

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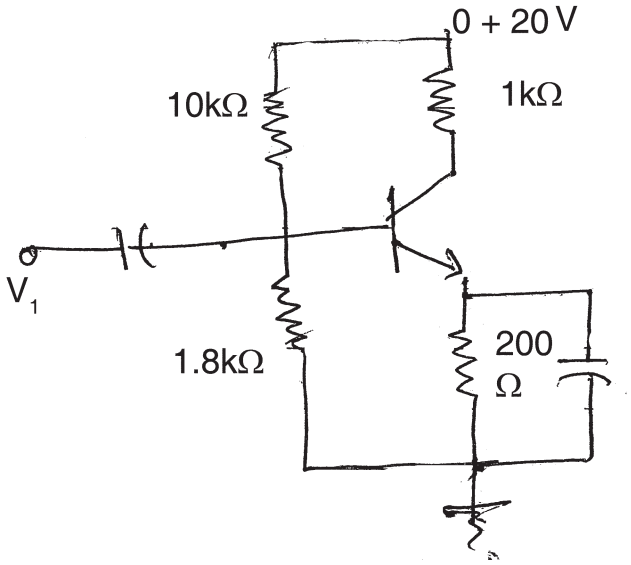
4) Explain construction and working of DIAC power device.

5) Explain working of astable multivibrator using IC555. Draw necessary waveform.

5. Attempt **any 2** questions : **(6×2=12)**

1) For the circuit shown determine : I_{CQ}, I_{BQ}, V_{EQ} and stability factor $\beta = 80$.



2) Explain construction and working of power transistors and trial.

3) Draw and explain various configuration of MOSFET in short.

Set S

SLR-TC – 438

Seat No.	

Set P

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ is not a bilateral.
   a) Resistor b) Diode c) Capacitor d) Inductor

2) In active filter, _____ element is absent.
   a) Inductor b) Capacitor
   c) Both a) and b) d) Resistor

3) Reactive power drawn by a pure resistor is _____
   a) 0 b) Minimum
   c) Maximum d) Average

4) Under resonance condition, the power factor of a system is _____
   a) Unity b) Lagging c) Leading d) Any of above

5) In an AC circuit containing pure inductance, the voltage applied is 120V, 50Hz, while the current is 10A. The value of inductance will be _____
   a) 35 mH b) 34 mH c) 30 mH d) 38 mH

6) In 2 port network, $Z_{12} = Z_{21}$ indicates _____ property.
   a) Unilateral b) Bilateral c) Linear d) Non-linear

P.T.O.

7) Advantage of active filter is _____

a) Do not offer again
b) Easy to tune
c) Both a) and b)
d) Derive high impedance load

8) Number of an ideal value of attenuation for the frequencies in pass band especially for cascade configuration is _____

a) Zero
b) Unity
c) Infinity
d) Unpredictable

9) A 2 port network is driven by a source V_s = 100V in series with 5Ω and terminated in a 25Ω resistor. The impedance parameters are _____

a) $\begin{bmatrix} 20 & 2 \\ 40 & 10 \end{bmatrix}$
b) $\begin{bmatrix} 20 & 40 \\ 2 & 10 \end{bmatrix}$
c) $\begin{bmatrix} 10 & 40 \\ 10 & 20 \end{bmatrix}$
d) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$

10) In series R – L circuit, power factor can be defined as _____

a) R/Z
b) P/S
c) V_r/V
d) All above

11) Superposition theorem is not applicable for

a) Current calculation
b) Voltage calculation
c) Power calculation
d) Energy calculation

12) A circuit with a resistor, inductor and capacitor in series is resonant at f_0 Hz. If all the components values are now doubled, the new resonant frequency is _____

a) $2f_0$
b) f_0
c) $f_0/4$
d) $f_0/2$

13) In a series R-L-C circuit, R = 2kΩ, L = 1H, C = 1/400 μf. The resonant frequency is _____

a) 2×10^4 Hz
b) $\frac{1}{\pi} \times 10^4$ Hz
c) 10^4Hz
d) $2\pi \times 10^4$ Hz

14) A network contains only an independent current source and resistors. If the values of all resistors are doubled. The value of the node voltages will _____

a) Becomes half
b) Remain unchanged
c) Becomes double
d) None of the above

_____

SLR-TC – 438

Seat No.	

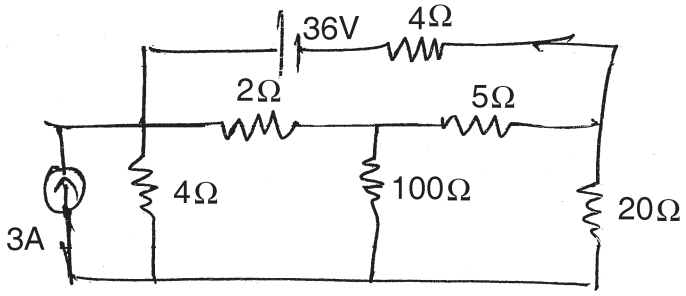
S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

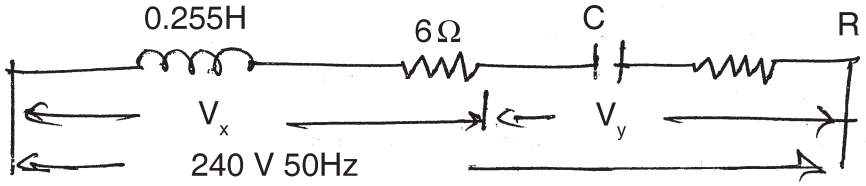
2. Attempt **any 4** questions : **(4×4=16)**

1) Determine the current through the 5Ω resistor using nodal analysis.



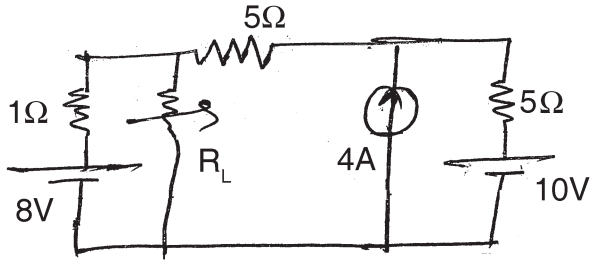
2) State and explain superposition theorem.

3) Find the values of R and C, so that $V_x = 3V_y$, V_x and V_y are in quadrature.



4) Compare between Thevenin's theorem and Norton's theorem.

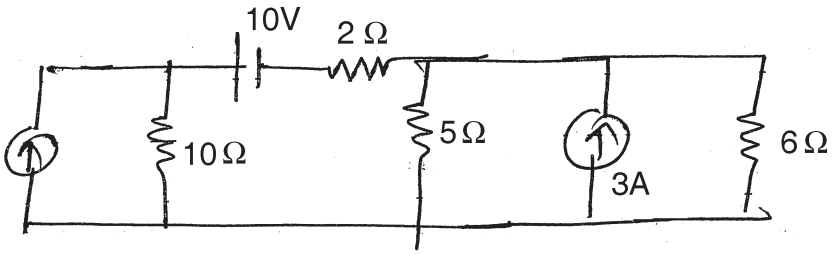
5) For the circuit shown, find the value of resistance R_L for maximum power and calculate maximum power.



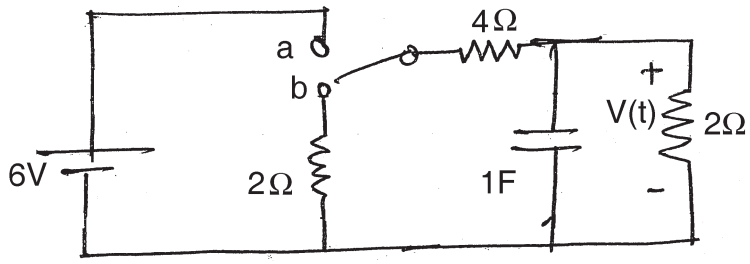
Set P

3. Attempt **any two** questions : **(6×2=12)**

1) Using Thevenin's theorem, find the current through the 6Ω resistor.



2) For the network shown below, the switch is moved from 'a' to 'b' at t = 0, find V(t).



3) Write a short note on :

a) Mesh and Nodal analysis.

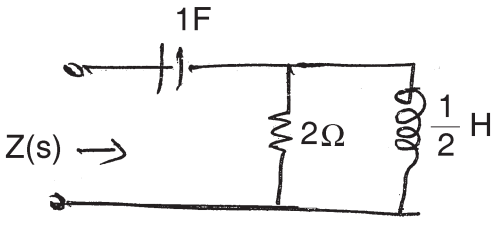
b) Current and voltage source transformation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

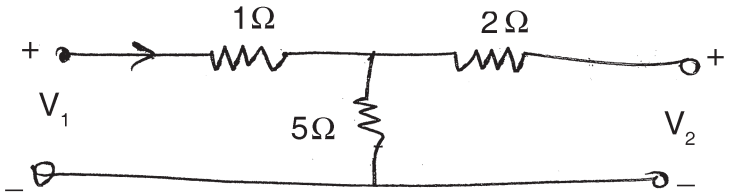
1) With the help of neat diagram, explain working of band pass and band reject filter.

2) Find poles and zeros of the impedance of the following network and plot them on S-plane.



3) Derive condition for reciprocity for open circuit impedance parameter.

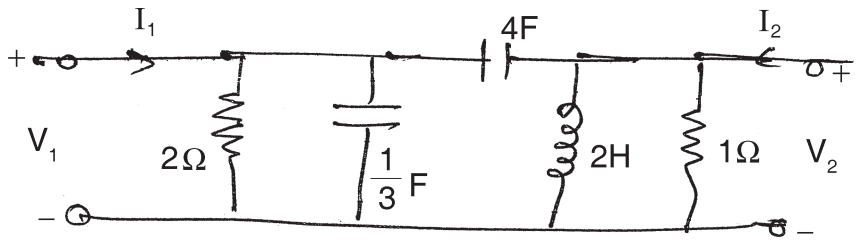
4) Find the transmission parameter for the network shown.



5) Explain how 2 port network can be represented by an equivalent T network.

5. Attempt **any 2** questions : **(6×2=12)**

1) Find Y parameter for shown network.



2) Draw and explain concept of notch filtering using RC and RL circuits.

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a) ABCD parameter in term of Z parameter.

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Set P

SLR-TC – 438

Seat No.	

Set Q

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Number of an ideal value of attenuation for the frequencies in pass band especially for cascade configuration is _____

a) Zero b) Unity c) Infinity d) Unpredictable

2) A 2 port network is driven by a source V_s = 100V in series with 5Ω and terminated in a 25Ω resistor. The impedance parameters are _____

a) $\begin{bmatrix} 20 & 2 \\ 40 & 10 \end{bmatrix}$ b) $\begin{bmatrix} 20 & 40 \\ 2 & 10 \end{bmatrix}$ c) $\begin{bmatrix} 10 & 40 \\ 10 & 20 \end{bmatrix}$ d) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$

3) In series R – L circuit, power factor can be defined as _____

a) R/Z b) P/S c) V_r/V d) All above

4) Superposition theorem is not applicable for

a) Current calculation b) Voltage calculation

c) Power calculation d) Energy calculation

5) A circuit with a resistor, inductor and capacitor in series is resonant at f_0 Hz. If all the components values are now doubled, the new resonant frequency is _____

a) $2f_0$ b) f_0 c) $f_0/4$ d) $f_0/2$

P.T.O.

6) In a series R-L-C circuit, R = 2kΩ, L = 1H, C = 1/400 μf. The resonant frequency is _____

a) 2×10^4 Hz b) $\frac{1}{\pi} \times 10^4$Hz c) 10^4Hz d) $2\pi \times 10^4$ Hz

7) A network contains only an independent current source and resistors. If the values of all resistors are doubled. The value of the node voltages will _____

a) Becomes half b) Remain unchanged

c) Becomes double d) None of the above

8) _____ is not a bilateral.

a) Resistor b) Diode c) Capacitor d) Inductor

9) In active filter, _____ element is absent.

a) Inductor b) Capacitor

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10) Reactive power drawn by a pure resistor is _____

a) 0 b) Minimum

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11) Under resonance condition, the power factor of a system is _____

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12) In an AC circuit containing pure inductance, the voltage applied is 120V, 50Hz, while the current is 10A. The value of inductance will be _____

a) 35 mH b) 34 mH c) 30 mH d) 38 mH

13) In 2 port network, $Z_{12} = Z_{21}$ indicates _____ property.

a) Unilateral b) Bilateral c) Linear d) Non-linear

14) Advantage of active filter is _____

a) Do not offer again b) Easy to tune

c) Both a) and b) d) Derive high impedance load

_____

SLR-TC – 438

Seat No.	

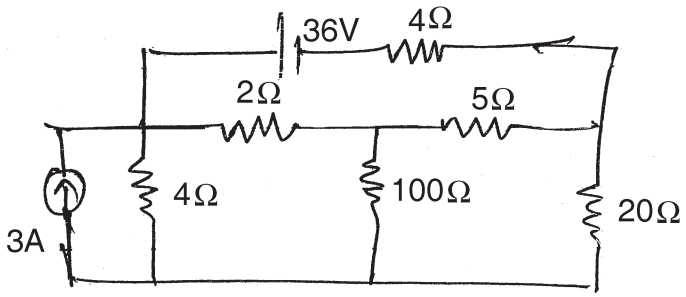
S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

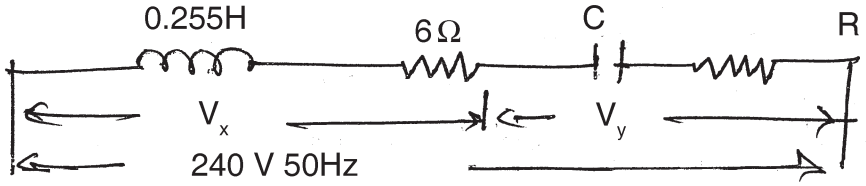
2. Attempt **any 4** questions : **(4×4=16)**

1) Determine the current through the 5Ω resistor using nodal analysis.



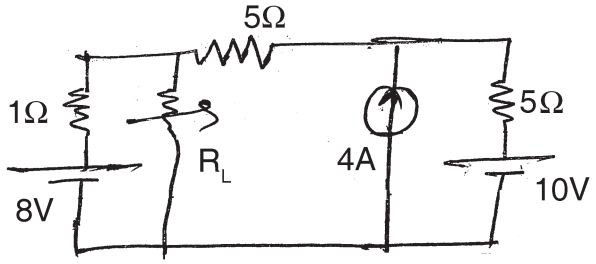
2) State and explain superposition theorem.

3) Find the values of R and C, so that $V_x = 3V_y$, V_x and V_y are in quadrature.



4) Compare between Thevenin's theorem and Norton's theorem.

5) For the circuit shown, find the value of resistance R_L for maximum power and calculate maximum power.



Set Q

3. Attempt **any two** questions : **(6×2=12)**

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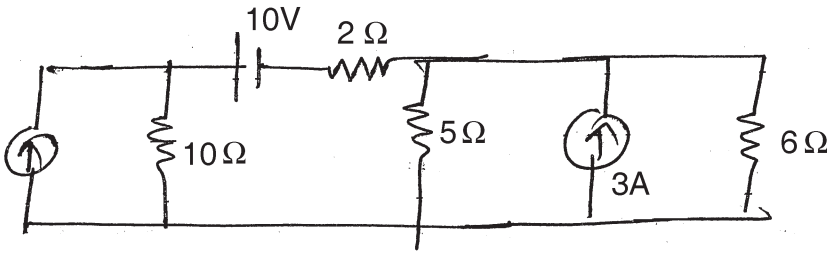
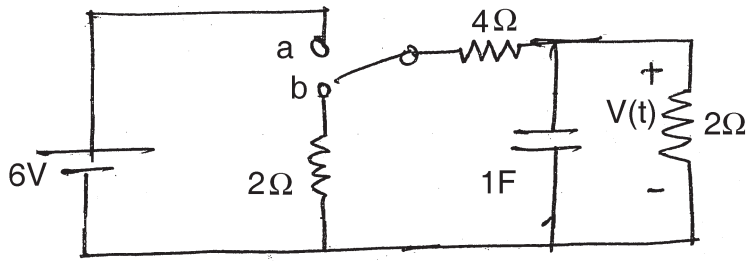


2) For the network shown below, the switch is moved from 'a' to 'b' at t = 0, find V(t).



3) Write a short note on :

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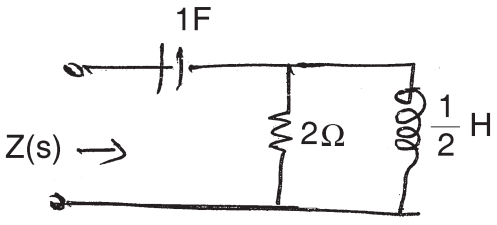
SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) With the help of neat diagram, explain working of band pass and band reject filter.

2) Find poles and zeros of the impedance of the following network and plot them on S-plane.



3) Derive condition for reciprocity for open circuit impedance parameter.

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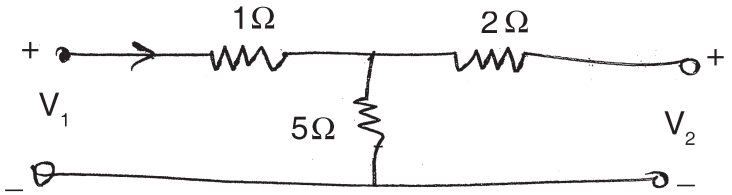

5) Explain how 2 port network can be represented by an equivalent T network.

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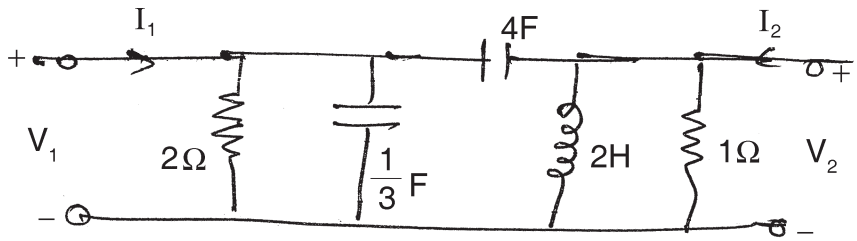
1) Find Y parameter for shown network.



2) Draw and explain concept of notch filtering using RC and RL circuits.

3) Write a short note on :

a) ABCD parameter in term of Z parameter.

b) ABCD parameter in term of Y parameter.

Set Q

SLR-TC – 438

Seat No.	

Set R

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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1) In an AC circuit containing pure inductance, the voltage applied is 120V, 50Hz, while the current is 10A. The value of inductance will be _____

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3) Advantage of active filter is _____

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P.T.O.

6) In series R – L circuit, power factor can be defined as _____
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_____

SLR-TC – 438

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

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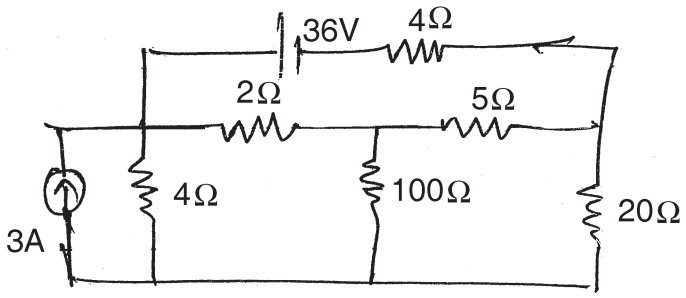
1) Determine the current through the 5Ω resistor using nodal analysis.



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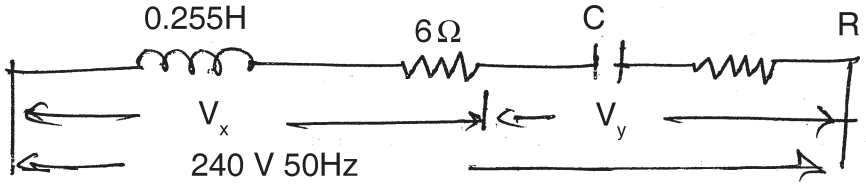

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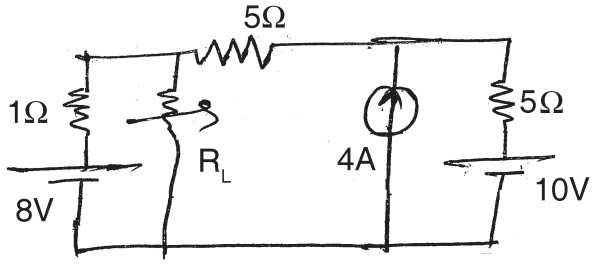
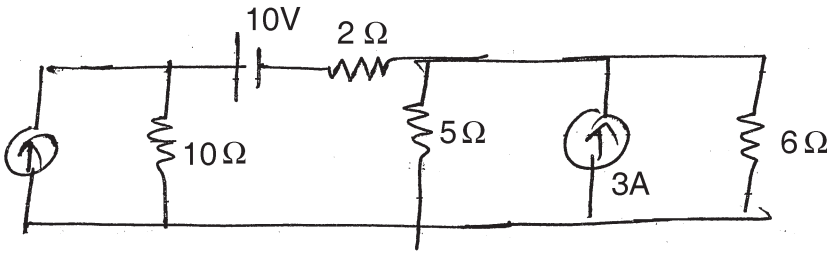


Set R

3. Attempt **any two** questions : **(6×2=12)**

1) Using Thevenin's theorem, find the current through the 6Ω resistor.



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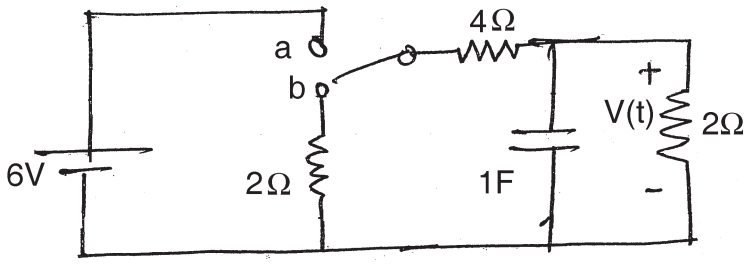

3) Write a short note on :

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SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) With the help of neat diagram, explain working of band pass and band reject filter.

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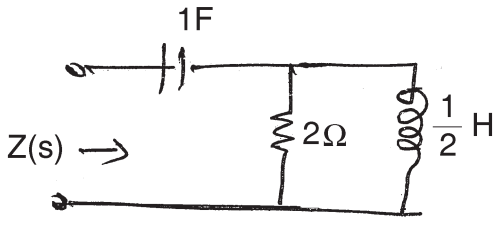

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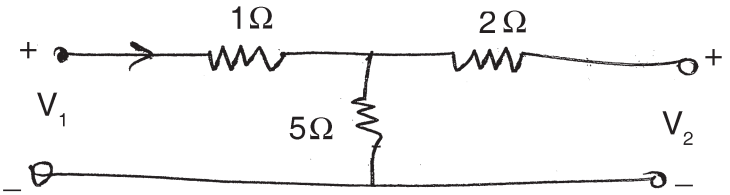

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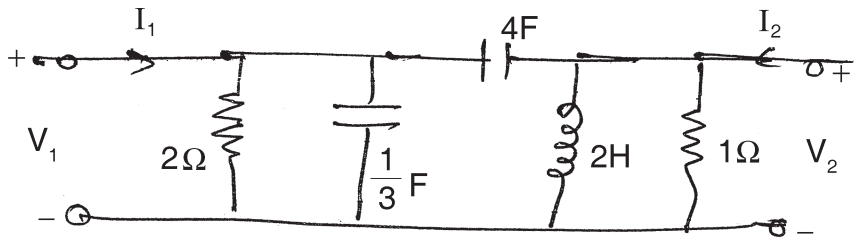

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Set R

SLR-TC – 438

Seat No.	

Set S

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
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Duration : 30 Minutes Marks : 14

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_____

SLR-TC – 438

Seat No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018
LINEAR CIRCUIT ANALYSIS

Day and Date : Tuesday, 8-5-2018 Marks : 56
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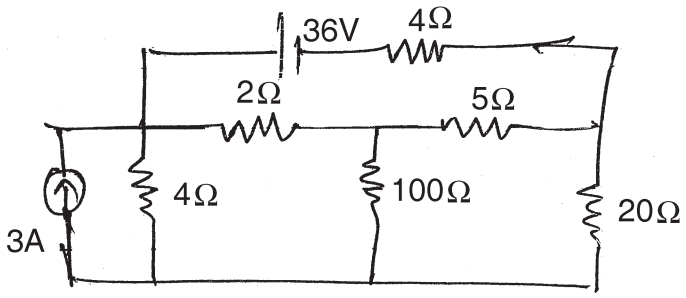
1) Determine the current through the 5Ω resistor using nodal analysis.



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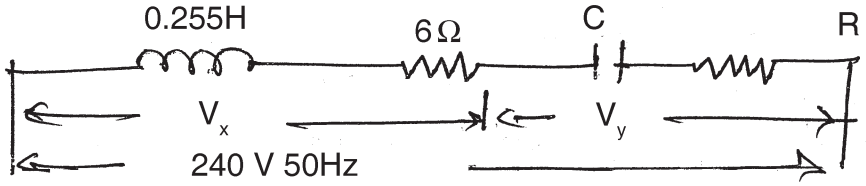

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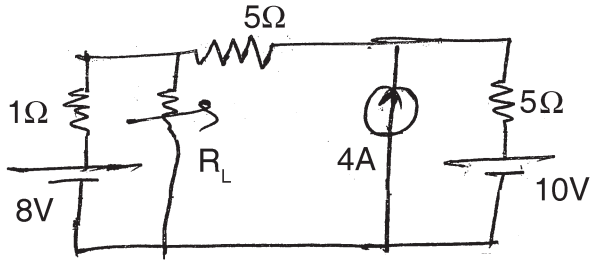

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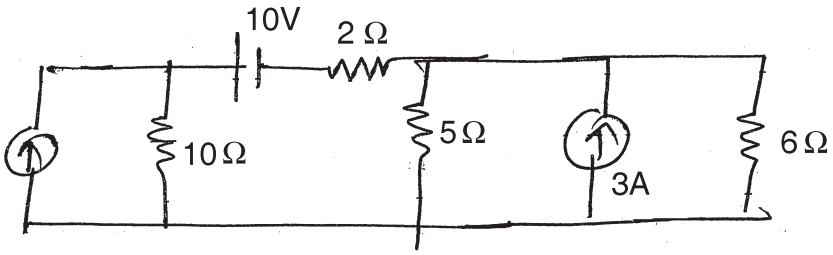

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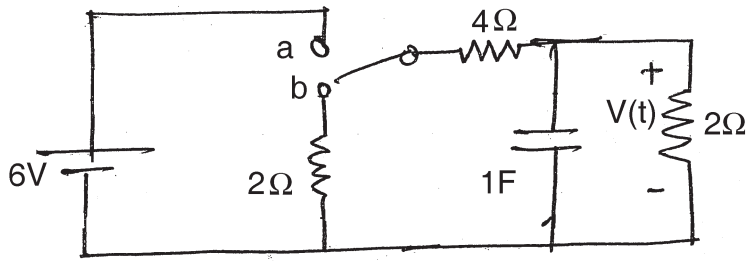

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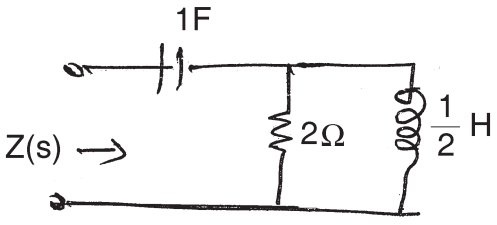
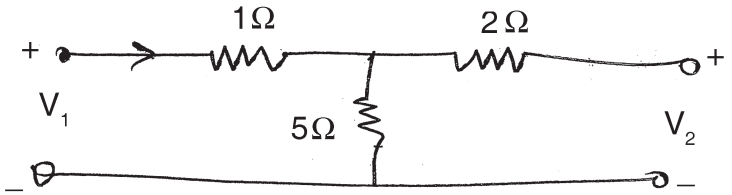


3) Derive condition for reciprocity for open circuit impedance parameter.

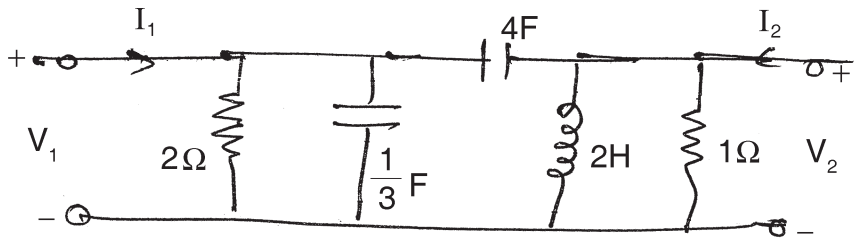
4) Find the transmission parameter for the network shown.



5) Explain how 2 port network can be represented by an equivalent T network.

5. Attempt **any 2** questions : **(6×2=12)**

1) Find Y parameter for shown network.



2) Draw and explain concept of notch filtering using RC and RL circuits.

3) Write a short note on :

a) ABCD parameter in term of Z parameter.

b) ABCD parameter in term of Y parameter.

Set S

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Seat No.	

Set **P**

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date : Saturday, 12-5-2018 Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Fill in the blanks : **(1×20=20)**

1) _____ is the property of a substance due to which it opposes the flow of electric current through it.
a) Capacitance b) Resistance c) Inductance d) Impedance

2) _____ is the property of a coil that opposes any change in the amount of current flowing through it.
a) Inductance b) Resistance c) Capacitance d) Impedance

3) An element which is a source of electrical signal of signal energy is termed as _____ element.
a) Passive b) Active c) Series d) Parallel

4) A _____ is any closed part of the circuit.
a) Mesh b) Node c) Branch d) Loop

5) A _____ is a junction where two or more circuit elements are connected together.
a) Node b) Mesh c) Branch d) Loop

6) A voltage source with a series resistance can be converted into an equivalent _____ source with a parallel resistance.
a) voltage b) power c) current d) watt

7) Nodal analysis is based on _____ current law.
a) Kirchoff's b) Mesh c) Star delta d) Faraday

8) A sinusoidal alternating current and _____ can be represented by phasors.
a) voltages b) power c) energy d) watts

9) A graph drawn on a _____ plane is said to be planer if two branches do not intersect.
a) 1-dimension b) 3-dimentional c) 2-dimentional d) none of the above

10) Sub graph is a subset of branches and _____ of a graph.
a) Nodes b) Planers c) Meshes d) Loop

11) For a graph with 'n' nodes and 'b' branches, the complete incidence matrix is 0 + order _____
a) n + b b) n/b c) n × b d) n – b

12) If excitation and response are measured at same ports the network function is known as the _____ point function.
a) Transfer b) Fourier c) Laplace d) Driving

13) When a unit impulse voltage is applied to an inductor of 1H, the energy supplied by the source is _____
a) ∞ b) 1J c) ½J d) 0

14) The transfer function is used to describe networks which have atleast _____ ports.
a) 3 b) 4 c) 1 d) 2

15) As the poles of a network shift away from the X-axis, the response _____
a) remains constant b) becomes less oscillating
c) more oscillating d) variable

16) The transfer function of a low pass RC network is _____
a) (RCs) (1+ RCs) b) $\frac{1}{1+RCs}$ c) $\frac{RCs}{1+RCs}$ d) $\frac{s}{1+RCs}$

17) For a 2 port symmetrical bilateral network, if A = 3 and B = 1 ,the value of parameter C will be _____
a) 4 b) 6 c) 8 d) 16

18) For a two port network to be reciprocal _____
a) $z_{11} = z_{22}$ b) $y_{12} = y_{21}$ c) $h_{21} = -h_{12}$ d) AD = BC

19) The number of roots of $s^3 + 5s^2 + 7s + 3 = 0$ in the left half of s-plane is _____
a) zero b) one c) two d) three

20) The nodal method of circuit analysis is based on_____
a) KVL and Ohm's law b) KCL and Ohm's law
c) KCL and KVL d) KCL, KVL and Ohm's low

_____

SLR-TC – 439

Seat No.	

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

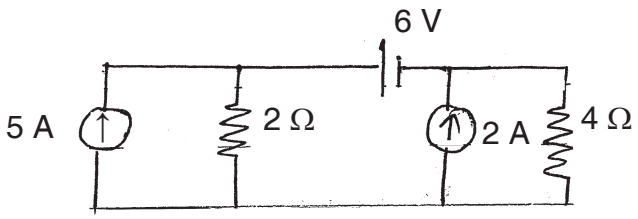
Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

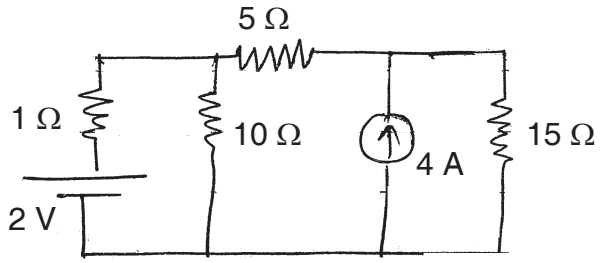
2. Attempt **any four** : **(4×5=20)**

1) State and explain Kirchoff's current low and voltage low.

2) Find the current in 4Ω resistor.



3) Find the current through 10 Ω resistor using mesh analysis.

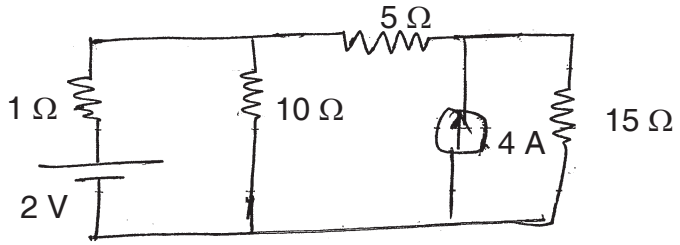


4) Define and differentiate between nodal and mesh analysis.

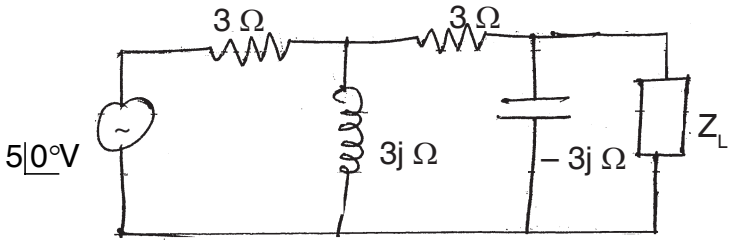
5) State and explain superposition theorem.

3. Attempt **any two** : **(10×2=20)**

1) State Norton's theorem and find current through 10 Ω resistor using it.



2) State maximum power transfer theorem and find the impedance Z_L so that maximum power can be transferred to it in the network of shown it.

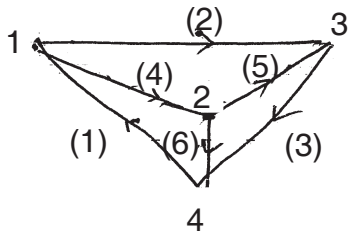


3) For the graph shown, calculate :

a) incidence matrix

b) r-cutset matrix

c) f-circuit matrix.



SECTION – II

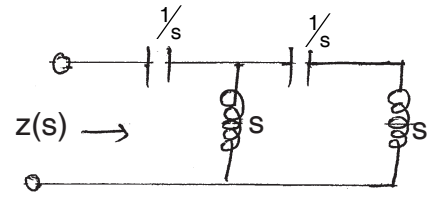
4. Attempt **any four** : **(4×5=20)**

1) Define following :

a) Current transfer function

b) Transfer impedance function.

2) Determine the driving point impedance of given network.



3) Derive and explain condition for symmetry for z parameter.

4) State whether the following polynomial is Hurwitz or not.

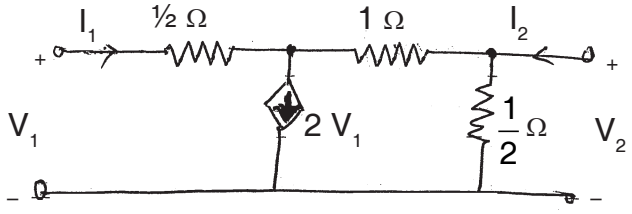
   a) $s^4 + 4s^3 + 3s + 2$

   b) $s^6 + 5s^5 + 4s^4 + 3s^3 + 2s^2 + s + 3$.

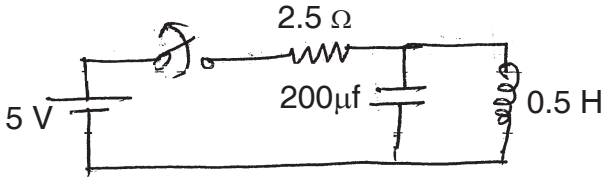
5) Mention any 4 properties of positive real function and its necessary and sufficient condition.

5. Attempt **any two** : **(10×2=20)**

1) Obtain y and z parameter for given network .



2) In the network shown, switch is closed and steady state is attained. At t = 0, switch is opened. Determine current through the inductor.



3) Realize Foster forms of given LC impedance function.

$$z(s) = \frac{(s^2+1)(s^2+3)}{s(s^2+2)(s^2+4)}$$

Set P

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Seat No.	

Set Q

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date : Saturday, 12-5-2018 Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Fill in the blanks : **(1×20=20)**

1) The transfer function of a low pass RC network is _____
a) (RCs) (1+ RCs) b) $\frac{1}{1+RCs}$ c) $\frac{RCs}{1+RCs}$ d) $\frac{s}{1+RCs}$

2) For a 2 port symmetrical bilateral network, if A = 3 and B = 1 ,the value of parameter C will be _____
a) 4 b) 6 c) 8 d) 16

3) For a two port network to be reciprocal _____
a) $z_{11} = z_{22}$ b) $y_{12} = y_{21}$ c) $h_{21} = -h_{12}$ d) AD = BC

4) The number of roots of $s^3 + 5s^2 + 7s + 3 = 0$ in the left half of s-plane is _____
a) zero b) one c) two d) three

5) The nodal method of circuit analysis is based on_____
a) KVL and Ohm's law b) KCL and Ohm's law
c) KCL and KVL d) KCL, KVL and Ohm's low

6) _____ is the property of a substance due to which it opposes the flow of electric current through it.
a) Capacitance b) Resistance c) Inductance d) Impedance

7) _____ is the property of a coil that opposes any change in the amount of current flowing through it.
a) Inductance b) Resistance c) Capacitance d) Impedance

P.T.O.

8 An element which is a source of electrical signal of signal energy is termed as _____ element.
a) Passive b) Active c) Series d) Parallel

9) A _____ is any closed part of the circuit.
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14) A graph drawn on a _____ plane is said to be planer if two branches do not intersect.
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15) Sub graph is a subset of branches and _____ of a graph.
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16) For a graph with 'n' nodes and 'b' branches, the complete incidence matrix is 0 + order _____
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17) If excitation and response are measured at same ports the network function is known as the _____ point function.
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18) When a unit impulse voltage is applied to an inductor of 1H, the energy supplied by the source is _____
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19) The transfer function is used to describe networks which have atleast _____ ports.
a) 3 b) 4 c) 1 d) 2

20) As the poles of a network shift away from the X-axis, the response _____
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c) more oscillating d) variable

_____

SLR-TC – 439

Seat No.	

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

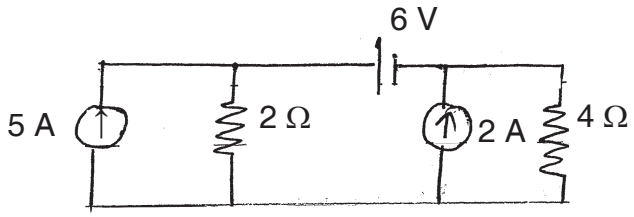
Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

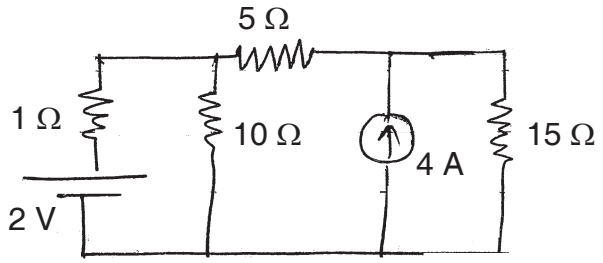
2. Attempt **any four** : **(4×5=20)**

1) State and explain Kirchoff's current low and voltage low.

2) Find the current in 4Ω resistor.



3) Find the current through 10 Ω resistor using mesh analysis.

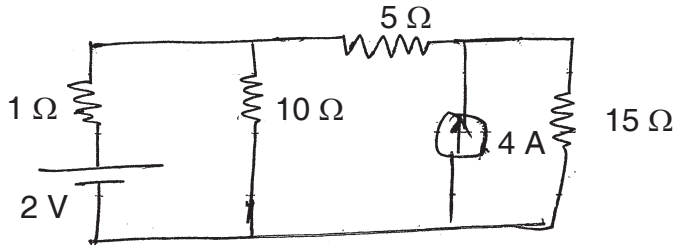


4) Define and differentiate between nodal and mesh analysis.

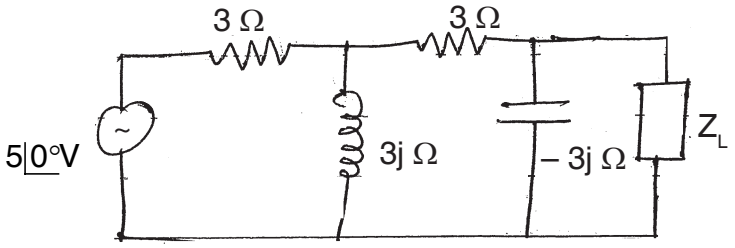
5) State and explain superposition theorem.

3. Attempt **any two** : **(10×2=20)**

1) State Norton's theorem and find current through 10 Ω resistor using it.



2) State maximum power transfer theorem and find the impedance Z_L so that maximum power can be transferred to it in the network of shown it.

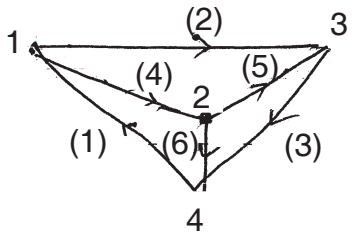


3) For the graph shown, calculate :

a) incidence matrix

b) r-cutset matrix

c) f-circuit matrix.



SECTION – II

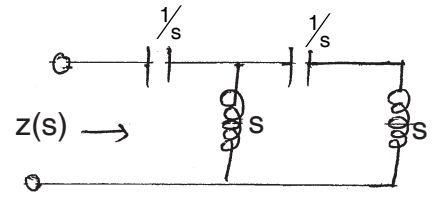
4. Attempt **any four** : **(4×5=20)**

1) Define following :

a) Current transfer function

b) Transfer impedance function.

2) Determine the driving point impedance of given network.



3) Derive and explain condition for symmetry for z parameter.

4) State whether the following polynomial is Hurwitz or not.

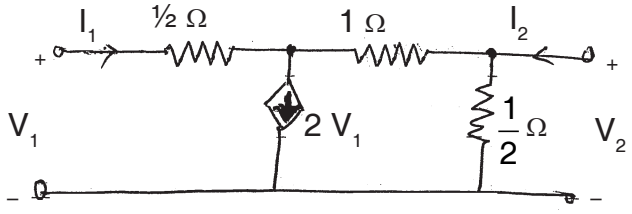
   a) $s^4 + 4s^3 + 3s + 2$

   b) $s^6 + 5s^5 + 4s^4 + 3s^3 + 2s^2 + s + 3$.

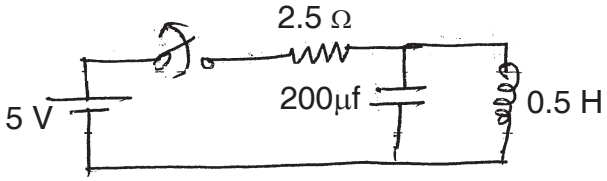
5) Mention any 4 properties of positive real function and its necessary and sufficient condition.

5. Attempt **any two** : **(10×2=20)**

1) Obtain y and z parameter for given network .



2) In the network shown, switch is closed and steady state is attained. At t = 0, switch is opened. Determine current through the inductor.



3) Realize Foster forms of given LC impedance function.

$$z(s) = \frac{(s^2+1)(s^2+3)}{s(s^2+2)(s^2+4)}$$

Set Q

SLR-TC – 439

Seat No.	

Set **R**

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date : Saturday, 12-5-2018 Total Marks : 100
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*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Fill in the blanks : **(1×20=20)**

1) For a graph with 'n' nodes and 'b' branches, the complete incidence matrix is 0 + order _____
a) n + b b) n/b c) n × b d) n – b

2) If excitation and response are measured at same ports the network function is known as the _____ point function.
a) Transfer b) Fourier c) Laplace d) Driving

3) When a unit impulse voltage is applied to an inductor of 1H, the energy supplied by the source is _____
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4) The transfer function is used to describe networks which have atleast _____ ports.
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6) The transfer function of a low pass RC network is _____
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7) For a 2 port symmetrical bilateral network, if A = 3 and B = 1 ,the value of parameter C will be _____
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P.T.O.

8) For a two port network to be reciprocal _____
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13) An element which is a source of electrical signal of signal energy is termed as _____ element.
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14) A _____ is any closed part of the circuit.
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16) A voltage source with a series resistance can be converted into an equivalent _____ source with a parallel resistance.
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17) Nodal analysis is based on _____ current law.
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18) A sinusoidal alternating current and _____ can be represented by phasors.
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19) A graph drawn on a _____ plane is said to be planer if two branches do not intersect.
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20) Sub graph is a subset of branches and _____ of a graph.
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_____

SLR-TC – 439

Seat No.	

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×5=20)**

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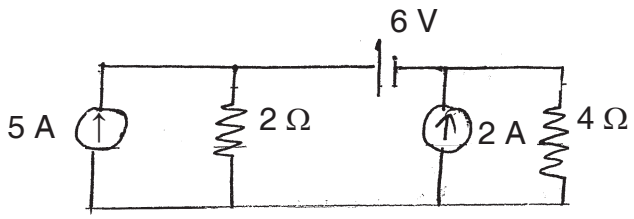
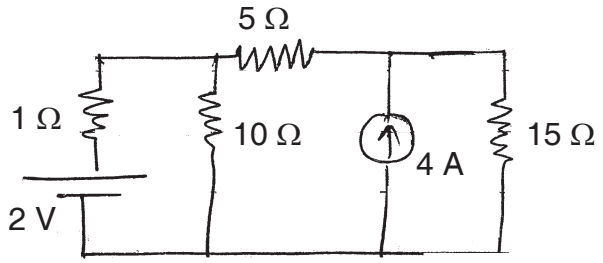


3) Find the current through 10 Ω resistor using mesh analysis.

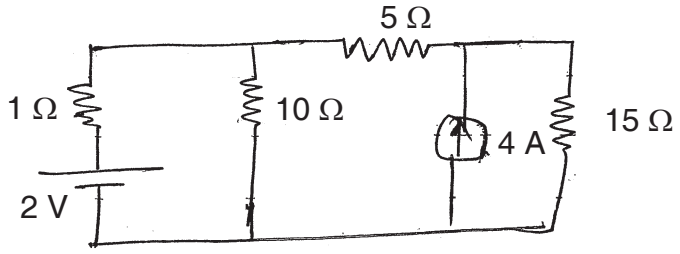


4) Define and differentiate between nodal and mesh analysis.

5) State and explain superposition theorem.

3. Attempt **any two** : **(10×2=20)**

1) State Norton's theorem and find current through 10 Ω resistor using it.



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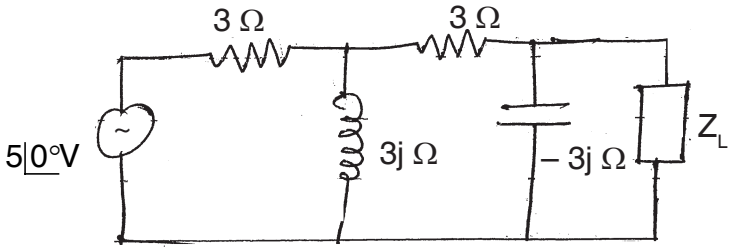

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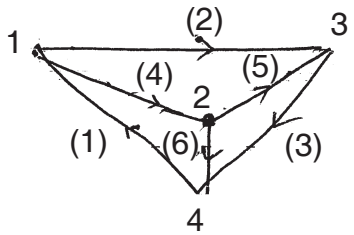

SECTION – II

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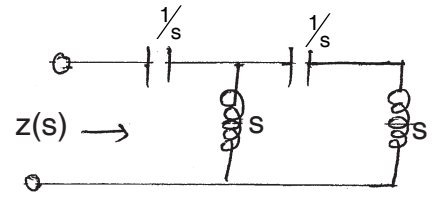

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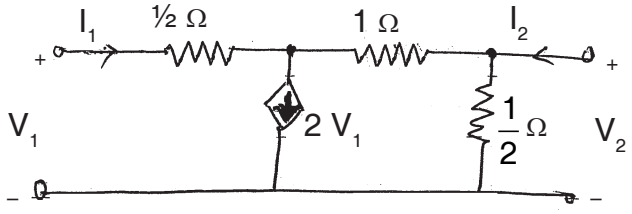
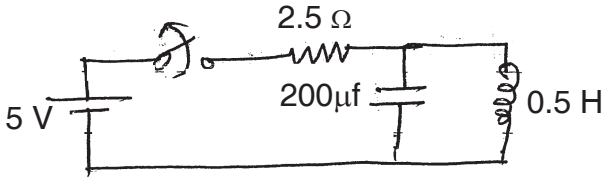
5) Mention any 4 properties of positive real function and its necessary and sufficient condition.

5. Attempt **any two** : **(10×2=20)**

1) Obtain y and z parameter for given network .



2) In the network shown, switch is closed and steady state is attained. At t = 0, switch is opened. Determine current through the inductor.



3) Realize Foster forms of given LC impedance function.

$$z(s) = \frac{(s^2+1)(s^2+3)}{s(s^2+2)(s^2+4)}$$

Set R

SLR-TC – 439

Seat No.	

Set **S**

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date : Saturday, 12-5-2018 Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Fill in the blanks : **(1×20=20)**

1) A voltage source with a series resistance can be converted into an equivalent _____ source with a parallel resistance.
a) voltage b) power c) current d) watt

2) Nodal analysis is based on _____ current law.
a) Kirchoff's b) Mesh c) Star delta d) Faraday

3) A sinusoidal alternating current and _____ can be represented by phasors.
a) voltages b) power c) energy d) watts

4) A graph drawn on a _____ plane is said to be planer if two branches do not intersect.
a) 1-dimension b) 3-dimentional c) 2-dimentional d) none of the above

5) Sub graph is a subset of branches and _____ of a graph.
a) Nodes b) Planers c) Meshes d) Loop

6) For a graph with 'n' nodes and 'b' branches, the complete incidence matrix is 0 + order _____
a) n + b b) n/b c) n × b d) n – b

7) If excitation and response are measured at same ports the network function is known as the _____ point function.
a) Transfer b) Fourier c) Laplace d) Driving

8) When a unit impulse voltage is applied to an inductor of 1H, the energy supplied by the source is _____
a) ∞ b) 1J c) ½J d) 0

9) The transfer function is used to describe networks which have atleast _____ ports.
a) 3 b) 4 c) 1 d) 2

10) As the poles of a network shift away from the X-axis, the response _____
a) remains constant b) becomes less oscillating
c) more oscillating d) variable

11) The transfer function of a low pass RC network is _____
a) (RCs) (1+ RCs) b) $\frac{1}{1+RCs}$ c) $\frac{RCs}{1+RCs}$ d) $\frac{s}{1+RCs}$

12) For a 2 port symmetrical bilateral network, if A = 3 and B = 1 ,the value of parameter C will be _____
a) 4 b) 6 c) 8 d) 16

13) For a two port network to be reciprocal _____
a) $z_{11} = z_{22}$ b) $y_{12} = y_{21}$ c) $h_{21} = -h_{12}$ d) AD = BC

14) The number of roots of $s^3 + 5s^2 + 7s + 3 = 0$ in the left half of s-plane is _____
a) zero b) one c) two d) three

15) The nodal method of circuit analysis is based on_____
a) KVL and Ohm's law b) KCL and Ohm's law
c) KCL and KVL d) KCL, KVL and Ohm's low

16) _____ is the property of a substance due to which it opposes the flow of electric current through it.
a) Capacitance b) Resistance c) Inductance d) Impedance

17) _____ is the property of a coil that opposes any change in the amount of current flowing through it.
a) Inductance b) Resistance c) Capacitance d) Impedance

18) An element which is a source of electrical signal of signal energy is termed as _____ element.
a) Passive b) Active c) Series d) Parallel

19) A _____ is any closed part of the circuit.
a) Mesh b) Node c) Branch d) Loop

20) A _____ is a junction where two or more circuit elements are connected together.
a) Node b) Mesh c) Branch d) Loop

_____

SLR-TC – 439

Seat No.	

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

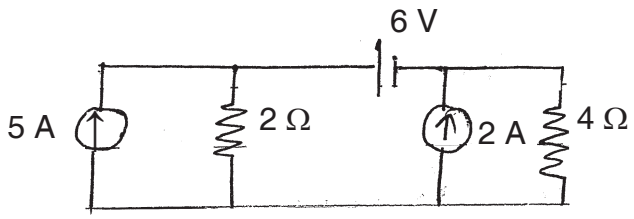
Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

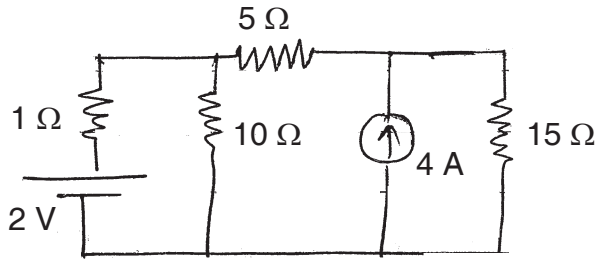
2. Attempt **any four** : **(4×5=20)**

1) State and explain Kirchoff's current low and voltage low.

2) Find the current in 4Ω resistor.



3) Find the current through 10 Ω resistor using mesh analysis.

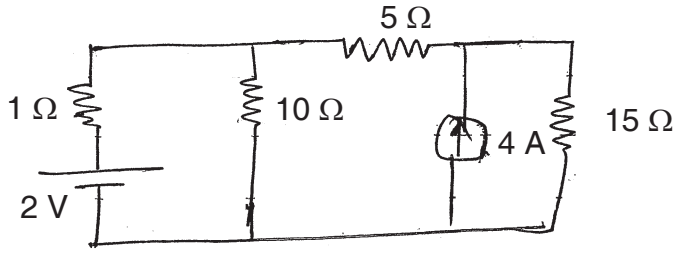


4) Define and differentiate between nodal and mesh analysis.

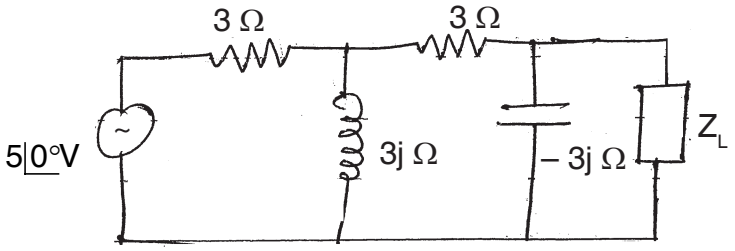
5) State and explain superposition theorem.

3. Attempt **any two** : **(10×2=20)**

1) State Norton's theorem and find current through 10 Ω resistor using it.



2) State maximum power transfer theorem and find the impedance Z_L so that maximum power can be transferred to it in the network of shown it.

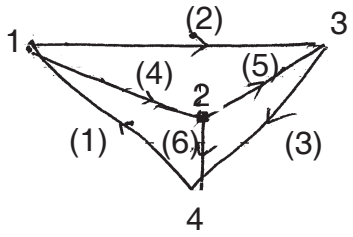


3) For the graph shown, calculate :

a) incidence matrix

b) r-cutset matrix

c) f-circuit matrix.



SECTION – II

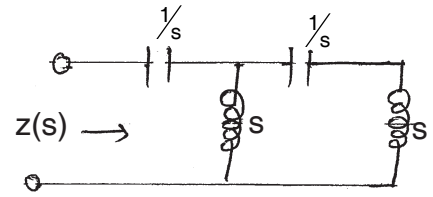
4. Attempt **any four** : **(4×5=20)**

1) Define following :

a) Current transfer function

b) Transfer impedance function.

2) Determine the driving point impedance of given network.



3) Derive and explain condition for symmetry for z parameter.

4) State whether the following polynomial is Hurwitz or not.

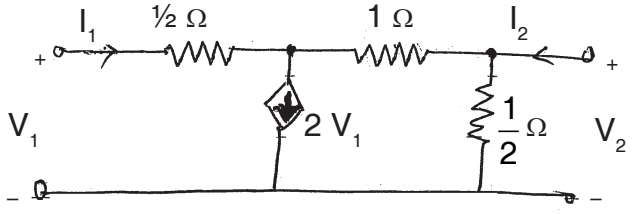
   a) $s^4 + 4s^3 + 3s + 2$

   b) $s^6 + 5s^5 + 4s^4 + 3s^3 + 2s^2 + s + 3$.

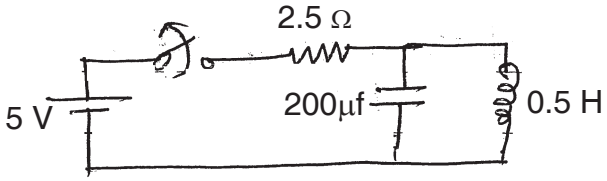
5) Mention any 4 properties of positive real function and its necessary and sufficient condition.

5. Attempt **any two** : **(10×2=20)**

1) Obtain y and z parameter for given network .



2) In the network shown, switch is closed and steady state is attained. At t = 0, switch is opened. Determine current through the inductor.



3) Realize Foster forms of given LC impedance function.

$$z(s) = \frac{(s^2+1)(s^2+3)}{s(s^2+2)(s^2+4)}$$

Set S

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Seat No.	

Set P

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ is defined as the largest charge in the input quantity to which the measuring system does not respond.
a) Drift b) Resolution c) Dead band d) Error

2) Capacitive transducers are also called as _____ transducers as they measure an object without mechanical coupling.
a) Proximity b) Invasive c) Loading d) Inductive

3) Quartz is an _____ , the surfaces on which charge accumulates are provided with metallic electrodes.
a) Conductor b) Insulator
c) Capacitor d) None of above

4) Standard electrode potential for any half cell is measurement of
a) Voltage b) Ions apart c) Radii of ions d) Deposited ion

5) _____ biosensors use the movement of electrons produced during redox reaction.
a) Amperometric b) Potentiometric c) Piezoelectric d) Optical

6) _____ acts as detector in optical sensor.
a) LED b) Photo diode c) Transistor d) All of above

7) _____ conversion take place in bourdon tubes.
a) Pressure to displacement b) Pressure to voltage
c) Pressure to strain d) Pressure to force

P.T.O.

8) _____ quantities cannot be measured by capacitive transducers.
   a) Displacement b) Speed
   c) Moisture d) None of above

9) _____ describes current flow between two junctions formed by two different metals.
   a) Peltier effect b) Thomson effect
   c) Seebeck effect d) None of above

10) In piezoelectric strain transducer voltage developed is _____ to strain applied.
   a) Directly proportional b) Inversely proportional
   c) Equal d) Independent

11) With the increase in the intensity of light, the resistance of photovoltaic cell
   a) Increases b) Decreases c) Remains same d) Separates

12) _____ represents active transducer.
   a) Strain gauge b) Thermister
   c) LVDT d) Thermo couple

13) Capacitive transducer are used for
   a) Static measurement b) Dynamic measurement
   c) Transient measurement d) Both a) and b)

14) _____error is caused by careless handling.
   a) Systematic b) Gross c) Random d) Kinetic

_____

SLR-TC – 440

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
   3) Define gauge factor and distinguish between bonded and unbonded strain gauges.
   4) With the help of diagram explain electrode electrolyte interface and define half cell potential.
   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
   3) Describe construction, working and application of microelectrodes.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
      a) Working and construction of amperometric sensor.
      b) Catalytic biosensor.
   2) Explain how fiber optic sensors are designed for measuring following variables :
      a) temperature
      b) pressure
   3) With the help of diagram explain working of ISFET's.

SLR-TC – 440

Seat No.	

Set Q

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ quantities cannot be measured by capacitive transducers.
   a) Displacement b) Speed
   c) Moisture d) None of above

2) _____ describes current flow between two junctions formed by two different metals.
   a) Peltier effect b) Thomson effect
   c) Seebeck effect d) None of above

3) In piezoelectric strain transducer voltage developed is _____ to strain applied.
   a) Directly proportional b) Inversely proportional
   c) Equal d) Independent

4) With the increase in the intensity of light, the resistance of photovoltaic cell
   a) Increases b) Decreases c) Remains same d) Separates

5) _____ represents active transducer.
   a) Strain gauge b) Thermister
   c) LVDT d) Thermo couple

6) Capacitive transducer are used for
   a) Static measurement b) Dynamic measurement
   c) Transient measurement d) Both a) and b)

P.T.O.

7) _____error is caused by careless handling.
a) Systematic b) Gross c) Random d) Kinetic

8) _____ is defined as the largest charge in the input quantity to which the measuring system does not respond.
a) Drift b) Resolution c) Dead band d) Error

9) Capacitive transducers are also called as _____ transducers as they measure an object without mechanical coupling.
a) Proximity b) Invasive c) Loading d) Inductive

10) Quartz is an _____ , the surfaces on which charge accumulates are provided with metallic electrodes.
a) Conductor b) Insulator
c) Capacitor d) None of above

11) Standard electrode potential for any half cell is measurement of
a) Voltage b) Ions apart c) Radii of ions d) Deposited ion

12) _____ biosensors use the movement of electrons produced during redox reaction.
a) Amperometric b) Potentiometric c) Piezoelectric d) Optical

13) _____ acts as detector in optical sensor.
a) LED b) Photo diode c) Transistor d) All of above

14) _____ conversion take place in bourdon tubes.
a) Pressure to displacement b) Pressure to voltage
c) Pressure to strain d) Pressure to force

_____

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Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
   3) Define gauge factor and distinguish between bonded and unbonded strain gauges.
   4) With the help of diagram explain electrode electrolyte interface and define half cell potential.
   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
   3) Describe construction, working and application of microelectrodes.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
      a) Working and construction of amperometric sensor.
      b) Catalytic biosensor.
   2) Explain how fiber optic sensors are designed for measuring following variables :
      a) temperature
      b) pressure
   3) With the help of diagram explain working of ISFET's.

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Seat No.	

Set R

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ biosensors use the movement of electrons produced during redox reaction.
a) Amperometric b) Potentiometric c) Piezoelectric d) Optical

2) _____ acts as detector in optical sensor.
a) LED b) Photo diode c) Transistor d) All of above

3) _____ conversion take place in bourdon tubes.
a) Pressure to displacement b) Pressure to voltage
c) Pressure to strain d) Pressure to force

4) _____ quantities cannot be measured by capacitive transducers.
a) Displacement b) Speed
c) Moisture d) None of above

5) _____ describes current flow between two junctions formed by two different metals.
a) Peltier effect b) Thomson effect
c) Seebeck effect d) None of above

6) In piezoelectric strain transducer voltage developed is _____ to strain applied.
a) Directly proportional b) Inversely proportional
c) Equal d) Independent

P.T.O.

7) With the increase in the intensity of light, the resistance of photovoltaic cell
   a) Increases b) Decreases c) Remains same d) Separates

8) _____ represents active transducer.
   a) Strain gauge b) Thermister
   c) LVDT d) Thermo couple

9) Capacitive transducer are used for
   a) Static measurement b) Dynamic measurement
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10) _____error is caused by careless handling.
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11) _____ is defined as the largest charge in the input quantity to which the measuring system does not respond.
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12) Capacitive transducers are also called as _____ transducers as they measure an object without mechanical coupling.
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13) Quartz is an _____ , the surfaces on which charge accumulates are provided with metallic electrodes.
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   a) Voltage b) Ions apart c) Radii of ions d) Deposited ion

_____

SLR-TC – 440

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
   3) Define gauge factor and distinguish between bonded and unbonded strain gauges.
   4) With the help of diagram explain electrode electrolyte interface and define half cell potential.
   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
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SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
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   3) With the help of diagram explain working of ISFET's.

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Seat No.	

Set **S**

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In piezoelectric strain transducer voltage developed is _____ to strain applied.
   a) Directly proportional b) Inversely proportional
   c) Equal d) Independent

2) With the increase in the intensity of light, the resistance of photovoltaic cell
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3) _____ represents active transducer.
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   c) Moisture d) None of above

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   a) Peltier effect b) Thomson effect
   c) Seebeck effect d) None of above

SLR-TC – 440

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
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   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
   3) Describe construction, working and application of microelectrodes.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
      a) Working and construction of amperometric sensor.
      b) Catalytic biosensor.
   2) Explain how fiber optic sensors are designed for measuring following variables :
      a) temperature
      b) pressure
   3) With the help of diagram explain working of ISFET's.

SLR-TC – 441

Seat No.	

Set P

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing
c) Loading response d) Post swing

2) Cadence is

a) Steps per gait cycle b) Steps per minute
c) Walking time d) Stepping time

3) The ratio of stress of strain is known as

a) Modulus of elasticity b) Young's modulus
c) Both a and b d) Hook's modulus

4) The shoulder and hip joints are of _____ type.

a) ball and socket b) pivot
c) saddle d) gliding

5) In a _____ lever, the resistance is positioned between the fulcrum and the effort.

a) first class b) second class c) third class d) fourth class

P.T.O.

6) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.

a) Hinge b) Gliding c) Pivot d) Condyloid

7) Following are basic types of stress except

a) tensile stress b) compressive c) shear d) volumetric

8) _____ movement is measured by goniometry is the upward or backward movement of a body part.

a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

9) The degree to which ajoint is able to move is referred as

a) posture b) range of motion

c) gait d) muscle strength

10) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

11) A clot formation in blood vessels is also called

a) Diffusion b) Drift

c) Coagulation d) Hydrolysis

12) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

13) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

14) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

_____

SLR-TC – 441

Seat No.	

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short note on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foot.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it with the help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

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SLR-TC – 441

Seat No.	

Set **Q**

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ movement is measured by goniometry is the upward or backward movement of a body part.

a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

2) The degree to which ajoint is able to move is referred as

a) posture b) range of motion

c) gait d) muscle strength

3) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

4) A clot formation in blood vessels is also called

a) Diffusion b) Drift

c) Coagulation d) Hydrolysis

5) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

6) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

7) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

8) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing

c) Loading response d) Post swing

9) Cadence is

a) Steps per gait cycle b) Steps per minute

c) Walking time d) Stepping time

11) The ratio of stress of strain is known as

a) Modulus of elasticity b) Young's modulus

c) Both a and b d) Hook's modulus

11) The shoulder and hip joints are of _____ type.

a) ball and socket b) pivot

c) saddle d) gliding

12) In a _____ lever, the resistance is positioned between the fulcrum and the effort.

a) first class b) second class c) third class d) fourth class

13) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.

a) Hinge b) Gliding c) Pivot d) Condyloid

14) Following are basic types of stress except

a) tensile stress b) compressive c) shear d) volumetric

_____

SLR-TC – 441

Seat No.	

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short note on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foot.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it with the help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

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SLR-TC – 441

Seat No.	

Set R

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In a _____ lever, the resistance is positioned between the fulcrum and the effort.

a) first class b) second class c) third class d) fourth class

2) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.

a) Hinge b) Gliding c) Pivot d) Condyloid

3) Following are basic types of stress except

a) tensile stress b) compressive c) shear d) volumetric

4) _____ movement is measured by goniometry is the upward or backward movement of a body part.

a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

5) The degree to which ajoint is able to move is referred as

a) posture b) range of motion

c) gait d) muscle strength

6) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

7) A clot formation in blood vessels is also called

a) Diffusion b) Drift

c) Coagulation d) Hydrolysis

8) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

9) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

10) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

11) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing

c) Loading response d) Post swing

12) Cadence is

a) Steps per gait cycle b) Steps per minute

c) Walking time d) Stepping time

13) The ratio of stress of strain is known as

a) Modulus of elasticity b) Young's modulus

c) Both a and b d) Hook's modulus

14) The shoulder and hip joints are of _____ type.

a) ball and socket b) pivot

c) saddle d) gliding

_____

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Seat No.	

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short note on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foot.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it with the help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

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SLR-TC – 441

Seat No.	

Set **S**

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

2) A clot formation in blood vessels is also called

a) Diffusion b) Drift
c) Coagulation d) Hydrolysis

3) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

4) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

5) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

6) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing
c) Loading response d) Post swing

7) Cadence is

a) Steps per gait cycle b) Steps per minute

c) Walking time d) Stepping time

8) The ratio of stress of strain is known as

a) Modulus of elasticity b) Young's modulus

c) Both a and b d) Hook's modulus

9) The shoulder and hip joints are of _____ type.

a) ball and socket b) pivot

c) saddle d) gliding

10) In a _____ lever, the resistance is positioned between the fulcrum and the effort.

a) first class b) second class c) third class d) fourth class

11) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.

a) Hinge b) Gliding c) Pivot d) Condyloid

12) Following are basic types of stress except

a) tensile stress b) compressive c) shear d) volumetric

13) _____ movement is measured by goniometry is the upward or backward movement of a body part.

a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

14) The degree to which ajoint is able to move is referred as

a) posture b) range of motion

c) gait d) muscle strength

_____

SLR-TC – 441

Seat No.	

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short note on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foot.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it with the help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

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Seat No.	

SLR-TC – 442

Set **P**

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The sensitivity of a multimeter is given in _____

a) Ω b) Amperes c) K Ω/V d) Joules

2) Dynamic errors are caused by _____

a) Instrument not responding fast

b) Human error

c) Environmental error

d) Observational error

3) A time base selector is used to select _____

a) Frequency b) Time

c) Amplitude d) Voltage

4) A frequency meter is used to measure _____

a) Frequency b) Ratio

c) Time interval d) Phase

5) The distance between 2 peaks measured on the X-axis is 2 cm, at 1 cm/div. The frequency of the signal is _____
   a) 50 Hz b) 5 Hz c) 1 KHz d) 500 Hz

6) A sampling CRO is used for _____
   a) HF b) VLF c) VHF d) LF

7) Frequency dividers are obtained by the use of _____
   a) LC network b) AND gate c) Flip flop d) RC n/W

8) A sweep generator is used to _____
   a) Fault finding b) Frequency generation
   c) Amplification d) Alignment

9) In a function generator, the resistance diode network is used to produce _____ wave.
   a) Square b) Sine c) Triangular d) Pulse

10) A null type recorder uses _____
   a) Amplifier b) Inductor c) Capacitor d) Potentiometer

11) Measurement by dual slope DVM is performed during _____ slope.
   a) Rising b) Falling
   c) Rising and falling d) None of the above

12) A distortion is defined as _____
   a) Unwanted frequency b) Unwanted amplitude
   c) Change in shape of waveform d) Unwanted signal

13) Q factor is defined as _____
   a) Reactance/resistance b) Resistance/reactance
   c) Resistance/impedance d) Impedance/resistance

14) Accuracy is expressed as _____
   a) Relative accuracy b) % accuracy
   c) Error d) % error

_____

SLR-TC – 442

Seat No.	

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain how a PMMC can be used as an AC voltmeter.

   2) Draw and explain working of average responding voltmeter.

   3) State the advantages of a DVM over an analog meter.

   4) Describe with a diagram, the working of digital multimeter.

   5) A voltmeter having a sensitivity of 1 K Ω/V is connected across an unknown resistance in series with a milli ammeter reading 80 V on 150 V scale. When the milliammeter reads 10 μA, calculate the :

      a) Total circuit resistance.

      b) Actual value of unknown resistance.

      c) Error due to loading effect of voltmeter.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Derive an expression for dynamic response of first order and second order instrument.

   2) With the help of block diagram, explain working of digital frequency meter.

   3) With the help of block diagram, and waveform, explain working of integrating type DVM.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms :

      a) Intensity modulation

      b) Time base circuit.

   2) Explain the principle of operation of single beam CRO.

   3) Explain the working of data acquisition system with an example.

   4) Differentiate between indicator and recorder also differentiate between galvanotype recorder and potentiometric recorder.

   5) With the help of block diagram, explain working of sampling oscilloscope.

5. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of block diagram, explain working of dual trace CRO.

   2) With the help of block diagram, explain working of function generator.

   3) Explain working of following :

      a) LCD display system.

      b) Non fade display system.

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SLR-TC – 442

Seat No.	

Set Q

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) A sweep generator is used to _____
   a) Fault finding b) Frequency generation
   c) Amplification d) Alignment

2) In a function generator, the resistance diode network is used to produce _____ wave.
   a) Square b) Sine c) Triangular d) Pulse

3) A null type recorder uses _____
   a) Amplifier b) Inductor c) Capacitor d) Potentiometer

4) Measurement by dual slope DVM is performed during _____ slope.
   a) Rising b) Falling
   c) Rising and falling d) None of the above

5) A distortion is defined as _____
   a) Unwanted frequency b) Unwanted amplitude
   c) Change in shape of waveform d) Unwanted signal

P.T.O.

6) Q factor is defined as _____
   a) Reactance/resistance b) Resistance/reactance
   c) Resistance/impedance d) Impedance/resistance

7) Accuracy is expressed as _____
   a) Relative accuracy b) % accuracy
   c) Error d) % error

8) The sensitivity of a multimeter is given in _____
   a) Ω b) Amperes c) K Ω/V d) Joules

9) Dynamic errors are caused by _____
   a) Instrument not responding fast
   b) Human error
   c) Environmental error
   d) Observational error

10) A time base selector is used to select _____
   a) Frequency b) Time
   c) Amplitude d) Voltage

11) A frequency meter is used to measure _____
   a) Frequency b) Ratio
   c) Time interval d) Phase

12) The distance between 2 peaks measured on the X-axis is 2 cm, at 1 cm/div. The frequency of the signal is _____
   a) 50 Hz b) 5 Hz c) 1 KHz d) 500 Hz

13) A sampling CRO is used for _____
   a) HF b) VLF c) VHF d) LF

14) Frequency dividers are obtained by the use of _____
   a) LC network b) AND gate c) Flip flop d) RC n/W

_____

SLR-TC – 442

Seat No.	

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain how a PMMC can be used as an AC voltmeter.

   2) Draw and explain working of average responding voltmeter.

   3) State the advantages of a DVM over an analog meter.

   4) Describe with a diagram, the working of digital multimeter.

   5) A voltmeter having a sensitivity of 1 K Ω/V is connected across an unknown resistance in series with a milli ammeter reading 80 V on 150 V scale. When the milliammeter reads 10 μA, calculate the :

      a) Total circuit resistance.

      b) Actual value of unknown resistance.

      c) Error due to loading effect of voltmeter.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Derive an expression for dynamic response of first order and second order instrument.

   2) With the help of block diagram, explain working of digital frequency meter.

   3) With the help of block diagram, and waveform, explain working of integrating type DVM.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms :

      a) Intensity modulation

      b) Time base circuit.

   2) Explain the principle of operation of single beam CRO.

   3) Explain the working of data acquisition system with an example.

   4) Differentiate between indicator and recorder also differentiate between galvanotype recorder and potentiometric recorder.

   5) With the help of block diagram, explain working of sampling oscilloscope.

5. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of block diagram, explain working of dual trace CRO.

   2) With the help of block diagram, explain working of function generator.

   3) Explain working of following :

      a) LCD display system.

      b) Non fade display system.

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SLR-TC – 442

Seat No.	

Set R

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The distance between 2 peaks measured on the X-axis is 2 cm, at 1 cm/div. The frequency of the signal is _____

a) 50 Hz b) 5 Hz c) 1 KHz d) 500 Hz

2) A sampling CRO is used for _____

a) HF b) VLF c) VHF d) LF

3) Frequency dividers are obtained by the use of _____

a) LC network b) AND gate c) Flip flop d) RC n/W

4) A sweep generator is used to _____

a) Fault finding b) Frequency generation

c) Amplification d) Alignment

5) In a function generator, the resistance diode network is used to produce _____ wave.

a) Square b) Sine c) Triangular d) Pulse

P.T.O.

6) A null type recorder uses _____
   a) Amplifier b) Inductor c) Capacitor d) Potentiometer

7) Measurement by dual slope DVM is performed during _____ slope.
   a) Rising b) Falling
   c) Rising and falling d) None of the above

8) A distortion is defined as _____
   a) Unwanted frequency b) Unwanted amplitude
   c) Change in shape of waveform d) Unwanted signal

9) Q factor is defined as _____
   a) Reactance/resistance b) Resistance/reactance
   c) Resistance/impedance d) Impedance/resistance

10) Accuracy is expressed as _____
   a) Relative accuracy b) % accuracy
   c) Error d) % error

11) The sensitivity of a multimeter is given in _____
   a) Ω b) Amperes c) K Ω/V d) Joules

12) Dynamic errors are caused by _____
   a) Instrument not responding fast
   b) Human error
   c) Environmental error
   d) Observational error

13) A time base selector is used to select _____
   a) Frequency b) Time
   c) Amplitude d) Voltage

14) A frequency meter is used to measure _____
   a) Frequency b) Ratio
   c) Time interval d) Phase

_____

SLR-TC – 442

Seat No.	

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain how a PMMC can be used as an AC voltmeter.

   2) Draw and explain working of average responding voltmeter.

   3) State the advantages of a DVM over an analog meter.

   4) Describe with a diagram, the working of digital multimeter.

   5) A voltmeter having a sensitivity of 1 K Ω/V is connected across an unknown resistance in series with a milli ammeter reading 80 V on 150 V scale. When the milliammeter reads 10 μA, calculate the :

      a) Total circuit resistance.

      b) Actual value of unknown resistance.

      c) Error due to loading effect of voltmeter.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Derive an expression for dynamic response of first order and second order instrument.

   2) With the help of block diagram, explain working of digital frequency meter.

   3) With the help of block diagram, and waveform, explain working of integrating type DVM.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms :

      a) Intensity modulation

      b) Time base circuit.

   2) Explain the principle of operation of single beam CRO.

   3) Explain the working of data acquisition system with an example.

   4) Differentiate between indicator and recorder also differentiate between galvanotype recorder and potentiometric recorder.

   5) With the help of block diagram, explain working of sampling oscilloscope.

5. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of block diagram, explain working of dual trace CRO.

   2) With the help of block diagram, explain working of function generator.

   3) Explain working of following :

      a) LCD display system.

      b) Non fade display system.

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SLR-TC – 442

Seat No.	

Set S

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) A null type recorder uses _____
   a) Amplifier b) Inductor c) Capacitor d) Potentiometer

2) Measurement by dual slope DVM is performed during _____ slope.
   a) Rising b) Falling
   c) Rising and falling d) None of the above

3) A distortion is defined as _____
   a) Unwanted frequency b) Unwanted amplitude
   c) Change in shape of waveform d) Unwanted signal

4) Q factor is defined as _____
   a) Reactance/resistance b) Resistance/reactance
   c) Resistance/impedance d) Impedance/resistance

5) Accuracy is expressed as _____
   a) Relative accuracy b) % accuracy
   c) Error d) % error

P.T.O.

6) The sensitivity of a multimeter is given in _____
   a) Ω b) Amperes c) K Ω/V d) Joules

7) Dynamic errors are caused by _____
   a) Instrument not responding fast
   b) Human error
   c) Environmental error
   d) Observational error

8) A time base selector is used to select _____
   a) Frequency b) Time
   c) Amplitude d) Voltage

9) A frequency meter is used to measure _____
   a) Frequency b) Ratio
   c) Time interval d) Phase

10) The distance between 2 peaks measured on the X-axis is 2 cm, at 1 cm/div. The frequency of the signal is _____
   a) 50 Hz b) 5 Hz c) 1 KHz d) 500 Hz

11) A sampling CRO is used for _____
   a) HF b) VLF c) VHF d) LF

12) Frequency dividers are obtained by the use of _____
   a) LC network b) AND gate c) Flip flop d) RC n/W

13) A sweep generator is used to _____
   a) Fault finding b) Frequency generation
   c) Amplification d) Alignment

14) In a function generator, the resistance diode network is used to produce _____ wave.
   a) Square b) Sine c) Triangular d) Pulse

_____

SLR-TC – 442

Seat No.	

S.E. (Part – II) (New CBCS) Biomedical Engg. Examination, 2018
ELECTRONIC INSTRUMENTATIONS

Day and Date : Saturday, 19-5-2018 Total Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain how a PMMC can be used as an AC voltmeter.

   2) Draw and explain working of average responding voltmeter.

   3) State the advantages of a DVM over an analog meter.

   4) Describe with a diagram, the working of digital multimeter.

   5) A voltmeter having a sensitivity of 1 K Ω/V is connected across an unknown resistance in series with a milli ammeter reading 80 V on 150 V scale. When the milliammeter reads 10 μA, calculate the :

      a) Total circuit resistance.

      b) Actual value of unknown resistance.

      c) Error due to loading effect of voltmeter.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Derive an expression for dynamic response of first order and second order instrument.

   2) With the help of block diagram, explain working of digital frequency meter.

   3) With the help of block diagram, and waveform, explain working of integrating type DVM.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms :

      a) Intensity modulation

      b) Time base circuit.

   2) Explain the principle of operation of single beam CRO.

   3) Explain the working of data acquisition system with an example.

   4) Differentiate between indicator and recorder also differentiate between galvanotype recorder and potentiometric recorder.

   5) With the help of block diagram, explain working of sampling oscilloscope.

5. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of block diagram, explain working of dual trace CRO.

   2) With the help of block diagram, explain working of function generator.

   3) Explain working of following :

      a) LCD display system.

      b) Non fade display system.

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SLR-TC – 443

Seat No.	

Set P

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ variables will be represented by four minterm.
   a) 8 b) 2
   c) 4 d) 3

2) Extremely _____ power dissipation and low cost per gate can be achieved in CMOS IC's .
   a) Low b) High
   c) Moderate d) Negligible

3) In excitation of _____ flip flop next state is equal to D state.
   a) T b) D
   c) J-K d) R-S

4) _____ adder circuits, the carry look ripple delay is eliminated.
   a) Half b) Full
   c) Carry look ahead d) Parallel

5) Conversion of fractional numbers from one radix to another is accomplished using a successive _____ algorithm.
   a) Multiplication b) Addition
   c) Approximation d) Integration

6) The time required for a gate or inverter to change its state is called _____ time.
a) Rise b) Decay c) Propagation d) Changing

7) Odd parity of word can be conveniently tested by _____ gate.
a) OR b) AND c) NOR d) XOR

8) The _____ gate is equivalent to XOR gate.
a) EX-NOR b) EX-OR c) NAND d) NOR

9) Applying Demorgan's theorem to expression $\overline{\overline{X+Y}+\overline{Z}}$, we get
a) (X + Y)Z b) $(\overline{X}+\overline{Y})Z$ c) $(X+Y)\overline{Z}$ d) $(\overline{X}+\overline{Y})\overline{Z}$

10) The Boolean expression $X=\overline{A}+\overline{B}+\overline{C}$ is logically equivalent to _____ single gate.
a) NAND b) NOR c) AND d) OR

11) For the SOP expression $AB+\overline{B}C$, _____ zero's are in truth tables output column.
a) Zero b) One c) Four d) Five

12) _____ operations are more faster among the following.
a) Combinational Circuits b) Sequential circuits
c) Latches d) Flip flop

13) A ripple counter's speed is limited by the propagation delay of
a) Each flip flop b) All flip flops and gates
c) The flip flops only with gates d) Only circuit gates

14) Internal propagation delay of asynchronous counter is removed by _____ counter.
a) Ripple b) Ring c) Modulus d) Synchronous

_____

SLR-TC – 443

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms with respect to flip flops.
      a) Set up time
      b) Propagation delays
      c) Hold time
      d) Clock pulse width

   2) Define and differentiate between various types of flip flops.

   3) Implement the expression using a multiplexer
      f (A, B, C, D) = $\sum m(0, 2, 3, 6, 8, 9, 12, 14)$.

   4) What are the advantages of an edge triggered flip flop over a level triggered device ?

   5) With the help of diagram explain working of ECL.

3. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of logic diagram explain working of master-slave J-K flip flop.

   2) Write a short note on :
      a) TTL
      b) DTL

   3) Design a 4 : 1 multiplexer using 8 : 1 multiplexer.

SECTION – II

4. Attempt **any four** questions. **(4×4=16)**

   1) Design a half subtractor with truth table and logic diagram.

   2) Perform following operation.
      a) $(7F)_{16} + (BA)_{16} = (?)_{16}$
      b) $(247.36)_{8} = (?)_{16}$
      c) $(327.89)_{10} = (?)_{BCD}$
      d) $(23)_{8} + (67)_{8} = (?)_{2}$

   3) Explain working of successive approximation A to D conversion with necessary diagram.

   4) Write down the count sequence of 3 bit binary down counter. Design a ripple counter using flip flops for this sequence.

   5) With the help of diagram explain working of basic cell IC bipolar RAM.

5. Attempt **any two** questions. **(6×2=12)**

   1) Explain the operation of bidirectional shift register.

   2) Draw write cycle waveforms of memory device and define following terms.
      a) Write cycle time
      b) Read cycle time
      c) Data setup time
      d) Data hold time

   3) Design a 3 bit asynchronous counter using J-K flip flop.

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SLR-TC – 443

Seat No.	

Set Q

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The _____ gate is equivalent to XOR gate.
a) EX-NOR b) EX-OR c) NAND d) NOR

2) Applying Demorgan's theorem to expression $\overline{\overline{X+Y}+\overline{Z}}$, we get
a) (X + Y)Z b) $(\overline{X}+\overline{Y})Z$
c) $(X+Y)\overline{Z}$ d) $(\overline{X}+\overline{Y})\overline{Z}$

3) The Boolean expression $X=\overline{A}+\overline{B}+\overline{C}$ is logically equivalent to _____ single gate.
a) NAND b) NOR c) AND d) OR

4) For the SOP expression $AB+\overline{B}C$, _____ zero's are in truth tables output column.
a) Zero b) One c) Four d) Five

5) _____ operations are more faster among the following.
a) Combinational Circuits b) Sequential circuits
c) Latches d) Flip flop

P.T.O.

6) A ripple counter's speed is limited by the propagation delay of
   a) Each flip flop
   b) All flip flops and gates
   c) The flip flops only with gates
   d) Only circuit gates

7) Internal propagation delay of asynchronous counter is removed by _____ counter.
   a) Ripple b) Ring c) Modulus d) Synchronous

8) _____ variables will be represented by four minterm.
   a) 8
   b) 2
   c) 4
   d) 3

9) Extremely _____ power dissipation and low cost per gate can be achieved in CMOS IC's .
   a) Low
   b) High
   c) Moderate
   d) Negligible

10) In excitation of _____ flip flop next state is equal to D state.
   a) T
   b) D
   c) J-K
   d) R-S

11) _____ adder circuits, the carry look ripple delay is eliminated.
   a) Half
   b) Full
   c) Carry look ahead
   d) Parallel

12) Conversion of fractional numbers from one radix to another is accomplished using a successive _____ algorithm.
   a) Multiplication
   b) Addition
   c) Approximation
   d) Integration

13) The time required for a gate or inverter to change its state is called _____ time.
   a) Rise b) Decay c) Propagation d) Changing

14) Odd parity of word can be conveniently tested by _____ gate.
   a) OR b) AND c) NOR d) XOR

_____

SLR-TC – 443

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms with respect to flip flops.
      a) Set up time
      b) Propagation delays
      c) Hold time
      d) Clock pulse width

   2) Define and differentiate between various types of flip flops.

   3) Implement the expression using a multiplexer
      f (A, B, C, D) = $\sum m(0, 2, 3, 6, 8, 9, 12, 14)$.

   4) What are the advantages of an edge triggered flip flop over a level triggered device ?

   5) With the help of diagram explain working of ECL.

3. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of logic diagram explain working of master-slave J-K flip flop.

   2) Write a short note on :
      a) TTL
      b) DTL

   3) Design a 4 : 1 multiplexer using 8 : 1 multiplexer.

SECTION – II

4. Attempt **any four** questions. **(4×4=16)**

   1) Design a half subtractor with truth table and logic diagram.

   2) Perform following operation.
      a) $(7F)_{16} + (BA)_{16} = (?)_{16}$
      b) $(247.36)_{8} = (?)_{16}$
      c) $(327.89)_{10} = (?)_{BCD}$
      d) $(23)_{8} + (67)_{8} = (?)_{2}$

   3) Explain working of successive approximation A to D conversion with necessary diagram.

   4) Write down the count sequence of 3 bit binary down counter. Design a ripple counter using flip flops for this sequence.

   5) With the help of diagram explain working of basic cell IC bipolar RAM.

5. Attempt **any two** questions. **(6×2=12)**

   1) Explain the operation of bidirectional shift register.

   2) Draw write cycle waveforms of memory device and define following terms.
      a) Write cycle time
      b) Read cycle time
      c) Data setup time
      d) Data hold time

   3) Design a 3 bit asynchronous counter using J-K flip flop.

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SLR-TC – 443

Seat No.	

Set R

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Conversion of fractional numbers from one radix to another is accomplished using a successive _____ algorithm.
   a) Multiplication b) Addition
   c) Approximation d) Integration

2) The time required for a gate or inverter to change its state is called _____ time.
   a) Rise b) Decay c) Propagation d) Changing

3) Odd parity of word can be conveniently tested by _____ gate.
   a) OR b) AND c) NOR d) XOR

4) The _____ gate is equivalent to XOR gate.
   a) EX-NOR b) EX-OR c) NAND d) NOR

5) Applying Demorgan's theorem to expression $\overline{\overline{X+Y}+\overline{Z}}$, we get
   a) (X + Y)Z b) $(\overline{X}+\overline{Y})Z$
   c) $(X+Y)\overline{Z}$ d) $(\overline{X}+\overline{Y})\overline{Z}$

6) The Boolean expression $X = \overline{A} + \overline{B} + \overline{C}$ is logically equivalent to _____ single gate.
   a) NAND b) NOR c) AND d) OR

7) For the SOP expression $AB + \overline{B}C$, _____ zero's are in truth tables output column.
   a) Zero b) One c) Four d) Five

8) _____ operations are more faster among the following.
   a) Combinational Circuits b) Sequential circuits
   c) Latches d) Flip flop

9) A ripple counter's speed is limited by the propagation delay of
   a) Each flip flop b) All flip flops and gates
   c) The flip flops only with gates d) Only circuit gates

10) Internal propagation delay of asynchronous counter is removed by _____ counter.
   a) Ripple b) Ring c) Modulus d) Synchronous

11) _____ variables will be represented by four minterm.
   a) 8 b) 2
   c) 4 d) 3

12) Extremely _____ power dissipation and low cost per gate can be achieved in CMOS IC's .
   a) Low b) High
   c) Moderate d) Negligible

13) In excitation of _____ flip flop next state is equal to D state.
   a) T b) D
   c) J-K d) R-S

14) _____ adder circuits, the carry look ripple delay is eliminated.
   a) Half b) Full
   c) Carry look ahead d) Parallel

_____

SLR-TC – 443

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms with respect to flip flops.
      a) Set up time
      b) Propagation delays
      c) Hold time
      d) Clock pulse width

   2) Define and differentiate between various types of flip flops.

   3) Implement the expression using a multiplexer
      f (A, B, C, D) = $\sum m(0, 2, 3, 6, 8, 9, 12, 14)$.

   4) What are the advantages of an edge triggered flip flop over a level triggered device ?

   5) With the help of diagram explain working of ECL.

3. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of logic diagram explain working of master-slave J-K flip flop.

   2) Write a short note on :
      a) TTL
      b) DTL

   3) Design a 4 : 1 multiplexer using 8 : 1 multiplexer.

SECTION – II

4. Attempt **any four** questions. **(4×4=16)**

   1) Design a half subtractor with truth table and logic diagram.

   2) Perform following operation.
      a) $(7F)_{16} + (BA)_{16} = (?)_{16}$
      b) $(247.36)_{8} = (?)_{16}$
      c) $(327.89)_{10} = (?)_{BCD}$
      d) $(23)_{8} + (67)_{8} = (?)_{2}$

   3) Explain working of successive approximation A to D conversion with necessary diagram.

   4) Write down the count sequence of 3 bit binary down counter. Design a ripple counter using flip flops for this sequence.

   5) With the help of diagram explain working of basic cell IC bipolar RAM.

5. Attempt **any two** questions. **(6×2=12)**

   1) Explain the operation of bidirectional shift register.

   2) Draw write cycle waveforms of memory device and define following terms.
      a) Write cycle time
      b) Read cycle time
      c) Data setup time
      d) Data hold time

   3) Design a 3 bit asynchronous counter using J-K flip flop.

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SLR-TC – 443

Seat No.	

Set S

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The Boolean expression $X = \overline{A} + \overline{B} + \overline{C}$ is logically equivalent to _____ single gate.
a) NAND b) NOR c) AND d) OR

2) For the SOP expression $AB + \overline{B}C$, _____ zero's are in truth tables output column.
a) Zero b) One c) Four d) Five

3) _____ operations are more faster among the following.
a) Combinational Circuits b) Sequential circuits
c) Latches d) Flip flop

4) A ripple counter's speed is limited by the propagation delay of
a) Each flip flop b) All flip flops and gates
c) The flip flops only with gates d) Only circuit gates

5) Internal propagation delay of asynchronous counter is removed by _____ counter.
a) Ripple b) Ring c) Modulus d) Synchronous

6) _____ variables will be represented by four minterm.
a) 8 b) 2 c) 4 d) 3

P.T.O.

7) Extremely _____ power dissipation and low cost per gate can be achieved in CMOS IC's .
   a) Low b) High
   c) Moderate d) Negligible

8) In excitation of _____ flip flop next state is equal to D state.
   a) T b) D
   c) J-K d) R-S

9) _____ adder circuits, the carry look ripple delay is eliminated.
   a) Half b) Full
   c) Carry look ahead d) Parallel

10) Conversion of fractional numbers from one radix to another is accomplished using a successive _____ algorithm.
   a) Multiplication b) Addition
   c) Approximation d) Integration

11) The time required for a gate or inverter to change its state is called _____ time.
   a) Rise b) Decay c) Propagation d) Changing

12) Odd parity of word can be conveniently tested by _____ gate.
   a) OR b) AND c) NOR d) XOR

13) The _____ gate is equivalent to XOR gate.
   a) EX-NOR b) EX-OR c) NAND d) NOR

14) Applying Demorgan's theorem to expression $\overline{\overline{X+Y}+\overline{Z}}$, we get
   a) (X + Y)Z b) $\left(\overline{X}+\overline{Y}\right)Z$ c) $(X+Y)\overline{Z}$ d) $\left(\overline{X}+\overline{Y}\right)\overline{Z}$

_____

SLR-TC – 443

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Define following terms with respect to flip flops.
      a) Set up time
      b) Propagation delays
      c) Hold time
      d) Clock pulse width

   2) Define and differentiate between various types of flip flops.

   3) Implement the expression using a multiplexer
      f (A, B, C, D) = $\sum m(0, 2, 3, 6, 8, 9, 12, 14)$.

   4) What are the advantages of an edge triggered flip flop over a level triggered device ?

   5) With the help of diagram explain working of ECL.

3. Attempt **any 2** questions : **(6×2=12)**

   1) With the help of logic diagram explain working of master-slave J-K flip flop.

   2) Write a short note on :
      a) TTL
      b) DTL

   3) Design a 4 : 1 multiplexer using 8 : 1 multiplexer.

SECTION – II

4. Attempt **any four** questions. **(4×4=16)**

   1) Design a half subtractor with truth table and logic diagram.

   2) Perform following operation.
      a) $(7F)_{16} + (BA)_{16} = (?)_{16}$
      b) $(247.36)_{8} = (?)_{16}$
      c) $(327.89)_{10} = (?)_{BCD}$
      d) $(23)_{8} + (67)_{8} = (?)_{2}$

   3) Explain working of successive approximation A to D conversion with necessary diagram.

   4) Write down the count sequence of 3 bit binary down counter. Design a ripple counter using flip flops for this sequence.

   5) With the help of diagram explain working of basic cell IC bipolar RAM.

5. Attempt **any two** questions. **(6×2=12)**

   1) Explain the operation of bidirectional shift register.

   2) Draw write cycle waveforms of memory device and define following terms.
      a) Write cycle time
      b) Read cycle time
      c) Data setup time
      d) Data hold time

   3) Design a 3 bit asynchronous counter using J-K flip flop.

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SLR-TC – 444

Seat No.	

Set **P**

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The current gain for the Darlington connection is _____
a) $\beta_1.(\beta_2/2)$ b) $\beta_1.\beta_2$ c) β_1/β_2 d) β_2/β_1

2) _____ configurations has the lowest output impedance.
a) Fixed bias b) Voltage divider
c) Emitter follower d) Emitter-collecter

3) Typical value of current gain of a CB configuration is _____
a) > 1 b) between 1 and 50
c) undefined d) between 100 and 200

4) Amplifier gain for RC phase shift oscillations to obey Barkhausen's criteria should be minimum of _____
a) 43 b) 4 c) 10 d) 29

5) _____ component is used in Hartley oscillator feedback system.
a) Inductor b) Capacitor c) Transistor d) Resistor

6) The _____ configuration is frequently used for impedance matching.
a) fixed bias b) voltage divider bias
c) emitter follower d) collector feedback

7) _____ type of power amplifier is biased for operation at less than 180° of the cycle.
a) Class A b) Class B or AB
c) Class C d) Class D

P.T.O.

8) In class B operation at what friction of V_{CC} should the level of $V_L(P)$ be to active the maximum power dissipated by the output transistor ?
   a) 0.5 b) 0.636 c) 0.707 d) 1

9) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_e model.
   a) V_e b) β c) βV_e d) I_b

10) Op-amps used as a high and low pass filter circuits employ _____ configuration.
   a) non-inverting b) comparator
   c) open loop d) inverting

11) _____ amplifier is used as frequency multiplier.
   a) Class A b) Class B c) Class C d) Class AB

12) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
   a) Adder b) Subtractor
   c) Integrator d) Differentiator

13) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
   a) common mode b) darlington
   c) differential d) operational

14) The efficiency of a transformer coupled class A amplifier for a supply of 15V and an output of $V(P) = 10\ V_1$ is _____
   a) 25% b) 33.3% c) 50% d) 78.5%

_____

SLR-TC – 444

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

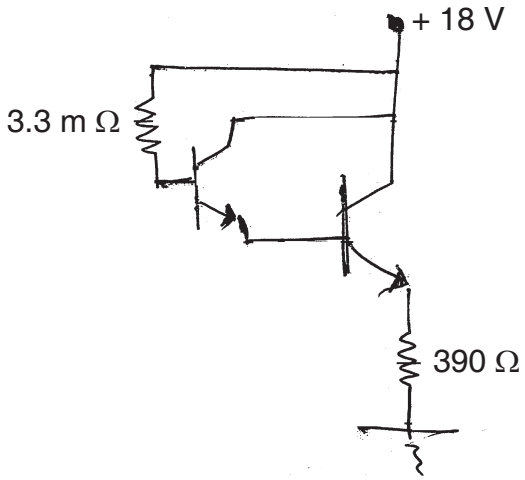
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) With the help of diagram explain working of BJT Darlington pair circuit and mention its advantages.

2) Explain working and analyze class B power amplifier.

3) Calculate the DC bias voltages and currents in the following circuits.



Given :

$B_D = 8000$

$V_{BE} = 1.6$ V

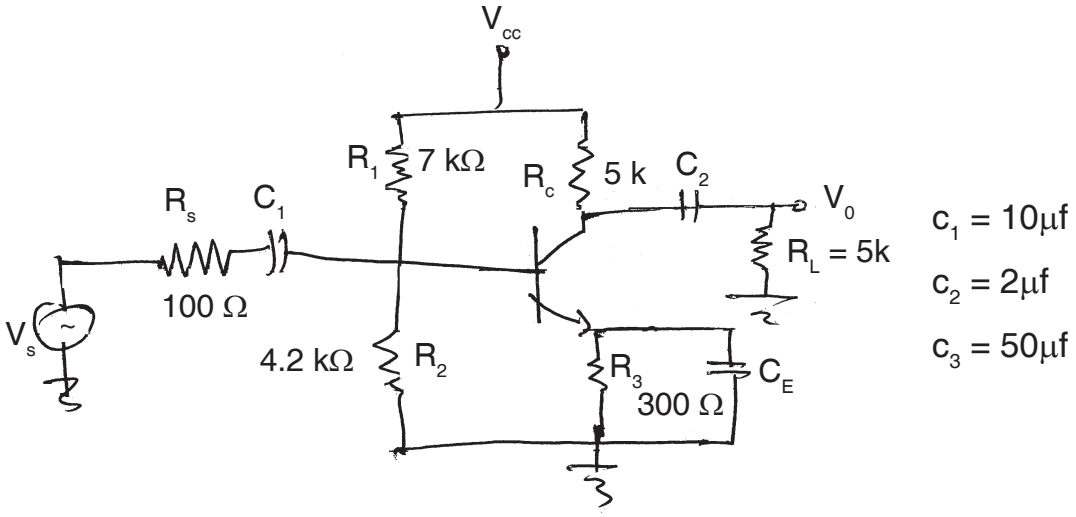
4) Draw and explain working of RC coupled oscillator with its frequency response.

5) Compare between class B amplifier with class C amplifier.

3. Attempt **any two** questions : **(6×2=12)**

1) For the common emitter BJT amplifier calculate the values of f_L and f_H and midband voltage gain amid. Assume following parameter.

$\beta = 80$, $g_m = 50\mu A/V$, $r_\pi = 1.3\ k\Omega$, $C_\pi = 15\ pf$ $c_\mu = 1pf$.



2) Compare different types at power amplifier based on following factors :

a) Conduction angle

b) Position of Q point

c) Efficiency

d) Distortion.

3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

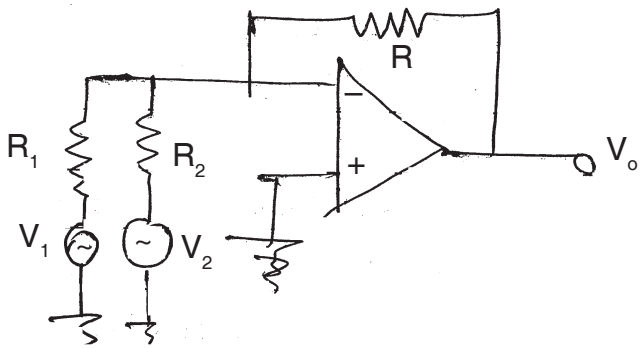
4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

2) List ideal characteristics of op-amp.

3) Draw the circuit for basic differentiator using op-amp and find the expression for the output voltage.

4) Find the output voltage for the circuit shown if R_f = 10kΩ, R_1= 2kΩ, R_2 = 5kΩ.



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set P

SLR-TC – 444

Seat No.	

Set **Q**

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In class B operation at what friction of V_{CC} should the level of $V_L(P)$ be to active the maximum power dissipated by the output transistor ?
a) 0.5 b) 0.636 c) 0.707 d) 1

2) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_e model.
a) V_e b) β c) βV_e d) I_b

3) Op-amps used as a high and low pass filter circuits employ _____ configuration.
a) non-inverting b) comparator
c) open loop d) inverting

4) _____ amplifier is used as frequency multiplier.
a) Class A b) Class B c) Class C d) Class AB

5) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
a) Adder b) Subtractor
c) Integrator d) Differentiator

6) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
a) common mode b) darlington
c) differential d) operational

P.T.O.

7) The efficiency of a transformer coupled class A amplifier for a supply of 15V and an output of $V(P) = 10\ V_1$ is _____
   a) 25% b) 33.3% c) 50% d) 78.5%

8) The current gain for the Darlington connection is _____
   a) $\beta_1.(\beta_2/2)$ b) $\beta_1.\beta_2$ c) β_1/β_2 d) β_2/β_1

9) _____ configurations has the lowest output impedance.
   a) Fixed bias b) Voltage divider
   c) Emitter follower d) Emitter-collecter

10) Typical value of current gain of a CB configuration is _____
   a) > 1 b) between 1 and 50
   c) undefined d) between 100 and 200

11) Amplifier gain for RC phase shift oscillations to obey Barkhausen's criteria should be minimum of _____
   a) 43 b) 4 c) 10 d) 29

12) _____ component is used in Hartley oscillator feedback system.
   a) Inductor b) Capacitor c) Transistor d) Resistor

13) The _____ configuration is frequently used for impedance matching.
   a) fixed bias b) voltage divider bias
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14) _____ type of power amplifier is biased for operation at less than 180° of the cycle.
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   c) Class C d) Class D

_____

SLR-TC – 444

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

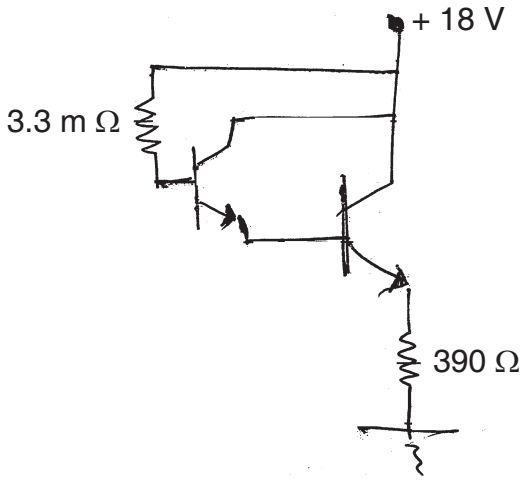
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) With the help of diagram explain working of BJT Darlington pair circuit and mention its advantages.

2) Explain working and analyze class B power amplifier.

3) Calculate the DC bias voltages and currents in the following circuits.



Given :

$B_D = 8000$

$V_{BE} = 1.6$ V

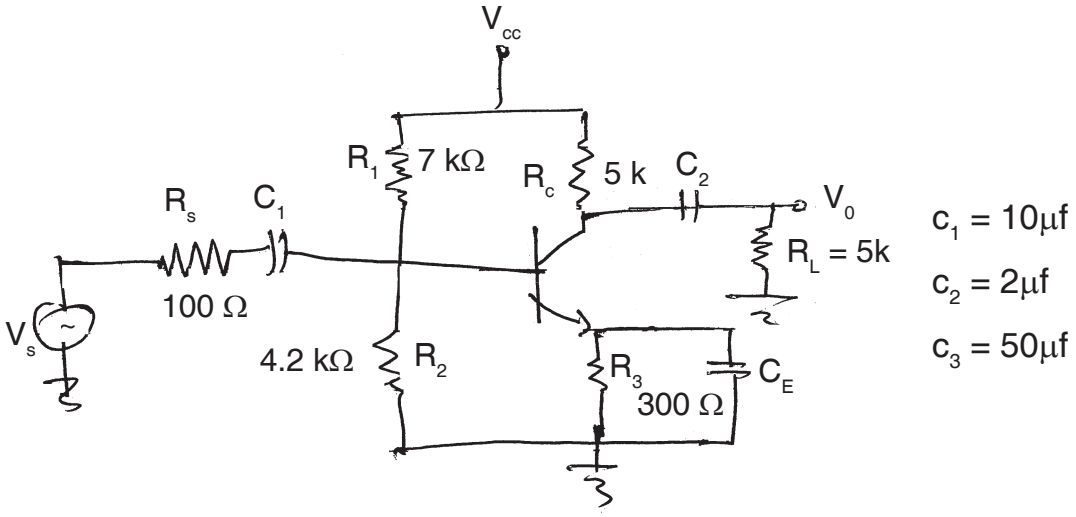
4) Draw and explain working of RC coupled oscillator with its frequency response.

5) Compare between class B amplifier with class C amplifier.

3. Attempt **any two** questions : **(6×2=12)**

1) For the common emitter BJT amplifier calculate the values of f_L and f_H and midband voltage gain amid. Assume following parameter.

$\beta = 80$, $g_m = 50\mu A/V$, $r_\pi = 1.3\ k\Omega$, $C_\pi = 15\ pf$ $c_\mu = 1pf$.



2) Compare different types at power amplifier based on following factors :

a) Conduction angle

b) Position of Q point

c) Efficiency

d) Distortion.

3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

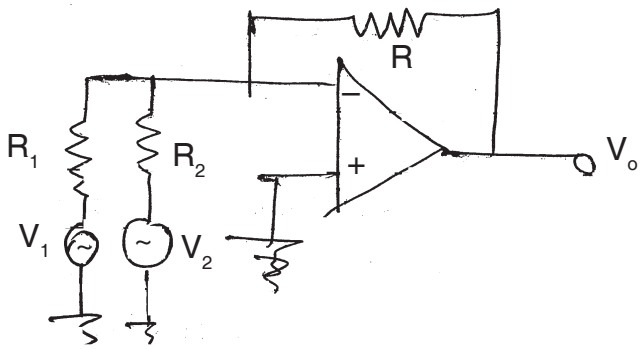
4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

2) List ideal characteristics of op-amp.

3) Draw the circuit for basic differentiator using op-amp and find the expression for the output voltage.

4) Find the output voltage for the circuit shown if R_f = 10kΩ, R_1= 2kΩ, R_2 = 5kΩ.



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set Q

SLR-TC – 444

Seat No.	

Set **R**

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ component is used in Hartley oscillator feedback system.
a) Inductor b) Capacitor c) Transistor d) Resistor

2) The _____ configuration is frequently used for impedance matching.
a) fixed bias b) voltage divider bias
c) emitter follower d) collector feedback

3) _____ type of power amplifier is biased for operation at less than 180° of the cycle.
a) Class A b) Class B or AB
c) Class C d) Class D

4) In class B operation at what friction of V_{CC} should the level of $V_L(P)$ be to active the maximum power dissipated by the output transistor ?
a) 0.5 b) 0.636 c) 0.707 d) 1

5) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_e model.
a) V_e b) β c) βV_e d) I_b

6) Op-amps used as a high and low pass filter circuits employ _____ configuration.
a) non-inverting b) comparator
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8) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
   a) Adder b) Subtractor
   c) Integrator d) Differentiator

9) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
   a) common mode b) darlington
   c) differential d) operational

10) The efficiency of a transformer coupled class A amplifier for a supply of 15V and an output of $V(P) = 10\ V_1$ is _____
   a) 25% b) 33.3% c) 50% d) 78.5%

11) The current gain for the Darlington connection is _____
   a) $\beta_1.(\beta_2/2)$ b) $\beta_1.\beta_2$ c) β_1/β_2 d) β_2/β_1

12) _____ configurations has the lowest output impedance.
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13) Typical value of current gain of a CB configuration is _____
   a) > 1 b) between 1 and 50
   c) undefined d) between 100 and 200

14) Amplifier gain for RC phase shift oscillations to obey Barkhausen's criteria should be minimum of _____
   a) 43 b) 4 c) 10 d) 29

_____

SLR-TC – 444

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

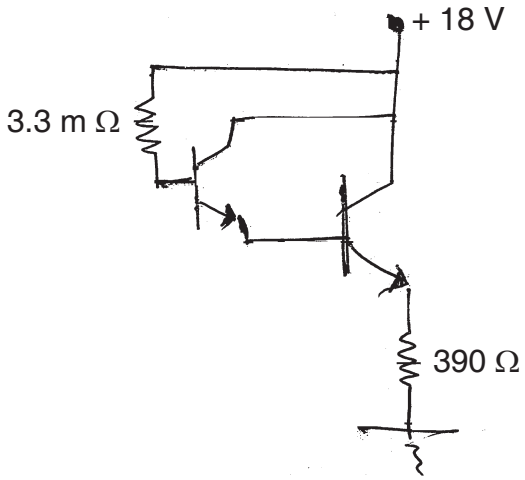
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) With the help of diagram explain working of BJT Darlington pair circuit and mention its advantages.

2) Explain working and analyze class B power amplifier.

3) Calculate the DC bias voltages and currents in the following circuits.



Given :

$B_D = 8000$

$V_{BE} = 1.6$ V

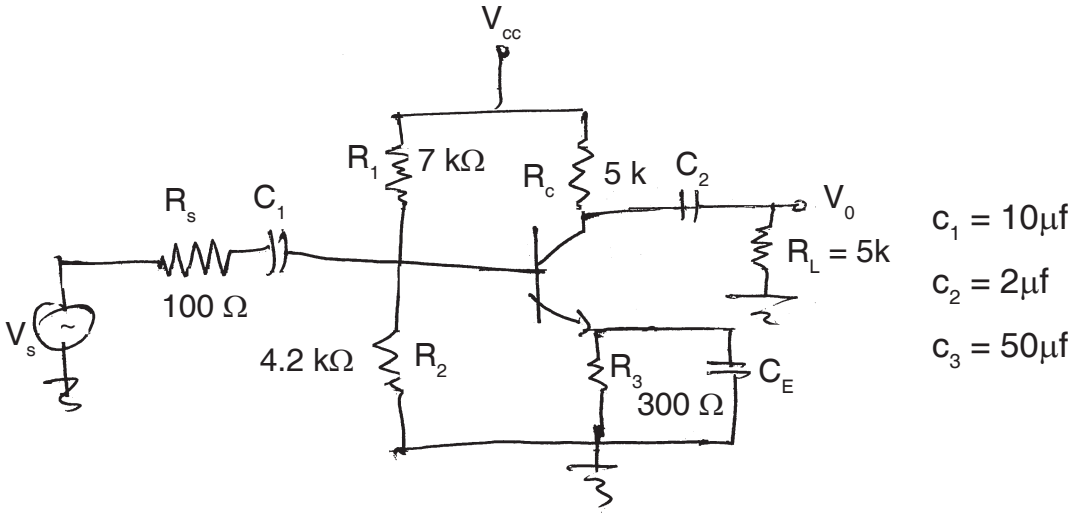
4) Draw and explain working of RC coupled oscillator with its frequency response.

5) Compare between class B amplifier with class C amplifier.

3. Attempt **any two** questions : **(6×2=12)**

1) For the common emitter BJT amplifier calculate the values of f_L and f_H and midband voltage gain amid. Assume following parameter.

$\beta = 80$, $g_m = 50\mu A/V$, $r_\pi = 1.3\ k\Omega$, $C_\pi = 15\ pf$ $c_\mu = 1pf$.



2) Compare different types at power amplifier based on following factors :

a) Conduction angle

b) Position of Q point

c) Efficiency

d) Distortion.

3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

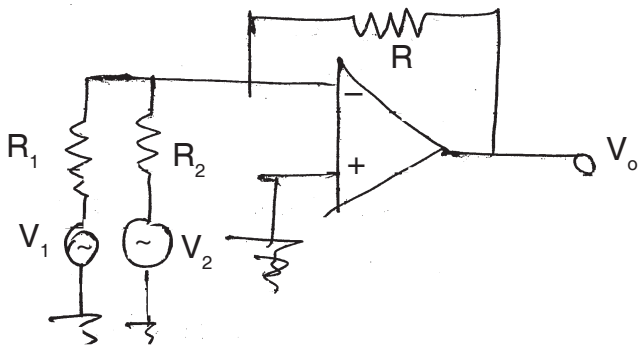
4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

2) List ideal characteristics of op-amp.

3) Draw the circuit for basic differentiator using op-amp and find the expression for the output voltage.

4) Find the output voltage for the circuit shown if R_f = 10kΩ, R_1= 2kΩ, R_2 = 5kΩ.



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set R

SLR-TC – 444

Seat No.	

Set S

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Op-amps used as a high and low pass filter circuits employ _____ configuration.
   a) non-inverting b) comparator
   c) open loop d) inverting

2) _____ amplifier is used as frequency multiplier.
   a) Class A b) Class B c) Class C d) Class AB

3) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
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   c) Integrator d) Differentiator

4) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
   a) common mode b) darlington
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P.T.O.

7) _____ configurations has the lowest output impedance.
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_____

SLR-TC – 444

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (CBCS) (New) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) With the help of diagram explain working of BJT Darlington pair circuit and mention its advantages.

2) Explain working and analyze class B power amplifier.

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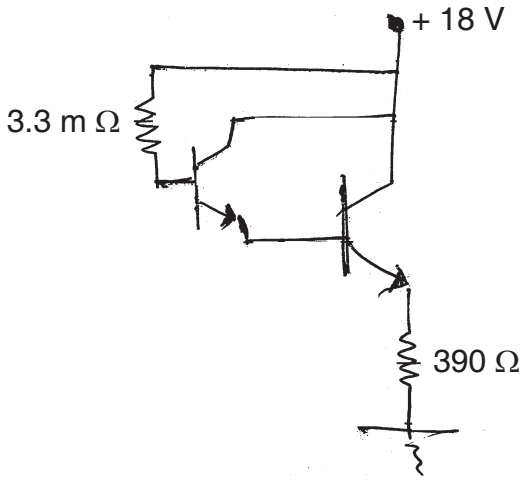

Given :

$B_D = 8000$

$V_{BE} = 1.6$ V

4) Draw and explain working of RC coupled oscillator with its frequency response.

5) Compare between class B amplifier with class C amplifier.

3. Attempt **any two** questions : **(6×2=12)**

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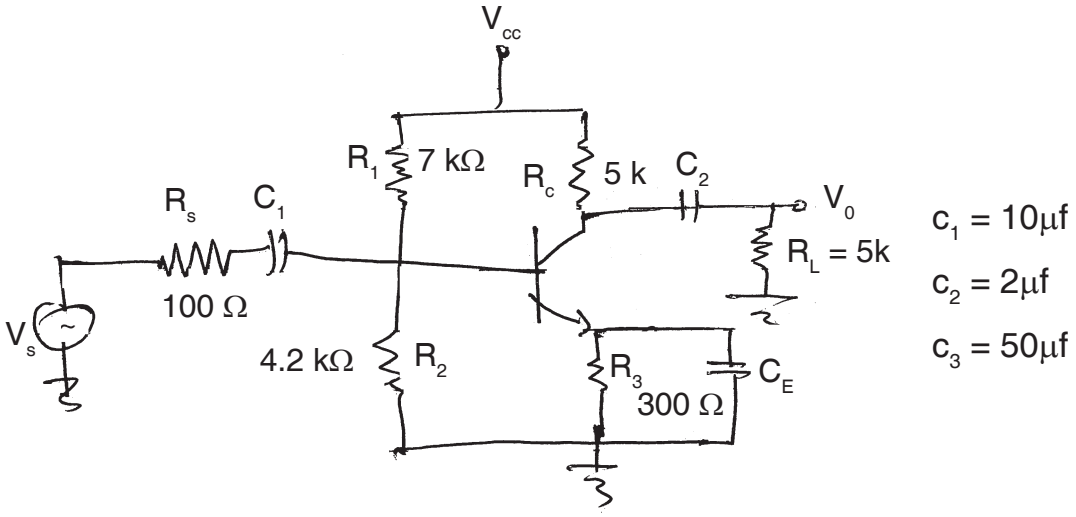

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c) Efficiency

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3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

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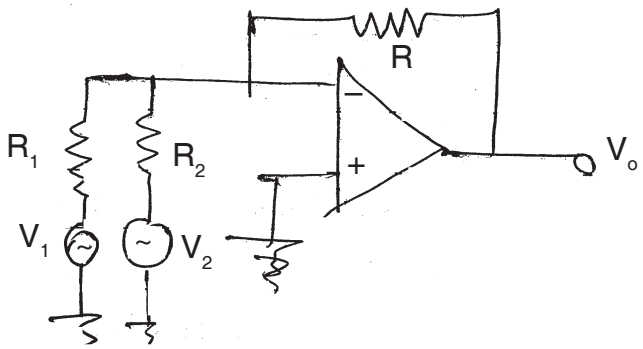

5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set S

SLR-TC – 445

Seat No.	

Set P

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ is defined as the largest charge in the input quantity to which the measuring system does not respond.
a) Drift b) Resolution c) Dead band d) Error

2) Capacitive transducers are also called as _____ transducers as they measure an object without mechanical coupling.
a) Proximity b) Invasive c) Loading d) Inductive

3) Quartz is an _____ , the surfaces on which charge accumulates are provided with metallic electrodes.
a) Conductor b) Insulator
c) Capacitor d) None of above

4) Standard electrode potential for any half cell is measurement of
a) Voltage b) Ions apart c) Radii of ions d) Deposited ion

5) _____ biosensors use the movement of electrons produced during redox reaction.
a) Amperometric b) Potentiometric c) Piezoelectric d) Optical

6) _____ acts as detector in optical sensor.
a) LED b) Photo diode c) Transistor d) All of above

7) _____ conversion take place in bourdon tubes.
a) Pressure to displacement b) Pressure to voltage
c) Pressure to strain d) Pressure to force

P.T.O.

8) _____ quantities cannot be measured by capacitive transducers.
   a) Displacement b) Speed
   c) Moisture d) None of above

9) _____ describes current flow between two junctions formed by two different metals.
   a) Peltier effect b) Thomson effect
   c) Seebeck effect d) None of above

10) In piezoelectric strain transducer voltage developed is _____ to strain applied.
   a) Directly proportional b) Inversely proportional
   c) Equal d) Independent

11) With the increase in the intensity of light, the resistance of photovoltaic cell
   a) Increases b) Decreases c) Remains same d) Separates

12) _____ represents active transducer.
   a) Strain gauge b) Thermister
   c) LVDT d) Thermo couple

13) Capacitive transducer are used for
   a) Static measurement b) Dynamic measurement
   c) Transient measurement d) Both a) and b)

14) _____error is caused by careless handling.
   a) Systematic b) Gross c) Random d) Kinetic

_____

SLR-TC – 445

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
   3) Define gauge factor and distinguish between bonded and unbonded strain gauges.
   4) With the help of diagram explain electrode electrolyte interface and define half cell potential.
   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
   3) Describe construction, working and application of microelectrodes.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

Set P

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
      a) Working and construction of amperometric sensor.
      b) Catalytic biosensor.
   2) Explain how fiber optic sensors are designed for measuring following variables :
      a) temperature
      b) pressure
   3) With the help of diagram explain working of ISFET's.

SLR-TC – 445

Seat No.	

Set **Q**

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ quantities cannot be measured by capacitive transducers.
   a) Displacement b) Speed
   c) Moisture d) None of above

2) _____ describes current flow between two junctions formed by two different metals.
   a) Peltier effect b) Thomson effect
   c) Seebeck effect d) None of above

3) In piezoelectric strain transducer voltage developed is _____ to strain applied.
   a) Directly proportional b) Inversely proportional
   c) Equal d) Independent

4) With the increase in the intensity of light, the resistance of photovoltaic cell
   a) Increases b) Decreases c) Remains same d) Separates

5) _____ represents active transducer.
   a) Strain gauge b) Thermister
   c) LVDT d) Thermo couple

6) Capacitive transducer are used for
   a) Static measurement b) Dynamic measurement
   c) Transient measurement d) Both a) and b)

P.T.O.

7) _____error is caused by careless handling.
a) Systematic b) Gross c) Random d) Kinetic

8) _____ is defined as the largest charge in the input quantity to which the measuring system does not respond.
a) Drift b) Resolution c) Dead band d) Error

9) Capacitive transducers are also called as _____ transducers as they measure an object without mechanical coupling.
a) Proximity b) Invasive c) Loading d) Inductive

10) Quartz is an _____ , the surfaces on which charge accumulates are provided with metallic electrodes.
a) Conductor b) Insulator
c) Capacitor d) None of above

11) Standard electrode potential for any half cell is measurement of
a) Voltage b) Ions apart c) Radii of ions d) Deposited ion

12) _____ biosensors use the movement of electrons produced during redox reaction.
a) Amperometric b) Potentiometric c) Piezoelectric d) Optical

13) _____ acts as detector in optical sensor.
a) LED b) Photo diode c) Transistor d) All of above

14) _____ conversion take place in bourdon tubes.
a) Pressure to displacement b) Pressure to voltage
c) Pressure to strain d) Pressure to force

_____

SLR-TC – 445

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
   3) Define gauge factor and distinguish between bonded and unbonded strain gauges.
   4) With the help of diagram explain electrode electrolyte interface and define half cell potential.
   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
   3) Describe construction, working and application of microelectrodes.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
      a) Working and construction of amperometric sensor.
      b) Catalytic biosensor.
   2) Explain how fiber optic sensors are designed for measuring following variables :
      a) temperature
      b) pressure
   3) With the help of diagram explain working of ISFET's.

SLR-TC – 445

Seat No.	

Set R

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ biosensors use the movement of electrons produced during redox reaction.
a) Amperometric b) Potentiometric c) Piezoelectric d) Optical

2) _____ acts as detector in optical sensor.
a) LED b) Photo diode c) Transistor d) All of above

3) _____ conversion take place in bourdon tubes.
a) Pressure to displacement b) Pressure to voltage
c) Pressure to strain d) Pressure to force

4) _____ quantities cannot be measured by capacitive transducers.
a) Displacement b) Speed
c) Moisture d) None of above

5) _____ describes current flow between two junctions formed by two different metals.
a) Peltier effect b) Thomson effect
c) Seebeck effect d) None of above

6) In piezoelectric strain transducer voltage developed is _____ to strain applied.
a) Directly proportional b) Inversely proportional
c) Equal d) Independent

P.T.O.

7) With the increase in the intensity of light, the resistance of photovoltaic cell
   a) Increases b) Decreases c) Remains same d) Separates

8) _____ represents active transducer.
   a) Strain gauge b) Thermister
   c) LVDT d) Thermo couple

9) Capacitive transducer are used for
   a) Static measurement b) Dynamic measurement
   c) Transient measurement d) Both a) and b)

10) _____error is caused by careless handling.
   a) Systematic b) Gross c) Random d) Kinetic

11) _____ is defined as the largest charge in the input quantity to which the measuring system does not respond.
   a) Drift b) Resolution c) Dead band d) Error

12) Capacitive transducers are also called as _____ transducers as they measure an object without mechanical coupling.
   a) Proximity b) Invasive c) Loading d) Inductive

13) Quartz is an _____ , the surfaces on which charge accumulates are provided with metallic electrodes.
   a) Conductor b) Insulator
   c) Capacitor d) None of above

14) Standard electrode potential for any half cell is measurement of
   a) Voltage b) Ions apart c) Radii of ions d) Deposited ion

_____

SLR-TC – 445

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
   3) Define gauge factor and distinguish between bonded and unbonded strain gauges.
   4) With the help of diagram explain electrode electrolyte interface and define half cell potential.
   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
   3) Describe construction, working and application of microelectrodes.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
      a) Working and construction of amperometric sensor.
      b) Catalytic biosensor.
   2) Explain how fiber optic sensors are designed for measuring following variables :
      a) temperature
      b) pressure
   3) With the help of diagram explain working of ISFET's.

SLR-TC – 445

Seat No.	

Set **S**

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In piezoelectric strain transducer voltage developed is _____ to strain applied.
   a) Directly proportional b) Inversely proportional
   c) Equal d) Independent

2) With the increase in the intensity of light, the resistance of photovoltaic cell
   a) Increases b) Decreases c) Remains same d) Separates

3) _____ represents active transducer.
   a) Strain gauge b) Thermister
   c) LVDT d) Thermo couple

4) Capacitive transducer are used for
   a) Static measurement b) Dynamic measurement
   c) Transient measurement d) Both a) and b)

5) _____error is caused by careless handling.
   a) Systematic b) Gross c) Random d) Kinetic

6) _____ is defined as the largest charge in the input quantity to which the measuring system does not respond.
   a) Drift b) Resolution c) Dead band d) Error

7) Capacitive transducers are also called as _____ transducers as they measure an object without mechanical coupling.
   a) Proximity b) Invasive c) Loading d) Inductive

8) Quartz is an _____ , the surfaces on which charge accumulates are provided with metallic electrodes.
   a) Conductor b) Insulator
   c) Capacitor d) None of above

9) Standard electrode potential for any half cell is measurement of
   a) Voltage b) Ions apart c) Radii of ions d) Deposited ion

10) _____ biosensors use the movement of electrons produced during redox reaction.
   a) Amperometric b) Potentiometric c) Piezoelectric d) Optical

11) _____ acts as detector in optical sensor.
   a) LED b) Photo diode c) Transistor d) All of above

12) _____ conversion take place in bourdon tubes.
   a) Pressure to displacement b) Pressure to voltage
   c) Pressure to strain d) Pressure to force

13) _____ quantities cannot be measured by capacitive transducers.
   a) Displacement b) Speed
   c) Moisture d) None of above

14) _____ describes current flow between two junctions formed by two different metals.
   a) Peltier effect b) Thomson effect
   c) Seebeck effect d) None of above

SLR-TC – 445

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Distinguish between : (a) passive and active transducer (b) static and dynamic characteristics.
   2) Define the dynamic error of a first order system and derive the expression for the same when it is subjected to standard input signals.
   3) Define gauge factor and distinguish between bonded and unbonded strain gauges.
   4) With the help of diagram explain electrode electrolyte interface and define half cell potential.
   5) Explain working of LVDT with the help of neat diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) Define motion artifacts. Explain various types of body surface electrodes with their application.
   2) Write a short note on : (a) types of diaphragms (b) types and material of belows (c) types of bourdon tubes.
   3) Describe construction, working and application of microelectrodes.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define pH and describe working of pH electrode.
   2) Describe designing principles in fabrication of fiber optic sensors.
   3) Explain physiology of acid base balance and blood gas analysis.
   4) Explain significance of O_2 cell and mention its applications.
   5) Describe transconduction phenomenon for biosensor.

5. Attempt **any two** questions : **(6×2=12)**

   1) Write a short note on :
      a) Working and construction of amperometric sensor.
      b) Catalytic biosensor.
   2) Explain how fiber optic sensors are designed for measuring following variables :
      a) temperature
      b) pressure
   3) With the help of diagram explain working of ISFET's.

Seat No.	

SLR-TC – 446

Set P

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing
c) Loading response d) Post swing

2) Cadence is

a) Steps per gait cycle b) Steps per minute
c) Walking time d) Stepping time

3) The ratio of stress of strain is known as

a) Modulus of elasticity b) Young's modulus
c) Both a and b d) Hook's modulus

4) The shoulder and hip joints are of _____ type.

a) ball and socket b) pivot
c) saddle d) gliding

5) In a _____ lever, the resistance is positioned between the fulcrum and the effort.

a) first class b) second class c) third class d) fourth class

P.T.O.

6) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.

a) Hinge b) Gliding c) Pivot d) Condyloid

7) Following are basic types of stress except

a) tensile stress b) compressive c) shear d) volumetric

8) _____ movement is measured by goniometry is the upward or backward movement of a body part.

a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

9) The degree to which ajoint is able to move is referred as

a) posture b) range of motion

c) gait d) muscle strength

10) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

11) A clot formation in blood vessels is also called

a) Diffusion b) Drift

c) Coagulation d) Hydrolysis

12) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

13) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

14) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

_____

SLR-TC – 446

Seat No.	

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short notes on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foots.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it the with help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

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SLR-TC – 446

Seat No.	

Set Q

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ movement is measured by goniometry is the upward or backward movement of a body part.

a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

2) The degree to which ajoint is able to move is referred as

a) posture b) range of motion

c) gait d) muscle strength

3) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

4) A clot formation in blood vessels is also called

a) Diffusion b) Drift

c) Coagulation d) Hydrolysis

5) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

6) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

7) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

8) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing

c) Loading response d) Post swing

9) Cadence is

a) Steps per gait cycle b) Steps per minute

c) Walking time d) Stepping time

10) The ratio of stress of strain is known as

a) Modulus of elasticity b) Young's modulus

c) Both a and b d) Hook's modulus

11) The shoulder and hip joints are of _____ type.

a) ball and socket b) pivot

c) saddle d) gliding

12) In a _____ lever, the resistance is positioned between the fulcrum and the effort.

a) first class b) second class c) third class d) fourth class

13) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.

a) Hinge b) Gliding c) Pivot d) Condyloid

14) Following are basic types of stress except

a) tensile stress b) compressive c) shear d) volumetric

_____

SLR-TC – 446

Seat No.	

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short notes on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foots.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it the with help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

SLR-TC – 446

Seat No.	

Set R

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In a _____ lever, the resistance is positioned between the fulcrum and the effort.

a) first class b) second class c) third class d) fourth class

2) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.

a) Hinge b) Gliding c) Pivot d) Condyloid

3) Following are basic types of stress except

a) tensile stress b) compressive c) shear d) volumetric

4) _____ movement is measured by goniometry is the upward or backward movement of a body part.

a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

5) The degree to which ajoint is able to move is referred as

a) posture b) range of motion

c) gait d) muscle strength

6) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

7) A clot formation in blood vessels is also called

a) Diffusion b) Drift

c) Coagulation d) Hydrolysis

8) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

9) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

10) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

11) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing

c) Loading response d) Post swing

12) Cadence is

a) Steps per gait cycle b) Steps per minute

c) Walking time d) Stepping time

13) The ratio of stress of strain is known as

a) Modulus of elasticity b) Young's modulus

c) Both a and b d) Hook's modulus

14) The shoulder and hip joints are of _____ type.

a) ball and socket b) pivot

c) saddle d) gliding

_____

SLR-TC – 446

Seat No.	

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICSS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short notes on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foots.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it the with help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

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SLR-TC – 446

Seat No.	

Set S

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Unit of strain is

a) Newton b) Kg c) Nm d) Unit less

2) A clot formation in blood vessels is also called

a) Diffusion b) Drift
c) Coagulation d) Hydrolysis

3) During gait muscles use _____ energy.

a) minimum b) maximum c) stored d) kinetic

4) A cord or strap of dense tissue that connects a muscle to bone is called a

a) tendon b) ligament c) bursa d) arthritis

5) Protective layer that covers dermis is known as

a) epidermis b) epithelial c) muscle d) nerve

6) _____ of the following is not stance phase of gait.

a) Preswing b) Midswing
c) Loading response d) Post swing

P.T.O.

7) Cadence is
   a) Steps per gait cycle
   b) Steps per minute
   c) Walking time
   d) Stepping time

8) The ratio of stress of strain is known as
   a) Modulus of elasticity
   b) Young's modulus
   c) Both a and b
   d) Hook's modulus

9) The shoulder and hip joints are of _____ type.
   a) ball and socket
   b) pivot
   c) saddle
   d) gliding

10) In a _____ lever, the resistance is positioned between the fulcrum and the effort.
   a) first class b) second class c) third class d) fourth class

11) _____ joints are capable only of side to side and bode and forth movement with only slightly rotation.
   a) Hinge b) Gliding c) Pivot d) Condyloid

12) Following are basic types of stress except
   a) tensile stress b) compressive c) shear d) volumetric

13) _____ movement is measured by goniometry is the upward or backward movement of a body part.
   a) Planter flexion b) Adduction c) Abduction d) Dorsiflexion

14) The degree to which ajoint is able to move is referred as
   a) posture
   b) range of motion
   c) gait
   d) muscle strength

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SLR-TC – 446

Seat No.	

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018
BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Draw and explain various parameters of stress, strain curve of biological tissues.
   2) Define and explain the concept of gait cycle and mention its applications for analysis.
   3) With the help of diagram explain biomechanics of skin.
   4) Explain biomechanics of bone and mention its significance.
   5) Define various types of forces and explain their analysis in the joints.

3. Attempt **any two** questions : **(6×2=12)**
   1) Explain complete gait cycle and draw the graphs for various joint angles.
   2) Write a short notes on :
      a) Biomechanics of tendons and ligaments.
      b) Synovial joints classification.
   3) With the help of diagram explain working of goniometer and foot switches.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Describe recent development in prosthesis and orthotics.
   2) Describe construction and application of Jaipur foots.
   3) Describe construction and applications of SACH foot.

4) Define AFO and explain it the with help of any one example in detail.

5) Define spinal orthosis and describe criteria for providing spinal orthosis.

5. Attempt **any 2** questions : **(6×2=12)**

1) Explain three point pressure principle with three examples.

2) List the various abnormal spinal curvatures and describe any one spinal orthosis.

3) Explain the PTB socket lamination procedure with necessary diagram in detail.

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Seat No.	

SLR-TC – 447

Set **P**

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ errors are inherent in measuring instrument because of their mechanical structure.
A) Instrumental B) Environmental
C) Random D) Human

2) _____ waveforms are most widely accurately measured with r.m.s. voltmeter.
A) Complex B) Continuous C) Dual D) Single

3) A multimeter is a _____
A) PMMC B) Digital C) Electronic D) Phase

4) In a strain measuring device using a strain gauge, the output quantity is _____
A) Voltage B) Resistance C) Impedance D) Either A) or B)

5) _____ Axis modulation is also called as intensity modulation.
A) 2D B) X C) Y D) Z

6) Multimeter consumes _____ 1 watt of power.
A) < And = B) More than C) < D) > & =

7) In magnetic type of recorder, data is replaced for _____ times.
A) ∞ B) Triple C) Multiple D) Dual

8) A _____ converts physical and biological quantity into electrical quantity.
A) Sensor B) Transducer C) Biosensor D) None of above

9) A Piezoelectric force transducer has a charge sensitivity of 20 PC/N. It is connected to charge amplifier and overall gain of transducer and amplifier is 50 mV/N. The gain of the amplifier is _____
A) 1 mV/PC B) 1.5 mV/PC C) 2.5 mV/PC D) 4 mV/PC

10) _____ metal is used to measure temperature.
A) Aluminum B) Platinum
C) Stainless steel D) Copper

11) _____ is the ratio of the change in output to change in the input.
A) Error B) Resolution C) Accuracy D) Sensitivity

12) Common anode type display requires an active _____ configuration for code conversion.
A) Low B) High C) Neutral D) Multi digit

13) In CRO, which of the following is not a part of electron gun ?
A) Cathode B) Grid
C) Accelerating Anode D) X-Y plates

14) Ink jet recorder gives frequency response up to _____ Hz.
A) 1000 B) 10 C) 500 D) 2000

_____

SLR-TC – 447

Seat No.	

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Explain each block of generalized measurement system in detail.

   2) Compare between analog and digital phase meter.

   3) Explain advantages over conventional type Analog Voltmeter.

   4) What is dead time element ? Explain in detail.

   5) Define sensitivity of electronic voltmeter. Write a short note on FET voltmeter.

3. Attempt **any two** : **(6×2=12)**

   1) Explain first order system response of a system to step, ramp and impulse input and frequency response.

   2) Explain principle working of ramp type, dual slope type and successive approximation type digital voltmeter.

   3) Explain factor involved in selection of voltmeter.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain intensity modulation and velocity modulation of CRO.

   2) Explain working of function generator with the help of block diagram.

   3) Explain principle working of ramp type digital voltmeter.

   4) Explain following term with respect to CRO :
      a) Focus
      b) ALT/CHOP.

   5) Explain the concept and working of non fade display system.

5. Attempt **any two** : **(6×2=12)**

   1) Draw and explain block diagram of multi channel DAS system.

   2) Explain design and working of magnetic, laser and ink jet type of writing system.

   3) What is Lissajous pattern ? Explain how it can be used for measurement of frequency and phase using suitable diagram.

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Seat No.	

SLR-TC – 447

Set Q

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) A _____ converts physical and biological quantity into electrical quantity.
A) Sensor B) Transducer C) Biosensor D) None of above

2) A Piezoelectric force transducer has a charge sensitivity of 20 PC/N. It is connected to charge amplifier and overall gain of transducer and amplifier is 50 mV/N. The gain of the amplifier is _____
A) 1 mV/PC B) 1.5 mV/PC C) 2.5 mV/PC D) 4 mV/PC

3) _____ metal is used to measure temperature.
A) Aluminum B) Platinum
C) Stainless steel D) Copper

4) _____ is the ratio of the change in output to change in the input.
A) Error B) Resolution C) Accuracy D) Sensitivity

5) Common anode type display requires an active _____ configuration for code conversion.
A) Low B) High C) Neutral D) Multi digit

6) In CRO, which of the following is not a part of electron gun ?
   A) Cathode B) Grid
   C) Accelerating Anode D) X-Y plates

7) Ink jet recorder gives frequency response up to _____ Hz.
   A) 1000 B) 10 C) 500 D) 2000

8) _____ errors are inherent in measuring instrument because of their mechanical structure.
   A) Instrumental B) Environmental
   C) Random D) Human

9) _____ waveforms are most widely accurately measured with r.m.s. voltmeter.
   A) Complex B) Continuous C) Dual D) Single

10) A multimeter is a _____
   A) PMMC B) Digital C) Electronic D) Phase

11) In a strain measuring device using a strain gauge, the output quantity is _____
   A) Voltage B) Resistance C) Impedance D) Either A) or B)

12) _____ Axis modulation is also called as intensity modulation.
   A) 2D B) X C) Y D) Z

13) Multimeter consumes _____ 1 watt of power.
   A) < And = B) More than C) < D) > & =

14) In magnetic type of recorder, data is replaced for _____ times.
   A) ∞ B) Triple C) Multiple D) Dual

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SLR-TC – 447

Seat No.	

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Explain each block of generalized measurement system in detail.

   2) Compare between analog and digital phase meter.

   3) Explain advantages over conventional type Analog Voltmeter.

   4) What is dead time element ? Explain in detail.

   5) Define sensitivity of electronic voltmeter. Write a short note on FET voltmeter.

3. Attempt **any two** : **(6×2=12)**

   1) Explain first order system response of a system to step, ramp and impulse input and frequency response.

   2) Explain principle working of ramp type, dual slope type and successive approximation type digital voltmeter.

   3) Explain factor involved in selection of voltmeter.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain intensity modulation and velocity modulation of CRO.

   2) Explain working of function generator with the help of block diagram.

   3) Explain principle working of ramp type digital voltmeter.

   4) Explain following term with respect to CRO :
      a) Focus
      b) ALT/CHOP.

   5) Explain the concept and working of non fade display system.

5. Attempt **any two** : **(6×2=12)**

   1) Draw and explain block diagram of multi channel DAS system.

   2) Explain design and working of magnetic, laser and ink jet type of writing system.

   3) What is Lissajous pattern ? Explain how it can be used for measurement of frequency and phase using suitable diagram.

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Seat No.	

SLR-TC – 447

Set R

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ Axis modulation is also called as intensity modulation.
A) 2D B) X C) Y D) Z

2) Multimeter consumes _____ 1 watt of power.
A) < And = B) More than C) < D) > & =

3) In magnetic type of recorder, data is replaced for _____ times.
A) ∞ B) Triple C) Multiple D) Dual

4) A _____ converts physical and biological quantity into electrical quantity.
A) Sensor B) Transducer C) Biosensor D) None of above

5) A Piezoelectric force transducer has a charge sensitivity of 20 PC/N. It is connected to charge amplifier and overall gain of transducer and amplifier is 50 mV/N. The gain of the amplifier is _____
A) 1 mV/PC B) 1.5 mV/PC C) 2.5 mV/PC D) 4 mV/PC

6) _____ metal is used to measure temperature.
A) Aluminum B) Platinum
C) Stainless steel D) Copper

7) _____ is the ratio of the change in output to change in the input.
A) Error B) Resolution C) Accuracy D) Sensitivity

8) Common anode type display requires an active _____ configuration for code conversion.
A) Low B) High C) Neutral D) Multi digit

9) In CRO, which of the following is not a part of electron gun ?
A) Cathode B) Grid
C) Accelerating Anode D) X-Y plates

10) Ink jet recorder gives frequency response up to _____ Hz.
A) 1000 B) 10 C) 500 D) 2000

11) _____ errors are inherent in measuring instrument because of their mechanical structure.
A) Instrumental B) Environmental
C) Random D) Human

12) _____ waveforms are most widely accurately measured with r.m.s. voltmeter.
A) Complex B) Continuous C) Dual D) Single

13) A multimeter is a _____
A) PMMC B) Digital C) Electronic D) Phase

14) In a strain measuring device using a strain gauge, the output quantity is _____
A) Voltage B) Resistance C) Impedance D) Either A) or B)

_____

SLR-TC – 447

Seat No.	

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Explain each block of generalized measurement system in detail.

   2) Compare between analog and digital phase meter.

   3) Explain advantages over conventional type Analog Voltmeter.

   4) What is dead time element ? Explain in detail.

   5) Define sensitivity of electronic voltmeter. Write a short note on FET voltmeter.

3. Attempt **any two** : **(6×2=12)**

   1) Explain first order system response of a system to step, ramp and impulse input and frequency response.

   2) Explain principle working of ramp type, dual slope type and successive approximation type digital voltmeter.

   3) Explain factor involved in selection of voltmeter.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain intensity modulation and velocity modulation of CRO.

   2) Explain working of function generator with the help of block diagram.

   3) Explain principle working of ramp type digital voltmeter.

   4) Explain following term with respect to CRO :
      a) Focus
      b) ALT/CHOP.

   5) Explain the concept and working of non fade display system.

5. Attempt **any two** : **(6×2=12)**

   1) Draw and explain block diagram of multi channel DAS system.

   2) Explain design and working of magnetic, laser and ink jet type of writing system.

   3) What is Lissajous pattern ? Explain how it can be used for measurement of frequency and phase using suitable diagram.

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Seat No.	

SLR-TC – 447

Set S

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ metal is used to measure temperature.

A) Aluminum B) Platinum

C) Stainless steel D) Copper

2) _____ is the ratio of the change in output to change in the input.

A) Error B) Resolution C) Accuracy D) Sensitivity

3) Common anode type display requires an active _____ configuration for code conversion.

A) Low B) High C) Neutral D) Multi digit

4) In CRO, which of the following is not a part of electron gun ?

A) Cathode B) Grid

C) Accelerating Anode D) X-Y plates

5) Ink jet recorder gives frequency response up to _____ Hz.

A) 1000 B) 10 C) 500 D) 2000

6) _____ errors are inherent in measuring instrument because of their mechanical structure.
A) Instrumental B) Environmental
C) Random D) Human

7) _____ waveforms are most widely accurately measured with r.m.s. voltmeter.
A) Complex B) Continuous C) Dual D) Single

8) A multimeter is a _____
A) PMMC B) Digital C) Electronic D) Phase

9) In a strain measuring device using a strain gauge, the output quantity is _____
A) Voltage B) Resistance C) Impedance D) Either A) or B)

10) _____ Axis modulation is also called as intensity modulation.
A) 2D B) X C) Y D) Z

11) Multimeter consumes _____ 1 watt of power.
A) < And = B) More than C) < D) > & =

12) In magnetic type of recorder, data is replaced for _____ times.
A) ∞ B) Triple C) Multiple D) Dual

13) A _____ converts physical and biological quantity into electrical quantity.
A) Sensor B) Transducer C) Biosensor D) None of above

14) A Piezoelectric force transducer has a charge sensitivity of 20 PC/N. It is connected to charge amplifier and overall gain of transducer and amplifier is 50 mV/N. The gain of the amplifier is _____
A) 1 mV/PC B) 1.5 mV/PC C) 2.5 mV/PC D) 4 mV/PC

_____

SLR-TC – 447

Seat No.	

S.E. (Biomedical Engg.) (Part – II) Examination, 2018
(CGPA)
ELECTRONIC INSTRUMENTATION (Old)

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Explain each block of generalized measurement system in detail.

   2) Compare between analog and digital phase meter.

   3) Explain advantages over conventional type Analog Voltmeter.

   4) What is dead time element ? Explain in detail.

   5) Define sensitivity of electronic voltmeter. Write a short note on FET voltmeter.

3. Attempt **any two** : **(6×2=12)**

   1) Explain first order system response of a system to step, ramp and impulse input and frequency response.

   2) Explain principle working of ramp type, dual slope type and successive approximation type digital voltmeter.

   3) Explain factor involved in selection of voltmeter.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain intensity modulation and velocity modulation of CRO.

   2) Explain working of function generator with the help of block diagram.

   3) Explain principle working of ramp type digital voltmeter.

   4) Explain following term with respect to CRO :
      a) Focus
      b) ALT/CHOP.

   5) Explain the concept and working of non fade display system.

5. Attempt **any two** : **(6×2=12)**

   1) Draw and explain block diagram of multi channel DAS system.

   2) Explain design and working of magnetic, laser and ink jet type of writing system.

   3) What is Lissajous pattern ? Explain how it can be used for measurement of frequency and phase using suitable diagram.

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SLR-TC – 448

Seat No.	

Set **P**

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Change in a state occurs during
   a) Pulse transition b) Outputs
   c) Clock pulse d) Inputs

2) A combinational circuit can be designed using only
   a) AND gate b) OR gate
   c) NAND gate d) NOR gate

3) _____ is the gray code for the binary 101011.
   a) 101011 b) 110101
   c) 011111 d) 111110

4) Register is a group of
   a) Binary cell b) Binary number
   c) Binary digit d) Binary system

5) A latch is _____ sensitive.
   a) Both level and edge b) Edge
   c) Level d) None

6) A digital circuit that can store on bit is a
   a) XOR gate b) Flip-flop
   c) Gate d) Register

7) Stack is also known as _____ memory.
   a) FIFO b) Flash
   c) LIFO d) LILO

8) The decimal equivalent of hex number $(3A.2F)_{16}$ is
   a) $(58.1836)_{10}$ b) $(57.1735)_{10}$
   c) $(18.1836)_{10}$ d) $(58.1830)_{10}$

9) A single transistor can be used to build _____ digital logic gates.
   a) AND gate b) NAND gate
   c) OR gate d) NOT gate

10) Simplified form of the function $f = (x + y + xy)(x + z)$ is
   a) $x + y$ b) $x + yz$
   c) $x + xyz$ d) $y + xz$

11) Slowest memory element is
   a) RAM b) ROM
   c) Cache d) Hard drive

12) Excess 3 code is known as _____ code.
   a) Weighted b) Redundancy
   c) Algebraic d) Self complementing

13) The fast logic family is
   a) FCL b) DRL
   c) TRL d) TTL

14) An 'n' variable k-map can have
   a) n^2 cell b) 2^n cell
   c) n^n cell d) $n2^n$ cell

_____

SLR-TC – 448

Seat No.	

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Represent the decimal number $(396)_{10}$ in

      a) Binary code

      b) BCD code

      c) Excess-3 code

      d) Hex code

   2) State and explain Demorgan's theorem for logic gates.

   3) Realize and design circuit for the given logic equation :

      a) $Y = \overline{A}B + A\overline{B}$

      b) $Y = \overline{A}BC + A\overline{B}C + A\overline{B}\overline{C}$

   4) Explain working of Schottky TTL design with neat figure.

   5) Define and differentiate latch and flip flop.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Design a binary to gray code converter using EX-OR gate and k-map.

   2) Design 4-variable 8 : 1 multiplexer and mention its truth table.

   3) Explain master slave J-K flip flop using NAND gate.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

   1) Perform following operations :
      a) $(53)_8 - (37)_8$
      b) $(7F)_{16} + (BA)_{16}$
   2) Draw and explain working of half subtractor circuit with its truth table.
   3) List digital to analog converter circuits and explain any one in detail.
   4) Draw and explain working of Bipolar RAM cell.
   5) Explain working and significance of arithmetic and logic unit in detail.

5. Attempt **any 2** questions : **(6×2=12)**

   1) Design divide by 8 ripple counter using flip flops. Draw its timing diagram for Q output.
   2) Draw and explain working of dual slope A to D converter in detail.
   3) Write a short note on :
      a) EPROM.
      b) FLASH memories.

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SLR-TC – 448

Seat No.	

Set **Q**

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The decimal equivalent of hex number $(3A.2F)_{16}$ is
   a) $(58.1836)_{10}$ b) $(57.1735)_{10}$
   c) $(18.1836)_{10}$ d) $(58.1830)_{10}$

2) A single transistor can be used to build _____ digital logic gates.
   a) AND gate b) NAND gate
   c) OR gate d) NOT gate

3) Simplified form of the function f = (x + y + xy) (x + z) is
   a) x + y b) x + yz
   c) x + xyz d) y + xz

4) Slowest memory element is
   a) RAM b) ROM
   c) Cache d) Hard drive

5) Excess 3 code is known as _____ code.
   a) Weighted b) Redundancy
   c) Algebraic d) Self complementing

6) The fast logic family is
   a) FCL b) DRL
   c) TRL d) TTL

7) An 'n' variable k-map can have
   a) n^2 cell
   b) 2^n cell
   c) n^n cell
   d) $n2^n$ cell

8) Change in a state occurs during
   a) Pulse transition
   b) Outputs
   c) Clock pulse
   d) Inputs

9) A combinational circuit can be designed using only
   a) AND gate
   b) OR gate
   c) NAND gate
   d) NOR gate

10) _____ is the gray code for the binary 101011.
   a) 101011
   b) 110101
   c) 011111
   d) 111110

11) Register is a group of
   a) Binary cell
   b) Binary number
   c) Binary digit
   d) Binary system

12) A latch is _____ sensitive.
   a) Both level and edge
   b) Edge
   c) Level
   d) None

13) A digital circuit that can store on bit is a
   a) XOR gate
   b) Flip-flop
   c) Gate
   d) Register

14) Stack is also known as _____ memory.
   a) FIFO
   b) Flash
   c) LIFO
   d) LILO

_____

SLR-TC – 448

Seat No.	

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Represent the decimal number $(396)_{10}$ in

      a) Binary code

      b) BCD code

      c) Excess-3 code

      d) Hex code

   2) State and explain Demorgan's theorem for logic gates.

   3) Realize and design circuit for the given logic equation :

      a) $Y = \overline{A}B + A\overline{B}$

      b) $Y = \overline{A}BC + A\overline{B}C + A\overline{B}\overline{C}$

   4) Explain working of Schottky TTL design with neat figure.

   5) Define and differentiate latch and flip flop.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Design a binary to gray code converter using EX-OR gate and k-map.

   2) Design 4-variable 8 : 1 multiplexer and mention its truth table.

   3) Explain master slave J-K flip flop using NAND gate.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

   1) Perform following operations :
      a) $(53)_8 - (37)_8$
      b) $(7F)_{16} + (BA)_{16}$
   2) Draw and explain working of half subtractor circuit with its truth table.
   3) List digital to analog converter circuits and explain any one in detail.
   4) Draw and explain working of Bipolar RAM cell.
   5) Explain working and significance of arithmetic and logic unit in detail.

5. Attempt **any 2** questions : **(6×2=12)**

   1) Design divide by 8 ripple counter using flip flops. Draw its timing diagram for Q output.
   2) Draw and explain working of dual slope A to D converter in detail.
   3) Write a short note on :
      a) EPROM.
      b) FLASH memories.

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SLR-TC – 448

Seat No.	

Set **R**

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) A latch is _____ sensitive.
   a) Both level and edge b) Edge
   c) Level d) None

2) A digital circuit that can store on bit is a
   a) XOR gate b) Flip-flop
   c) Gate d) Register

3) Stack is also known as _____ memory.
   a) FIFO b) Flash
   c) LIFO d) LILO

4) The decimal equivalent of hex number $(3A.2F)_{16}$ is
   a) $(58.1836)_{10}$ b) $(57.1735)_{10}$
   c) $(18.1836)_{10}$ d) $(58.1830)_{10}$

5) A single transistor can be used to build _____ digital logic gates.
   a) AND gate b) NAND gate
   c) OR gate d) NOT gate

6) Simplified form of the function f = (x + y + xy) (x + z) is
   a) x + y b) x + yz
   c) x + xyz d) y + xz

P.T.O.

7) Slowest memory element is
   a) RAM b) ROM
   c) Cache d) Hard drive

8) Excess 3 code is known as _____ code.
   a) Weighted b) Redundancy
   c) Algebraic d) Self complementing

9) The fast logic family is
   a) FCL b) DRL
   c) TRL d) TTL

10) An 'n' variable k-map can have
   a) n^2 cell b) 2^n cell
   c) n^n cell d) $n2^n$ cell

11) Change in a state occurs during
   a) Pulse transition b) Outputs
   c) Clock pulse d) Inputs

12) A combinational circuit can be designed using only
   a) AND gate b) OR gate
   c) NAND gate d) NOR gate

13) _____ is the gray code for the binary 101011.
   a) 101011 b) 110101
   c) 011111 d) 111110

14) Register is a group of
   a) Binary cell b) Binary number
   c) Binary digit d) Binary system

_____

SLR-TC – 448

Seat No.	

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Represent the decimal number $(396)_{10}$ in

      a) Binary code

      b) BCD code

      c) Excess-3 code

      d) Hex code

   2) State and explain Demorgan's theorem for logic gates.

   3) Realize and design circuit for the given logic equation :

      a) $Y = \overline{A}B + A\overline{B}$

      b) $Y = \overline{A}BC + A\overline{B}C + A\overline{B}\overline{C}$

   4) Explain working of Schottky TTL design with neat figure.

   5) Define and differentiate latch and flip flop.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Design a binary to gray code converter using EX-OR gate and k-map.

   2) Design 4-variable 8 : 1 multiplexer and mention its truth table.

   3) Explain master slave J-K flip flop using NAND gate.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

   1) Perform following operations :
      a) $(53)_8 - (37)_8$
      b) $(7F)_{16} + (BA)_{16}$
   2) Draw and explain working of half subtractor circuit with its truth table.
   3) List digital to analog converter circuits and explain any one in detail.
   4) Draw and explain working of Bipolar RAM cell.
   5) Explain working and significance of arithmetic and logic unit in detail.

5. Attempt **any 2** questions : **(6×2=12)**

   1) Design divide by 8 ripple counter using flip flops. Draw its timing diagram for Q output.
   2) Draw and explain working of dual slope A to D converter in detail.
   3) Write a short note on :
      a) EPROM.
      b) FLASH memories.

———————

SLR-TC – 448

Seat No.	

Set **S**

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Simplified form of the function f = (x + y + xy) (x + z) is
   a) x + y b) x + yz
   c) x + xyz d) y + xz

2) Slowest memory element is
   a) RAM b) ROM
   c) Cache d) Hard drive

3) Excess 3 code is known as _____ code.
   a) Weighted b) Redundancy
   c) Algebraic d) Self complementing

4) The fast logic family is
   a) FCL b) DRL
   c) TRL d) TTL

5) An 'n' variable k-map can have
   a) n^2 cell b) 2^n cell
   c) n^n cell d) $n2^n$ cell

6) Change in a state occurs during
   a) Pulse transition b) Outputs
   c) Clock pulse d) Inputs

7) A combinational circuit can be designed using only
   a) AND gate b) OR gate
   c) NAND gate d) NOR gate

8) _____ is the gray code for the binary 101011.
   a) 101011 b) 110101
   c) 011111 d) 111110

9) Register is a group of
   a) Binary cell b) Binary number
   c) Binary digit d) Binary system

10) A latch is _____ sensitive.
   a) Both level and edge b) Edge
   c) Level d) None

11) A digital circuit that can store on bit is a
   a) XOR gate b) Flip-flop
   c) Gate d) Register

12) Stack is also known as _____ memory.
   a) FIFO b) Flash
   c) LIFO d) LILO

13) The decimal equivalent of hex number $(3A.2F)_{16}$ is
   a) $(58.1836)_{10}$ b) $(57.1735)_{10}$
   c) $(18.1836)_{10}$ d) $(58.1830)_{10}$

14) A single transistor can be used to build _____ digital logic gates.
   a) AND gate b) NAND gate
   c) OR gate d) NOT gate

_____

SLR-TC – 448

Seat No.	

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018
DIGITAL DESIGN

Day and Date : Tuesday, 22-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) Represent the decimal number $(396)_{10}$ in

      a) Binary code

      b) BCD code

      c) Excess-3 code

      d) Hex code

   2) State and explain Demorgan's theorem for logic gates.

   3) Realize and design circuit for the given logic equation :

      a) $Y = \overline{A}B + A\overline{B}$

      b) $Y = \overline{A}BC + A\overline{B}C + A\overline{B}\overline{C}$

   4) Explain working of Schottky TTL design with neat figure.

   5) Define and differentiate latch and flip flop.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Design a binary to gray code converter using EX-OR gate and k-map.

   2) Design 4-variable 8 : 1 multiplexer and mention its truth table.

   3) Explain master slave J-K flip flop using NAND gate.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

   1) Perform following operations :
      a) $(53)_8 - (37)_8$
      b) $(7F)_{16} + (BA)_{16}$
   2) Draw and explain working of half subtractor circuit with its truth table.
   3) List digital to analog converter circuits and explain any one in detail.
   4) Draw and explain working of Bipolar RAM cell.
   5) Explain working and significance of arithmetic and logic unit in detail.

5. Attempt **any 2** questions : **(6×2=12)**

   1) Design divide by 8 ripple counter using flip flops. Draw its timing diagram for Q output.
   2) Draw and explain working of dual slope A to D converter in detail.
   3) Write a short note on :
      a) EPROM.
      b) FLASH memories.

———————

SLR-TC – 449

Seat No.	

Set **P**

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The current gain for the Darlington connection is _____
   a) $\beta_1.(\beta_2/2)$ b) $\beta_1.\beta_2$ c) β_1/β_2 d) β_2/β_1

2) _____ configurations has the lowest output impedance.
   a) Fixed bias b) Voltage divider
   c) Emitter follower d) Emitter-collecter

3) Typical value of current gain of a CB configuration is _____
   a) > 1 b) between 1 and 50
   c) undefined d) between 100 and 200

4) Amplifier gain for RC phase shift oscillations to obey Barkhausen's criteria should be minimum of _____
   a) 43 b) 4 c) 10 d) 29

5) _____ component is used in Hartley oscillator feedback system.
   a) Inductor b) Capacitor c) Transistor d) Resistor

6) The _____ configuration is frequently used for impedance matching.
   a) fixed bias b) voltage divider bias
   c) emitter follower d) collector feedback

7) _____ type of power amplifier is biased for operation at less than 180° of the cycle.
   a) Class A b) Class B or AB
   c) Class C d) Class D

P.T.O.

8) In class B operation at what friction of V_{CC} should the level of $V_L(P)$ be to active the maximum power dissipated by the output transistor ?
   a) 0.5 b) 0.636 c) 0.707 d) 1

9) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_e model.
   a) V_e b) β c) βV_e d) I_b

10) Op-amps used as a high and low pass filter circuits employ _____ configuration.
   a) non-inverting b) comparator
   c) open loop d) inverting

11) _____ amplifier is used as frequency multiplier.
   a) Class A b) Class B c) Class C d) Class AB

12) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
   a) Adder b) Subtractor
   c) Integrator d) Differentiator

13) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
   a) common mode b) darlington
   c) differential d) operational

14) The efficiency of a transformer coupled class A amplifier for a supply of 15V and an output of $V(P) = 10\ V_1$ is _____
   a) 25% b) 33.3% c) 50% d) 78.5%

_____

SLR-TC – 449

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

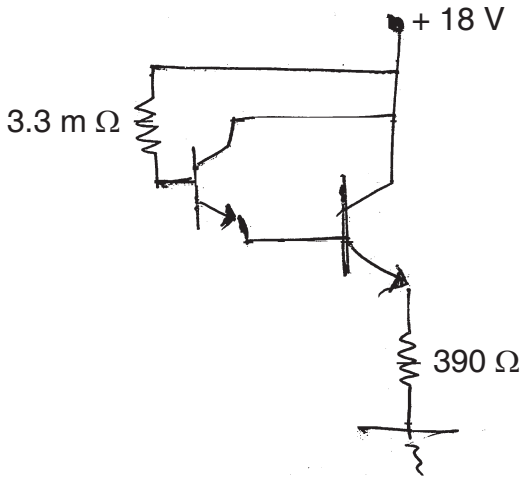
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) With the help of diagram explain working of BJT Darlington pair circuit and mention its advantages.

2) Explain working and analyze class B power amplifier.

3) Calculate the DC bias voltages and currents in the following circuits.



Given :

$B_D = 8000$

$V_{BE} = 1.6$ V

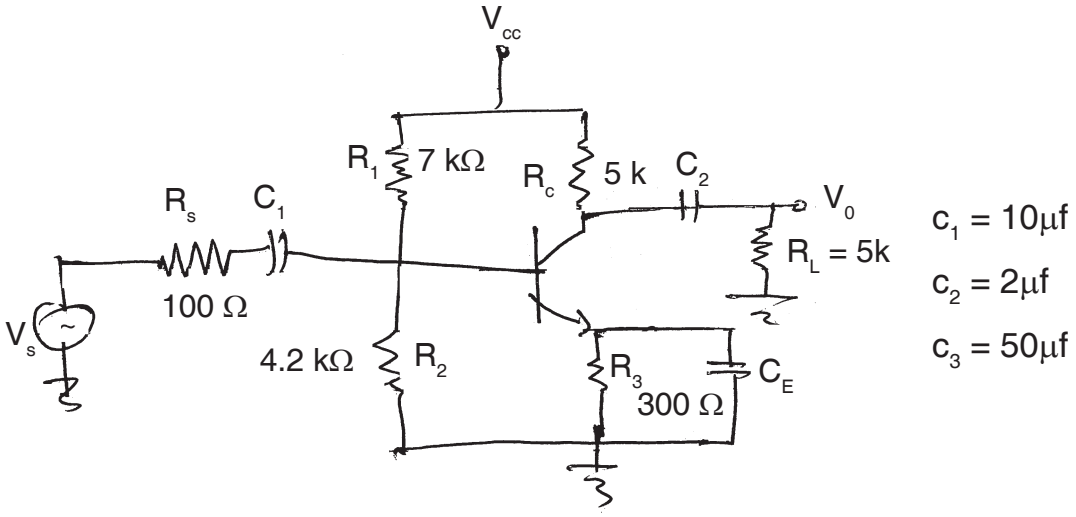
4) Draw and explain working of RC coupled oscillator with its frequency response.

5) Compare between class B amplifier with class C amplifier.

3. Attempt **any two** questions : **(6×2=12)**

1) For the common emitter BJT amplifier calculate the values of f_L and f_H and midband voltage gain amid. Assume following parameter.

$\beta = 80$, $g_m = 50\mu A/V$, $r_\pi = 1.3\ k\Omega$, $C_\pi = 15\ pf$ $c_\mu = 1pf$.



2) Compare different types at power amplifier based on following factors :

a) Conduction angle

b) Position of Q point

c) Efficiency

d) Distortion.

3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

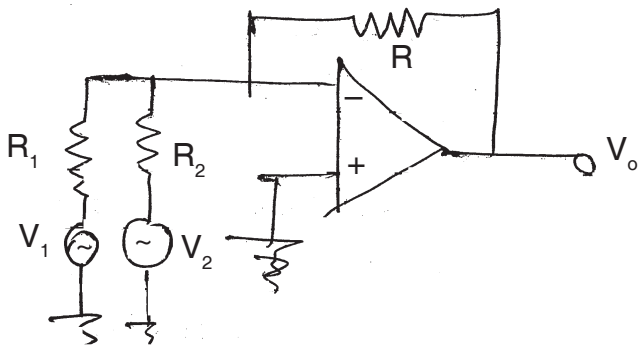
4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

2) List ideal characteristics of op-amp.

3) Draw the circuit for basic differentiator using op-amp and find the expression for the output voltage.

4) Find the output voltage for the circuit shown if R_f = 10kΩ, R_1= 2kΩ, R_2 = 5kΩ.



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set P

SLR-TC – 449

Seat No.	

Set **Q**

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In class B operation at what friction of V_{CC} should the level of $V_L(P)$ be to active the maximum power dissipated by the output transistor ?
a) 0.5 b) 0.636 c) 0.707 d) 1

2) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_e model.
a) V_e b) β c) βV_e d) I_b

3) Op-amps used as a high and low pass filter circuits employ _____ configuration.
a) non-inverting b) comparator
c) open loop d) inverting

4) _____ amplifier is used as frequency multiplier.
a) Class A b) Class B c) Class C d) Class AB

5) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
a) Adder b) Subtractor
c) Integrator d) Differentiator

6) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
a) common mode b) darlington
c) differential d) operational

7) The efficiency of a transformer coupled class A amplifier for a supply of 15V and an output of $V(P) = 10\ V_1$ is _____
   a) 25% b) 33.3% c) 50% d) 78.5%

8) The current gain for the Darlington connection is _____
   a) $\beta_1.(\beta_2/2)$ b) $\beta_1.\beta_2$ c) β_1/β_2 d) β_2/β_1

9) _____ configurations has the lowest output impedance.
   a) Fixed bias b) Voltage divider
   c) Emitter follower d) Emitter-collecter

10) Typical value of current gain of a CB configuration is _____
   a) > 1 b) between 1 and 50
   c) undefined d) between 100 and 200

11) Amplifier gain for RC phase shift oscillations to obey Barkhausen's criteria should be minimum of _____
   a) 43 b) 4 c) 10 d) 29

12) _____ component is used in Hartley oscillator feedback system.
   a) Inductor b) Capacitor c) Transistor d) Resistor

13) The _____ configuration is frequently used for impedance matching.
   a) fixed bias b) voltage divider bias
   c) emitter follower d) collector feedback

14) _____ type of power amplifier is biased for operation at less than 180° of the cycle.
   a) Class A b) Class B or AB
   c) Class C d) Class D

_____

SLR-TC – 449

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

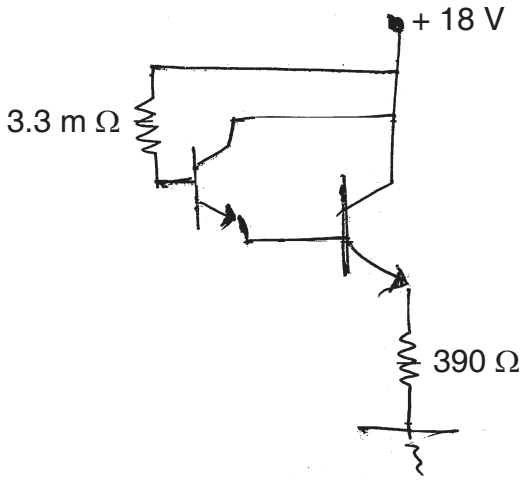
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) With the help of diagram explain working of BJT Darlington pair circuit and mention its advantages.

2) Explain working and analyze class B power amplifier.

3) Calculate the DC bias voltages and currents in the following circuits.



Given :

$B_D = 8000$

$V_{BE} = 1.6$ V

4) Draw and explain working of RC coupled oscillator with its frequency response.

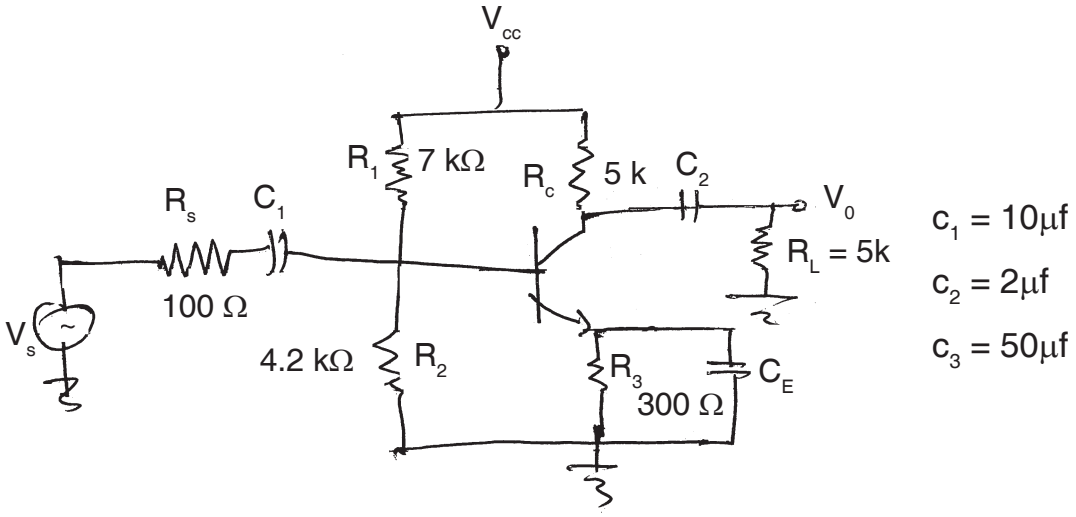
5) Compare between class B amplifier with class C amplifier.

Set Q

3. Attempt **any two** questions : **(6×2=12)**

1) For the common emitter BJT amplifier calculate the values of f_L and f_H and midband voltage gain amid. Assume following parameter.

$\beta = 80$, $g_m = 50\mu A/V$, $r_\pi = 1.3\ k\Omega$, $C_\pi = 15\ pf$ $c_\mu = 1pf$.



2) Compare different types at power amplifier based on following factors :

a) Conduction angle

b) Position of Q point

c) Efficiency

d) Distortion.

3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

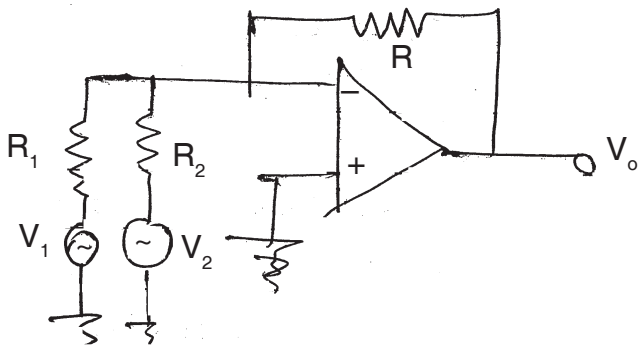
4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

2) List ideal characteristics of op-amp.

3) Draw the circuit for basic differentiator using op-amp and find the expression for the output voltage.

4) Find the output voltage for the circuit shown if R_f = 10kΩ, R_1= 2kΩ, R_2 = 5kΩ.



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set Q

SLR-TC – 449

Seat No.	

Set **R**

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ component is used in Hartley oscillator feedback system.
a) Inductor b) Capacitor c) Transistor d) Resistor

2) The _____ configuration is frequently used for impedance matching.
a) fixed bias b) voltage divider bias
c) emitter follower d) collector feedback

3) _____ type of power amplifier is biased for operation at less than 180° of the cycle.
a) Class A b) Class B or AB
c) Class C d) Class D

4) In class B operation at what friction of V_{CC} should the level of $V_L(P)$ be to active the maximum power dissipated by the output transistor ?
a) 0.5 b) 0.636 c) 0.707 d) 1

5) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_e model.
a) V_e b) β c) βV_e d) I_b

6) Op-amps used as a high and low pass filter circuits employ _____ configuration.
a) non-inverting b) comparator
c) open loop d) inverting

7) _____ amplifier is used as frequency multiplier.
   a) Class A b) Class B c) Class C d) Class AB

8) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
   a) Adder b) Subtractor
   c) Integrator d) Differentiator

9) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
   a) common mode b) darlington
   c) differential d) operational

10) The efficiency of a transformer coupled class A amplifier for a supply of 15V and an output of $V(P) = 10\ V_1$ is _____
   a) 25% b) 33.3% c) 50% d) 78.5%

11) The current gain for the Darlington connection is _____
   a) $\beta_1.(\beta_2/2)$ b) $\beta_1.\beta_2$ c) β_1/β_2 d) β_2/β_1

12) _____ configurations has the lowest output impedance.
   a) Fixed bias b) Voltage divider
   c) Emitter follower d) Emitter-collecter

13) Typical value of current gain of a CB configuration is _____
   a) > 1 b) between 1 and 50
   c) undefined d) between 100 and 200

14) Amplifier gain for RC phase shift oscillations to obey Barkhausen's criteria should be minimum of _____
   a) 43 b) 4 c) 10 d) 29

_____

SLR-TC – 449

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

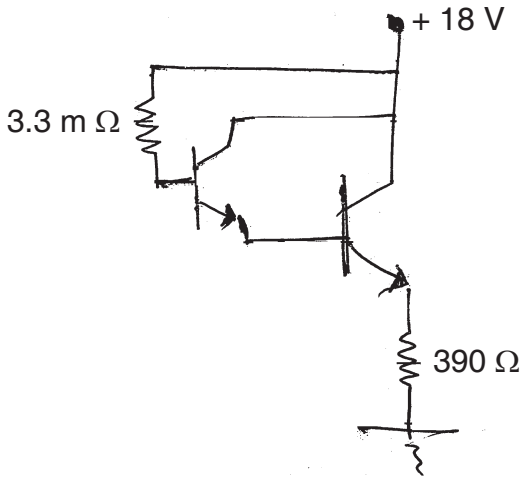
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) With the help of diagram explain working of BJT Darlington pair circuit and mention its advantages.

2) Explain working and analyze class B power amplifier.

3) Calculate the DC bias voltages and currents in the following circuits.



Given :

$B_D = 8000$

$V_{BE} = 1.6$ V

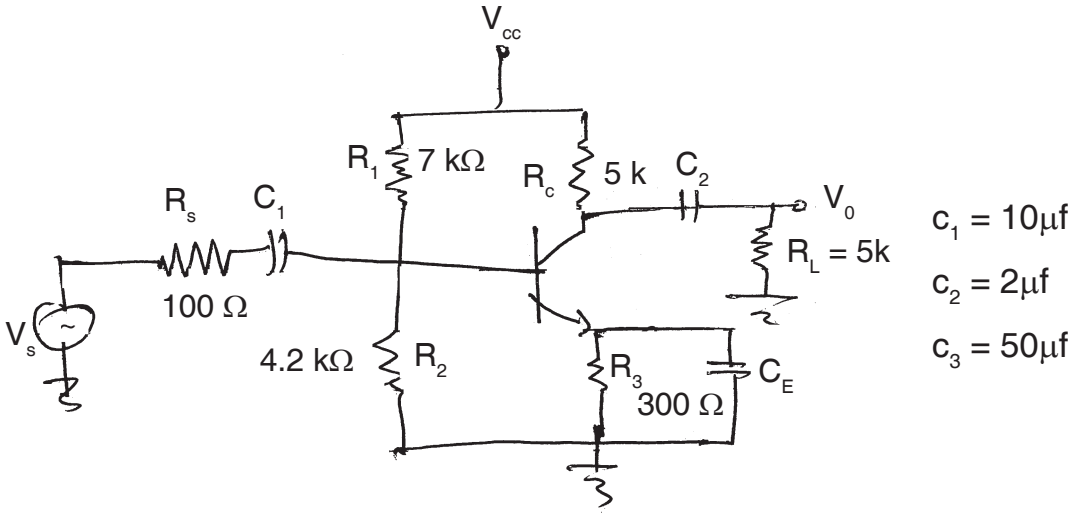
4) Draw and explain working of RC coupled oscillator with its frequency response.

5) Compare between class B amplifier with class C amplifier.

3. Attempt **any two** questions : **(6×2=12)**

1) For the common emitter BJT amplifier calculate the values of f_L and f_H and midband voltage gain amid. Assume following parameter.

$\beta = 80$, $g_m = 50\mu A/V$, $r_\pi = 1.3\ k\Omega$, $C_\pi = 15\ pf$ $c_\mu = 1pf$.



2) Compare different types at power amplifier based on following factors :

a) Conduction angle

b) Position of Q point

c) Efficiency

d) Distortion.

3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

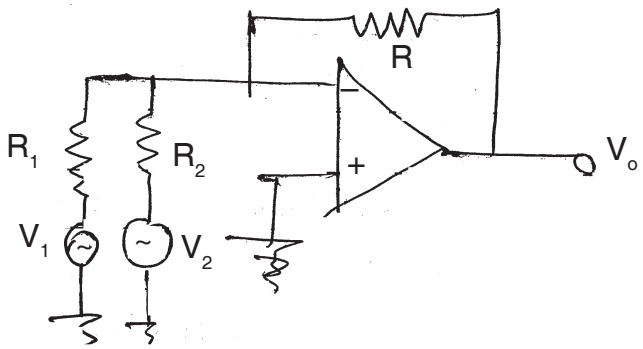
4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

2) List ideal characteristics of op-amp.

3) Draw the circuit for basic differentiator using op-amp and find the expression for the output voltage.

4) Find the output voltage for the circuit shown if R_f = 10kΩ, R_1= 2kΩ, R_2 = 5kΩ.



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set R

SLR-TC – 449

Seat No.	

Set **S**

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Op-amps used as a high and low pass filter circuits employ _____ configuration.
   a) non-inverting b) comparator
   c) open loop d) inverting

2) _____ amplifier is used as frequency multiplier.
   a) Class A b) Class B c) Class C d) Class AB

3) _____ among the following amplifier circuit exhibit the output voltage in the form of phase inversion.
   a) Adder b) Subtractor
   c) Integrator d) Differentiator

4) A circuit whose output is proportional to the difference between the input signals is considered to be _____ type of amplifier.
   a) common mode b) darlington
   c) differential d) operational

5) The efficiency of a transformer coupled class A amplifier for a supply of 15V and an output of $V(P) = 10\ V_1$ is _____
   a) 25% b) 33.3% c) 50% d) 78.5%

6) The current gain for the Darlington connection is _____
   a) $\beta_1.(\beta_2/2)$ b) $\beta_1.\beta_2$ c) β_1/β_2 d) β_2/β_1

P.T.O.

7) _____ configurations has the lowest output impedance.
   a) Fixed bias b) Voltage divider
   c) Emitter follower d) Emitter-collecter

8) Typical value of current gain of a CB configuration is _____
   a) > 1 b) between 1 and 50
   c) undefined d) between 100 and 200

9) Amplifier gain for RC phase shift oscillations to obey Barkhausen's criteria should be minimum of _____
   a) 43 b) 4 c) 10 d) 29

10) _____ component is used in Hartley oscillator feedback system.
   a) Inductor b) Capacitor c) Transistor d) Resistor

11) The _____ configuration is frequently used for impedance matching.
   a) fixed bias b) voltage divider bias
   c) emitter follower d) collector feedback

12) _____ type of power amplifier is biased for operation at less than 180° of the cycle.
   a) Class A b) Class B or AB
   c) Class C d) Class D

13) In class B operation at what friction of V_{CC} should the level of $V_L(P)$ be to active the maximum power dissipated by the output transistor ?
   a) 0.5 b) 0.636 c) 0.707 d) 1

14) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_e model.
   a) V_e b) β c) βV_e d) I_b

_____

SLR-TC – 449

Seat No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date : Thursday, 24-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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2) Explain working and analyze class B power amplifier.

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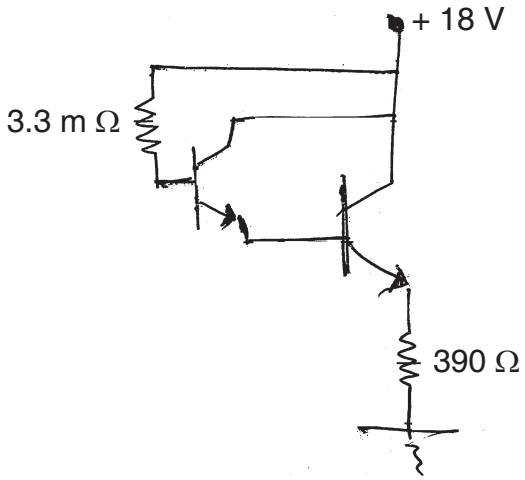

Given :

$B_D = 8000$

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4) Draw and explain working of RC coupled oscillator with its frequency response.

5) Compare between class B amplifier with class C amplifier.

3. Attempt **any two** questions : **(6×2=12)**

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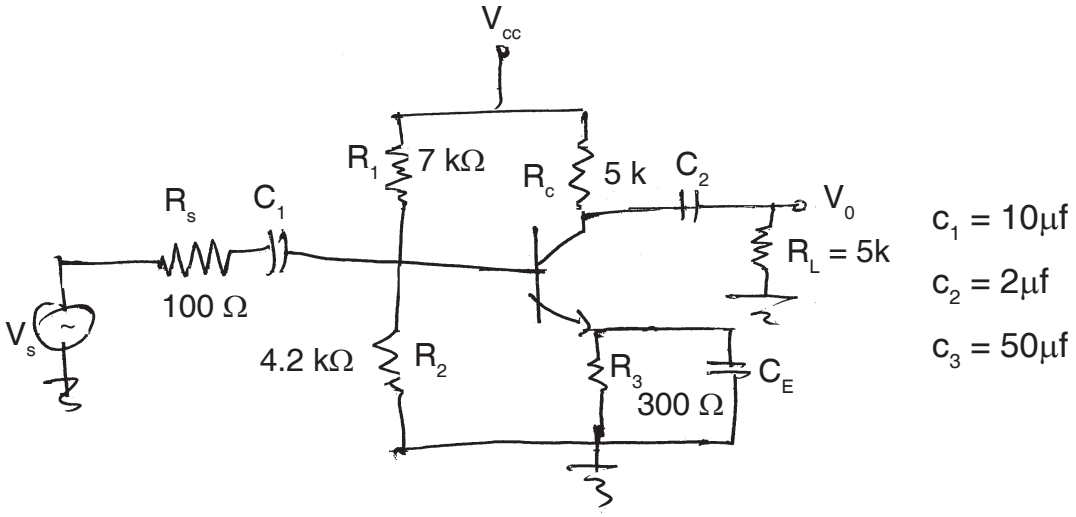

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b) Position of Q point

c) Efficiency

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3) Describe the effect of coupling, bypass and load capacitors on low frequency response of BJT.

SECTION – II

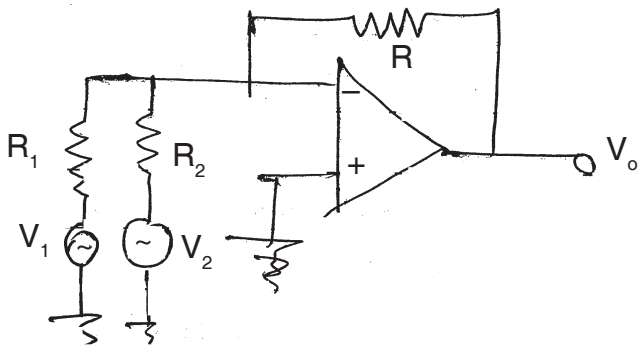
4. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between linear amplifier and error amplifier.

2) List ideal characteristics of op-amp.

3) Draw the circuit for basic differentiator using op-amp and find the expression for the output voltage.

4) Find the output voltage for the circuit shown if R_f = 10kΩ, R_1= 2kΩ, R_2 = 5kΩ.



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt **any 2** questions : **(6×2=12)**

1) Design an instrumentation amplifier of gain 1000 for ECG recording machine.

2) With the help of circuit diagrams and waveforms explain application of op-amp as zero crossing detector.

3) Write a short note on :

a) Op-amp as Schmitt trigger – working and application.

b) Definition of CMRR, PSRR, Shield drive.

Set S

SLR-TC – 450

Seat No.	

Set **P**

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) Figures to the **right** indicate **full** marks.*
*4) Assume suitable data **wherever** required.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) A _____ is an instrument that isolates monochromatic radiation in efficient manner than photometers.
a) flame photo meter b) colorimeter
c) ELISA d) spectrophotometer

2) Pulse oximetry is based upon the arterial oxygen _____ determinations using 2 wavelengths.
a) collection b) deposition
c) saturation d) reduction

3) Doppler shift is a non invasive technique to measure blood _____ in a vessel.
a) velocity b) acceleration
c) viscosity d) volume

4) The presence of indicator in the peripheral artery is detected by a _____ transducer.
a) photoelectric b) photovoltaic
c) photo emissive d) photodiode

5) The partial pressure in the _____ indicated the extent of oxygen exchange between the lungs and the blood.
a) WBC b) RBC c) Insulin d) Plasma

6) _____ conduction is the transmission of sound through the external and middle wear to the internal ear.
a) bone b) air c) muscle d) hearing

7) A pure tone audiometer consist of an _____ for having a precise control on the frequency of oscillations.
a) amplifier b) filter
c) oscillator d) audio amplifier

8) The _____ provides a positive force for transporting respiratory gases into an apneic patient.
a) spirometer b) blood gas analyzer
c) oxygenators d) ventilator

9) The main function of a ventilator is to ventilate _____ in a manner as close as natural respiration.
a) heart b) thoracic cavity
c) lungs d) cavity

10) White noise is a noise containing all frequencies in audible spectrum at _____ intensities.
a) different b) same
c) equal d) approximate

11) _____ are optical systems that provide better isolation of spectral energy than optical filters.
a) Lens b) Monochromators
c) Gratings d) Collimators

12) A colorimetric determination measure energetic spectrum ranges from _____ nm.
a) 400 – 700 b) 1000 – 2300
c) 500 – 750 d) 250 – 550

13) A normal Ph of the extracellular fluid lies in the range of _____
a) 7 – 9 b) 7.5 – 8.5
c) 6 – 7.5 d) 7.35 – 7.45

14) The glass electrode exhibits a _____ electrical resistance in the range of 100 – 1000 M Ohm.
a) high b) low
c) light d) moderate

_____

SLR-TC – 450

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*

*2) Assume suitable data **wherever** required.*

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) State and explain electrophoresis process.

   2) Explain schematic diagram and working of colorimeter.

   3) Draw and explain working of any one type of blood cell counter.

   4) Explain working of pH meter. Mention its any 2 applications.

   5) Explain the working of ELISA reader machine. State its any 2 applications.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Explain the working of complete blood gas analyzer.

   2) Draw and explain working of electromagnetic blood flow meter.

   3) Explain working of impedance plethysmography with necessary diagram.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

   1) Explain the principle of pulse oximetry.

   2) Define various lung volume and capacities with necessary diagram.

3) Explain working pCo2 measurement technique with necessary diagram.

4) List and explain various modes of ventilator.

5) Explain working of various types of oxygenators.

5. Attempt **any 2** questions : **(6×2=12)**

1) Draw and explain working of anesthesia machine in short.

2) Explain working of evoked response audiometry.

3) Explain working of pulmonary function analyzer.

SLR-TC – 450

Seat No.	

Set **Q**

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The _____ provides a positive force for transporting respiratory gases into an apneic patient.
a) spirometer b) blood gas analyzer
c) oxygenators d) ventilator

2) The main function of a ventilator is to ventilate _____ in a manner as close as natural respiration.
a) heart b) thoracic cavity
c) lungs d) cavity

3) White noise is a noise containing all frequencies in audible spectrum at _____ intensities.
a) different b) same
c) equal d) approximate

4) _____ are optical systems that provide better isolation of spectral energy than optical filters.
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5) A colorimetric determination measure energetic spectrum ranges from _____ nm.
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   c) 6 – 7.5 d) 7.35 – 7.45

7) The glass electrode exhibits a _____ electrical resistance in the range of 100 – 1000 M Ohm.
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   c) light d) moderate

8) A _____ is an instrument that isolates monochromatic radiation in efficient manner than photometers.
   a) flame photo meter b) colorimeter
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9) Pulse oximetry is based upon the arterial oxygen _____ determinations using 2 wavelengths.
   a) collection b) deposition
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10) Doppler shift is a non invasive technique to measure blood _____ in a vessel.
   a) velocity b) acceleration
   c) viscosity d) volume

11) The presence of indicator in the peripheral artery is detected by a _____ transducer.
   a) photoelectric b) photovoltaic
   c) photo emissive d) photodiode

12) The partial pressure in the _____ indicated the extent of oxygen exchange between the lungs and the blood.
   a) WBC b) RBC c) Insulin d) Plasma

13) _____ conduction is the transmission of sound through the external and middle wear to the internal ear.
   a) bone b) air c) muscle d) hearing

14) A pure tone audiometer consist of an _____ for having a precise control on the frequency of oscillations.
   a) amplifier b) filter
   c) oscillator d) audio amplifier

_____

SLR-TC – 450

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*

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SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) State and explain electrophoresis process.

   2) Explain schematic diagram and working of colorimeter.

   3) Draw and explain working of any one type of blood cell counter.

   4) Explain working of pH meter. Mention its any 2 applications.

   5) Explain the working of ELISA reader machine. State its any 2 applications.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Explain the working of complete blood gas analyzer.

   2) Draw and explain working of electromagnetic blood flow meter.

   3) Explain working of impedance plethysmography with necessary diagram.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

   1) Explain the principle of pulse oximetry.

   2) Define various lung volume and capacities with necessary diagram.

3) Explain working pCo2 measurement technique with necessary diagram.

4) List and explain various modes of ventilator.

5) Explain working of various types of oxygenators.

5. Attempt **any 2** questions : **(6×2=12)**

1) Draw and explain working of anesthesia machine in short.

2) Explain working of evoked response audiometry.

3) Explain working of pulmonary function analyzer.

SLR-TC – 450

Seat No.	

Set **R**

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The partial pressure in the _____ indicated the extent of oxygen exchange between the lungs and the blood.
a) WBC b) RBC c) Insulin d) Plasma

2) _____ conduction is the transmission of sound through the external and middle wear to the internal ear.
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7) _____ are optical systems that provide better isolation of spectral energy than optical filters.
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SLR-TC – 450

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

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SECTION – I

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   1) Explain the working of complete blood gas analyzer.

   2) Draw and explain working of electromagnetic blood flow meter.

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SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

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5. Attempt **any 2** questions : **(6×2=12)**

1) Draw and explain working of anesthesia machine in short.

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SLR-TC – 450

Seat No.	

Set **S**

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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_____

SLR-TC – 450

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – I

Day and Date : Thursday, 3-5-2018 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*

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SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

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   4) Explain working of pH meter. Mention its any 2 applications.

   5) Explain the working of ELISA reader machine. State its any 2 applications.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Explain the working of complete blood gas analyzer.

   2) Draw and explain working of electromagnetic blood flow meter.

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SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

   1) Explain the principle of pulse oximetry.

   2) Define various lung volume and capacities with necessary diagram.

3) Explain working pCo2 measurement technique with necessary diagram.

4) List and explain various modes of ventilator.

5) Explain working of various types of oxygenators.

5. Attempt **any 2** questions : **(6×2=12)**

1) Draw and explain working of anesthesia machine in short.

2) Explain working of evoked response audiometry.

3) Explain working of pulmonary function analyzer.

SLR-TC – 451

Seat No.	

Set P

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The fibers in muscle spindle
   a) cannot contract
   b) are intervated by gamma fiber
   c) maintain tension on spindle receptor
   d) b) and c)

2) An active transport occurs
   a) into cell b) out of cell
   c) both into and out of d) across the cell

3) Goldman equation is also called as _____ equation.
   a) constant field b) constant volume
   c) constant permeability d) constant coefficient

4) Diffusion of ions always takes place from _____ to ____concentration.
   a) higher to lower b) lower to higher
   c) higher to stable d) stable to lower

5) _____ is the unit for the product from the Nernst equation.
   a) mV b) mA c) coulombs d) tons/sec.

6) _____ is the most important factor in setting the resting membrane potential.
   a) K^+ gradient b) Cl^- gradient
   c) Na^+ permeability d) Active transport

P.T.O.

7) Ciliary muscles of eye controls the
   a) lens movement b) lens curvature and focal length
   c) pupil d) retina

8) 'Regional temperature difference within an animal is obtained by
   a) Vasodilation b) Vasoconstriction
   c) Both a) and b) d) Vasocirculation

9) Increase muscle contraction along with increase rate of heat production is called
   a) shivering b) non shivering c) overlapping d) osmogenesis

10) _____ equation defines cell membrane current.
   a) Nernst b) Donnan c) Goldman d) Cable

11) _____ occurs due to lack of Dopamine.
   a) Stretch reflex b) Shivering c) Parkinsons d) Diffusion

12) _____ relationship defines relation between diffusion and drift.
   a) Ohm's b) Faraday's c) Einstein's d) Donnan

13) _____ are simplified representation of objects.
   a) images b) models c) simulations d) validations

14) _____ transport induces conformational change in protein.
   a) simple diffusion b) active transport
   c) faciliated diffusion d) ion driven active transport

_____

SLR-TC – 451

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain active transport mechanism with necessary diagram.

   2) Explain Biophysic tools with related laws and expression.

   3) Define and differentiate Nernst equation and Donnan's equation.

   4) Define lumped parameter models and compartmental model with each of example.

   5) Describe modeling of regulation of cardiac output and respiratory system.

3. Attempt **any two** questions : **(6×2=12)**

   1) Draw and explain electrical equivalent model of a biological membrane and mention its significance.

   2) Write a short note on :

      a) Goldman's equation and its significance

      b) Cable equation and its significance

   3) Derive and explain Hodgkin – Huxley conductance equations with necessary figures.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Explain linearized model of immuno response with one example.

   2) Describe validation and controller model for thermo regulatory model.

   3) Explain symptoms and effects of Parkinson's syndrome.

Set P

4) Explain the role of spindle receptor and golgi tendon organ in modeling of neuro muscular system.

5) Describe model of drug delivery system with necessary figures.

5. Attempt **any two** questions : **(6×2=12)**

1) Explain four types of eye movements and name the type of muscles responsible for eye movements.

2) Describe thermo regulatory plant model with necessary diagram.

3) Write a short note on :

a) Insulin Glucose feedback system.

b) Pharmacokinetics.

SLR-TC – 451

Seat No.	

Set Q

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) 'Regional temperature difference within an animal is obtained by
   a) Vasodilation b) Vasoconstriction
   c) Both a) and b) d) Vasocirculation

2) Increase muscle contraction along with increase rate of heat production is called
   a) shivering b) non shivering
   c) overlapping d) osmogenesis

3) _____ equation defines cell membrane current.
   a) Nernst b) Donnan c) Goldman d) Cable

4) _____ occurs due to lack of Dopamine.
   a) Stretch reflex b) Shivering
   c) Parkinsons d) Diffusion

5) _____ relationship defines relation between diffusion and drift.
   a) Ohm's b) Faraday's
   c) Einstein's d) Donnan

6) _____ are simplified representation of objects.
   a) images b) models c) simulations d) validations

7) _____ transport induces conformational change in protein.
   a) simple diffusion b) active transport
   c) faciliated diffusion d) ion driven active transport

P.T.O.

8) The fibers in muscle spindle
   a) cannot contract
   b) are intervated by gamma fiber
   c) maintain tension on spindle receptor
   d) b) and c)

9) An active transport occurs
   a) into cell
   b) out of cell
   c) both into and out of
   d) across the cell

10) Goldman equation is also called as _____ equation.
   a) constant field
   b) constant volume
   c) constant permeability
   d) constant coefficient

11) Diffusion of ions always takes place from _____ to ____concentration.
   a) higher to lower
   b) lower to higher
   c) higher to stable
   d) stable to lower

12) _____ is the unit for the product from the Nernst equation.
   a) mV b) mA c) coulombs d) tons/sec.

13) _____ is the most important factor in setting the resting membrane potential.
   a) K^+ gradient
   b) Cl^- gradient
   c) Na^+ permeability
   d) Active transport

14) Ciliary muscles of eye controls the
   a) lens movement
   b) lens curvature and focal length
   c) pupil
   d) retina

_____

SLR-TC – 451

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain active transport mechanism with necessary diagram.

   2) Explain Biophysic tools with related laws and expression.

   3) Define and differentiate Nernst equation and Donnan's equation.

   4) Define lumped parameter models and compartmental model with each of example.

   5) Describe modeling of regulation of cardiac output and respiratory system.

3. Attempt **any two** questions : **(6×2=12)**

   1) Draw and explain electrical equivalent model of a biological membrane and mention its significance.

   2) Write a short note on :

      a) Goldman's equation and its significance

      b) Cable equation and its significance

   3) Derive and explain Hodgkin – Huxley conductance equations with necessary figures.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Explain linearized model of immuno response with one example.

   2) Describe validation and controller model for thermo regulatory model.

   3) Explain symptoms and effects of Parkinson's syndrome.

Set Q

4) Explain the role of spindle receptor and golgi tendon organ in modeling of neuro muscular system.

5) Describe model of drug delivery system with necessary figures.

5. Attempt **any two** questions : **(6×2=12)**

1) Explain four types of eye movements and name the type of muscles responsible for eye movements.

2) Describe thermo regulatory plant model with necessary diagram.

3) Write a short note on :

a) Insulin Glucose feedback system.

b) Pharmacokinetics.

SLR-TC – 451

Seat No.	

Set R

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ is the unit for the product from the Nernst equation.
a) mV b) mA c) coulombs d) tons/sec.

2) _____ is the most important factor in setting the resting membrane potential.
a) K^+ gradient b) Cl^- gradient
c) Na^+ permeability d) Active transport

3) Ciliary muscles of eye controls the
a) lens movement b) lens curvature and focal length
c) pupil d) retina

4) 'Regional temperature difference within an animal is obtained by
a) Vasodilation b) Vasoconstriction
c) Both a) and b) d) Vasocirculation

5) Increase muscle contraction along with increase rate of heat production is called
a) shivering b) non shivering c) overlapping d) osmogenesis

6) _____ equation defines cell membrane current.
a) Nernst b) Donnan c) Goldman d) Cable

7) _____ occurs due to lack of Dopamine.
a) Stretch reflex b) Shivering
c) Parkinsons d) Diffusion

P.T.O.

8) _____ relationship defines relation between diffusion and drift.
a) Ohm's b) Faraday's c) Einstein's d) Donnan

9) _____ are simplified representation of objects.
a) images b) models c) simulations d) validations

10) _____ transport induces conformational change in protein.
a) simple diffusion b) active transport
c) faciliated diffusion d) ion driven active transport

11) The fibers in muscle spindle
a) cannot contract
b) are intervated by gamma fiber
c) maintain tension on spindle receptor
d) b) and c)

12) An active transport occurs
a) into cell b) out of cell
c) both into and out of d) across the cell

13) Goldman equation is also called as _____ equation.
a) constant field b) constant volume
c) constant permeability d) constant coefficient

14) Diffusion of ions always takes place from _____ to ____concentration.
a) higher to lower b) lower to higher
c) higher to stable d) stable to lower

_____

SLR-TC – 451

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain active transport mechanism with necessary diagram.

   2) Explain Biophysic tools with related laws and expression.

   3) Define and differentiate Nernst equation and Donnan's equation.

   4) Define lumped parameter models and compartmental model with each of example.

   5) Describe modeling of regulation of cardiac output and respiratory system.

3. Attempt **any two** questions : **(6×2=12)**

   1) Draw and explain electrical equivalent model of a biological membrane and mention its significance.

   2) Write a short note on :

      a) Goldman's equation and its significance

      b) Cable equation and its significance

   3) Derive and explain Hodgkin – Huxley conductance equations with necessary figures.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Explain linearized model of immuno response with one example.

   2) Describe validation and controller model for thermo regulatory model.

   3) Explain symptoms and effects of Parkinson's syndrome.

Set R

4) Explain the role of spindle receptor and golgi tendon organ in modeling of neuro muscular system.

5) Describe model of drug delivery system with necessary figures.

5. Attempt **any two** questions : **(6×2=12)**

1) Explain four types of eye movements and name the type of muscles responsible for eye movements.

2) Describe thermo regulatory plant model with necessary diagram.

3) Write a short note on :

a) Insulin Glucose feedback system.

b) Pharmacokinetics.

SLR-TC – 451

Seat No.	

Set S

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ equation defines cell membrane current.
a) Nernst b) Donnan c) Goldman d) Cable

2) _____ occurs due to lack of Dopamine.
a) Stretch reflex b) Shivering
c) Parkinsons d) Diffusion

3) _____ relationship defines relation between diffusion and drift.
a) Ohm's b) Faraday's c) Einstein's d) Donnan

4) _____ are simplified representation of objects.
a) images b) models c) simulations d) validations

5) _____ transport induces conformational change in protein.
a) simple diffusion b) active transport
c) faciliated diffusion d) ion driven active transport

6) The fibers in muscle spindle
a) cannot contract
b) are intervated by gamma fiber
c) maintain tension on spindle receptor
d) b) and c)

7) An active transport occurs
a) into cell b) out of cell
c) both into and out of d) across the cell

P.T.O.

8) Goldman equation is also called as _____ equation.
   a) constant field b) constant volume
   c) constant permeability d) constant coefficient

9) Diffusion of ions always takes place from _____ to ____concentration.
   a) higher to lower b) lower to higher
   c) higher to stable d) stable to lower

10) _____ is the unit for the product from the Nernst equation.
   a) mV b) mA c) coulombs d) tons/sec.

11) _____ is the most important factor in setting the resting membrane potential.
   a) K^+ gradient b) Cl^- gradient
   c) Na^+ permeability d) Active transport

12) Ciliary muscles of eye controls the
   a) lens movement b) lens curvature and focal length
   c) pupil d) retina

13) 'Regional temperature difference within an animal is obtained by
   a) Vasodilation b) Vasoconstriction
   c) Both a) and b) d) Vasocirculation

14) Increase muscle contraction along with increase rate of heat production is called
   a) shivering b) non shivering c) overlapping d) osmogenesis

_____

SLR-TC – 451

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOLOGICAL MODELING AND SIMULATION

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain active transport mechanism with necessary diagram.

   2) Explain Biophysic tools with related laws and expression.

   3) Define and differentiate Nernst equation and Donnan's equation.

   4) Define lumped parameter models and compartmental model with each of example.

   5) Describe modeling of regulation of cardiac output and respiratory system.

3. Attempt **any two** questions : **(6×2=12)**

   1) Draw and explain electrical equivalent model of a biological membrane and mention its significance.

   2) Write a short note on :

      a) Goldman's equation and its significance

      b) Cable equation and its significance

   3) Derive and explain Hodgkin – Huxley conductance equations with necessary figures.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Explain linearized model of immuno response with one example.

   2) Describe validation and controller model for thermo regulatory model.

   3) Explain symptoms and effects of Parkinson's syndrome.

Set S

4) Explain the role of spindle receptor and golgi tendon organ in modeling of neuro muscular system.

5) Describe model of drug delivery system with necessary figures.

5. Attempt **any two** questions : **(6×2=12)**

1) Explain four types of eye movements and name the type of muscles responsible for eye movements.

2) Describe thermo regulatory plant model with necessary diagram.

3) Write a short note on :

a) Insulin Glucose feedback system.

b) Pharmacokinetics.

SLR-TC – 452

Seat No.	

Set P

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) INTEL 8085 A is _____ pin IC.

a) 8 b) 16 c) 32 d) 40

2) In 8085, name of the 16 bit register is _____

a) Stack pointer b) Program counter

c) Both a) and b) d) None of above

3) The ROM programmed during manufacturing process itself is called _____

a) MROM b) PROM c) EPROM d) EEPROM

4) A field programmable ROM is called _____

a) MROM b) PROM c) FROM d) FPROM

5) Output of the assembler in machine codes is referred to as _____

a) Object program b) Source program

c) Macro instruction d) Symbolic addressing

P.T.O.

6) The cycle required to fetch and execute an instruction in a 8085 microprocessor is _____

a) Clock cycle b) Memory cycle

c) Machine cycle d) Instruction cycle

7) A bus connected between the CPU and main memory that permits transfer of information is known as _____ bus.

a) DMA b) Memory c) Address d) Control

8) Number of hex digits needed to represent the 20 bit address of a memory location are _____

a) 20 b) 16 c) 5 d) 4

9) The field which is never present in an assembly language statement is _____

a) Opcode b) Operand c) Continue d) Comment

10) _____ is the non-maskable interrupt from the following.

a) RST 7.5 b) RST 6.5 c) RST 5.5 d) RST 4.5

11) The 8085 microprocessor uses a crystal of frequency 6.25 MHz. The T-state value is _____

a) 320 ns b) 640 ns c) 960 ns d) 1280 ns

12) When an 8085 microprocessor is reset, the address bus contains _____

a) 0000 H b) 002 CH c) 0043 H d) 003 CH

13) Pick out the matching pair.

a) READY; RIM b) HOLD; DMA

c) SID; SIM d) S0; S1; wait status

14) A microprocessor with a 12-bit address but will be able to access _____

a) 1 K bytes b) 4 K bytes c) 8 K bytes d) 10 K bytes

_____

SLR-TC – 452

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe various semiconductor memories and their significance.
   2) Define RST 7.5, RST 5.5, RST 6.5, TRAP.
   3) Explain any four instructions of interrupts.
   4) Classify hardware and software interrupts.
   5) Describe various EPROM programming methods.

3. Attempt **any two** : **(6×2=12)**
   1) Describe interrupt structure of 8085 in detail.
   2) List data transfer techniques and explain them in short.
   3) Draw and explain architecture of INTEL 8085 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Define DPTR and describe it with an example.
   2) Differentiate between memory mapped I/O and I/O mapped I/O.
   3) Describe different data transfer techniques in 8051.
   4) Draw and explain TCON register of microcontroller 8051.
   5) Describe different addressing techniques used in 8051.

5. Attempt **any two** : **(6×2=12)**

   1) Draw interfacing diagram of DAC 6808 with 8051 microcontroller.

   2) On the program given below, comment the result after every instruction and also find the content in the accumulator :

      ORG 0000H,

      MOV R 5, # 25 H

      MOV R 7, # 34 H

      MOV A, # 0

      ADD A, R 5

      ADD A, R 7

      ADD A, # 12 H

      END.

   3) Describe special function registers (SFRs) of 8051.

———————

SLR-TC – 452

Seat No.	

Set Q

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Number of hex digits needed to represent the 20 bit address of a memory location are _____

a) 20 b) 16 c) 5 d) 4

2) The field which is never present in an assembly language statement is _____

a) Opcode b) Operand c) Continue d) Comment

3) _____ is the non-maskable interrupt from the following.

a) RST 7.5 b) RST 6.5 c) RST 5.5 d) RST 4.5

4) The 8085 microprocessor uses a crystal of frequency 6.25 MHz. The T-state value is _____

a) 320 ns b) 640 ns c) 960 ns d) 1280 ns

5) When an 8085 microprocessor is reset, the address bus contains _____

a) 0000 H b) 002 CH c) 0043 H d) 003 CH

6) Pick out the matching pair.
   a) READY; RIM
   b) HOLD; DMA
   c) SID; SIM
   d) S0; S1; wait status

7) A microprocessor with a 12-bit address but will be able to access _____
   a) 1 K bytes b) 4 K bytes c) 8 K bytes d) 10 K bytes

8) INTEL 8085 A is _____ pin IC.
   a) 8 b) 16 c) 32 d) 40

9) In 8085, name of the 16 bit register is _____
   a) Stack pointer
   b) Program counter
   c) Both a) and b)
   d) None of above

10) The ROM programmed during manufacturing process itself is called _____
   a) MROM b) PROM c) EPROM d) EEPROM

11) A field programmable ROM is called _____
   a) MROM b) PROM c) FROM d) FPROM

12) Output of the assembler in machine codes is referred to as _____
   a) Object program
   b) Source program
   c) Macro instruction
   d) Symbolic addressing

13) The cycle required to fetch and execute an instruction in a 8085 microprocessor is _____
   a) Clock cycle
   b) Memory cycle
   c) Machine cycle
   d) Instruction cycle

14) A bus connected between the CPU and main memory that permits transfer of information is known as _____ bus.
   a) DMA b) Memory c) Address d) Control

_____

SLR-TC – 452

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe various semiconductor memories and their significance.
   2) Define RST 7.5, RST 5.5, RST 6.5, TRAP.
   3) Explain any four instructions of interrupts.
   4) Classify hardware and software interrupts.
   5) Describe various EPROM programming methods.

3. Attempt **any two** : **(6×2=12)**
   1) Describe interrupt structure of 8085 in detail.
   2) List data transfer techniques and explain them in short.
   3) Draw and explain architecture of INTEL 8085 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Define DPTR and describe it with an example.
   2) Differentiate between memory mapped I/O and I/O mapped I/O.
   3) Describe different data transfer techniques in 8051.
   4) Draw and explain TCON register of microcontroller 8051.
   5) Describe different addressing techniques used in 8051.

5. Attempt **any two** : **(6×2=12)**

   1) Draw interfacing diagram of DAC 6808 with 8051 microcontroller.

   2) On the program given below, comment the result after every instruction and also find the content in the accumulator :

      ORG 0000H,

      MOV R 5, # 25 H

      MOV R 7, # 34 H

      MOV A, # 0

      ADD A, R 5

      ADD A, R 7

      ADD A, # 12 H

      END.

   3) Describe special function registers (SFRs) of 8051.

———————

SLR-TC – 452

Seat No.	

Set R

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Output of the assembler in machine codes is referred to as _____

a) Object program b) Source program
c) Macro instruction d) Symbolic addressing

2) The cycle required to fetch and execute an instruction in a 8085 microprocessor is _____

a) Clock cycle b) Memory cycle
c) Machine cycle d) Instruction cycle

3) A bus connected between the CPU and main memory that permits transfer of information is known as _____ bus.

a) DMA b) Memory c) Address d) Control

4) Number of hex digits needed to represent the 20 bit address of a memory location are _____

a) 20 b) 16 c) 5 d) 4

5) The field which is never present in an assembly language statement is _____

a) Opcode b) Operand c) Continue d) Comment

6) _____ is the non-maskable interrupt from the following.

a) RST 7.5 b) RST 6.5 c) RST 5.5 d) RST 4.5

7) The 8085 microprocessor uses a crystal of frequency 6.25 MHz. The T-state value is _____

a) 320 ns b) 640 ns c) 960 ns d) 1280 ns

8) When an 8085 microprocessor is reset, the address bus contains _____

a) 0000 H b) 002 CH c) 0043 H d) 003 CH

9) Pick out the matching pair.

a) READY; RIM b) HOLD; DMA

c) SID; SIM d) S0; S1; wait status

10) A microprocessor with a 12-bit address but will be able to access _____

a) 1 K bytes b) 4 K bytes c) 8 K bytes d) 10 K bytes

11) INTEL 8085 A is _____ pin IC.

a) 8 b) 16 c) 32 d) 40

12) In 8085, name of the 16 bit register is _____

a) Stack pointer b) Program counter

c) Both a) and b) d) None of above

13) The ROM programmed during manufacturing process itself is called _____

a) MROM b) PROM c) EPROM d) EEPROM

14) A field programmable ROM is called _____

a) MROM b) PROM c) FROM d) FPROM

_____

SLR-TC – 452

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe various semiconductor memories and their significance.
   2) Define RST 7.5, RST 5.5, RST 6.5, TRAP.
   3) Explain any four instructions of interrupts.
   4) Classify hardware and software interrupts.
   5) Describe various EPROM programming methods.

3. Attempt **any two** : **(6×2=12)**
   1) Describe interrupt structure of 8085 in detail.
   2) List data transfer techniques and explain them in short.
   3) Draw and explain architecture of INTEL 8085 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Define DPTR and describe it with an example.
   2) Differentiate between memory mapped I/O and I/O mapped I/O.
   3) Describe different data transfer techniques in 8051.
   4) Draw and explain TCON register of microcontroller 8051.
   5) Describe different addressing techniques used in 8051.

5. Attempt **any two** : **(6×2=12)**

   1) Draw interfacing diagram of DAC 6808 with 8051 microcontroller.

   2) On the program given below, comment the result after every instruction and also find the content in the accumulator :

      ORG 0000H,

      MOV R 5, # 25 H

      MOV R 7, # 34 H

      MOV A, # 0

      ADD A, R 5

      ADD A, R 7

      ADD A, # 12 H

      END.

   3) Describe special function registers (SFRs) of 8051.

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SLR-TC – 452

Seat No.	

Set S

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ is the non-maskable interrupt from the following.

a) RST 7.5 b) RST 6.5 c) RST 5.5 d) RST 4.5

2) The 8085 microprocessor uses a crystal of frequency 6.25 MHz. The T-state value is _____

a) 320 ns b) 640 ns c) 960 ns d) 1280 ns

3) When an 8085 microprocessor is reset, the address bus contains _____

a) 0000 H b) 002 CH c) 0043 H d) 003 CH

4) Pick out the matching pair.

a) READY; RIM b) HOLD; DMA

c) SID; SIM d) S0; S1; wait status

5) A microprocessor with a 12-bit address but will be able to access _____

a) 1 K bytes b) 4 K bytes c) 8 K bytes d) 10 K bytes

6) INTEL 8085 A is _____ pin IC.

a) 8 b) 16 c) 32 d) 40

7) In 8085, name of the 16 bit register is _____

a) Stack pointer b) Program counter

c) Both a) and b) d) None of above

8) The ROM programmed during manufacturing process itself is called _____

a) MROM b) PROM c) EPROM d) EEPROM

9) A field programmable ROM is called _____

a) MROM b) PROM c) FROM d) FPROM

10) Output of the assembler in machine codes is referred to as _____

a) Object program b) Source program

c) Macro instruction d) Symbolic addressing

11) The cycle required to fetch and execute an instruction in a 8085 microprocessor is _____

a) Clock cycle b) Memory cycle

c) Machine cycle d) Instruction cycle

12) A bus connected between the CPU and main memory that permits transfer of information is known as _____ bus.

a) DMA b) Memory c) Address d) Control

13) Number of hex digits needed to represent the 20 bit address of a memory location are _____

a) 20 b) 16 c) 5 d) 4

14) The field which is never present in an assembly language statement is _____

a) Opcode b) Operand c) Continue d) Comment

_____

SLR-TC – 452

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSORS AND MICROCONTROLLER

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe various semiconductor memories and their significance.
   2) Define RST 7.5, RST 5.5, RST 6.5, TRAP.
   3) Explain any four instructions of interrupts.
   4) Classify hardware and software interrupts.
   5) Describe various EPROM programming methods.

3. Attempt **any two** : **(6×2=12)**
   1) Describe interrupt structure of 8085 in detail.
   2) List data transfer techniques and explain them in short.
   3) Draw and explain architecture of INTEL 8085 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Define DPTR and describe it with an example.
   2) Differentiate between memory mapped I/O and I/O mapped I/O.
   3) Describe different data transfer techniques in 8051.
   4) Draw and explain TCON register of microcontroller 8051.
   5) Describe different addressing techniques used in 8051.

5. Attempt **any two** : **(6×2=12)**

   1) Draw interfacing diagram of DAC 6808 with 8051 microcontroller.

   2) On the program given below, comment the result after every instruction and also find the content in the accumulator :

      ORG 0000H,

      MOV R 5, # 25 H

      MOV R 7, # 34 H

      MOV A, # 0

      ADD A, R 5

      ADD A, R 7

      ADD A, # 12 H

      END.

   3) Describe special function registers (SFRs) of 8051.

———————

SLR-TC – 453

Seat No.	

Set **P**

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In a communication system noise is affects the signal
   a) at the transmitter b) in the channel
   c) in information source d) at destination

2) One of the following types of noise becomes of great importance at high frequencies that is
   a) shot noise b) random noise
   c) impulse noise d) transit time noise

3) _____ is the most reliable measurement for comparing amplifier noise characteristic.
   a) Signal to noise ratio b) Noise factor
   c) Shot noise d) Thermal noise

4) In a low level AM system, amplifiers following the modulated stage must be
   a) linear devices b) harmonic devices
   c) class C amplifier d) nonlinear devices

5) _____ is the ratio of modulating power to total power at 100 percent modulation.
   a) 1 : 3 b) 1 : 2 c) 2 : 3 d) none

P.T.O.

6) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
   a) unchanged b) halved
   c) doubled d) increase by 50%

7) _____ is an indirect way of generating FM.
   a) Reactance FET modulator b) Varactor diode modulator
   c) Armstrong modulator d) Reactance bipolar modulator

8) _____ pulse modulation system is analog.
   a) PCM b) Differential PCM
   c) PWM d) Delta

9) Channel coding is used to
   a) secure the channel
   b) minimize interference
   c) protect information against noise
   d) protect against unnecessary fapping of signal

10) ASK is a result of combination of shift keying and _____ modulation.
   a) digital b) analog c) amplitude d) none

11) OSI reference model defines a networking framework to implement protocols in _____ layer.
   a) 5 b) 7 c) 10 d) 11

12) FSK is used mostly in
   a) telephony b) telegraphy
   c) radio transmission d) none of the above

13) QAM uses _____ as the dimensions.
   a) in phase b) quadrature c) both a and b d) none

14) The noise that affects PCM is _____ noise.
   a) transmission b) quantizing c) transit d) both a and b

_____

SLR-TC – 453

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**
   1) Define amplitude modulation, modulation index and different components of AM wave.
   2) Calculate the percentage power saving when the carrier and one of the side bands are suppressed in an AM wave modulated to a depth of
      a) 100 % b) 50%.
   3) Define and classify noise. Describe each type of noise with each of example.
   4) Differentiate between SSB and VSB.
   5) Explain concept of pre-emphasis and de-emphasis.

3. Attempt **any two** questions : **(6×2=12)**
   1) Draw and explain working of Armstrong frequency modulation system.
   2) Explain the generation of SSB signal using phase shift method.
   3) The antenna current of an AM transmitter is 8 A when only the carrier is sent, but it increases to 8.93 A when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain the working of PAM modulation circuit.
   2) Explain convolution and binary cyclic codes with each of example.
   3) State and explain sampling theorem and its significance.

Set P

4) Explain generation of Differential Pulse Code Modulation (DPCM).

5) Describe the generation of M ary QAM.

5. Attempt **any 2** : **(6×2=12)**

1) Define quantization process and explain its types in detail.

2) Define and differentiate between PAM, PPM and PWM.

3) Write a short note on :

a) Encoders and decoders

b) Hamming codes.

SLR-TC – 453

Seat No.	

Set Q

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ pulse modulation system is analog.
   a) PCM b) Differential PCM
   c) PWM d) Delta

2) Channel coding is used to
   a) secure the channel
   b) minimize interference
   c) protect information against noise
   d) protect against unnecessary fapping of signal

3) ASK is a result of combination of shift keying and _____ modulation.
   a) digital b) analog c) amplitude d) none

4) OSI reference model defines a networking framework to implement protocols in _____ layer.
   a) 5 b) 7 c) 10 d) 11

5) FSK is used mostly in
   a) telephony b) telegraphy
   c) radio transmission d) none of the above

6) QAM uses _____ as the dimensions.
   a) in phase b) quadrature c) both a and b d) none

P.T.O.

7) The noise that affects PCM is _____ noise.
   a) transmission b) quantizing c) transit d) both a and b

8) In a communication system noise is affects the signal
   a) at the transmitter b) in the channel
   c) in information source d) at destination

9) One of the following types of noise becomes of great importance at high frequencies that is
   a) shot noise b) random noise
   c) impulse noise d) transit time noise

10) _____ is the most reliable measurement for comparing amplifier noise characteristic.
   a) Signal to noise ratio b) Noise factor
   c) Shot noise d) Thermal noise

11) In a low level AM system, amplifiers following the modulated stage must be
   a) linear devices b) harmonic devices
   c) class C amplifier d) nonlinear devices

12) _____ is the ratio of modulating power to total power at 100 percent modulation.
   a) 1 : 3 b) 1 : 2 c) 2 : 3 d) none

13) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
   a) unchanged b) halved
   c) doubled d) increase by 50%

14) _____ is an indirect way of generating FM.
   a) Reactance FET modulator b) Varactor diode modulator
   c) Armstrong modulator d) Reactance bipolar modulator

_____

SLR-TC – 453

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**
   1) Define amplitude modulation, modulation index and different components of AM wave.
   2) Calculate the percentage power saving when the carrier and one of the side bands are suppressed in an AM wave modulated to a depth of
      a) 100 % b) 50%.
   3) Define and classify noise. Describe each type of noise with each of example.
   4) Differentiate between SSB and VSB.
   5) Explain concept of pre-emphasis and de-emphasis.

3. Attempt **any two** questions : **(6×2=12)**
   1) Draw and explain working of Armstrong frequency modulation system.
   2) Explain the generation of SSB signal using phase shift method.
   3) The antenna current of an AM transmitter is 8 A when only the carrier is sent, but it increases to 8.93 A when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain the working of PAM modulation circuit.
   2) Explain convolution and binary cyclic codes with each of example.
   3) State and explain sampling theorem and its significance.

Set Q

4) Explain generation of Differential Pulse Code Modulation (DPCM).

5) Describe the generation of M arry QAM.

5. Attempt **any 2** : **(6×2=12)**

1) Define quantization process and explain its types in detail.

2) Define and differentiate between PAM, PPM and PWM.

3) Write a short note on :

a) Encoders and decoders

b) Hamming codes.

SLR-TC – 453

Seat No.	

Set **R**

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ is the ratio of modulating power to total power at 100 percent modulation.
a) 1 : 3 b) 1 : 2 c) 2 : 3 d) none

2) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
a) unchanged b) halved
c) doubled d) increase by 50%

3) _____ is an indirect way of generating FM.
a) Reactance FET modulator b) Varactor diode modulator
c) Armstrong modulator d) Reactance bipolar modulator

4) _____ pulse modulation system is analog.
a) PCM b) Differential PCM
c) PWM d) Delta

5) Channel coding is used to
a) secure the channel
b) minimize interference
c) protect information against noise
d) protect against unnecessary fapping of signal

P.T.O.

6) ASK is a result of combination of shift keying and _____ modulation.
   a) digital b) analog c) amplitude d) none

7) OSI reference model defines a networking framework to implement protocols in _____ layer.
   a) 5 b) 7 c) 10 d) 11

8) FSK is used mostly in
   a) telephony b) telegraphy
   c) radio transmission d) none of the above

9) QAM uses _____ as the dimensions.
   a) in phase b) quadrature c) both a and b d) none

10) The noise that affects PCM is _____ noise.
   a) transmission b) quantizing c) transit d) both a and b

11) In a communication system noise is affects the signal
   a) at the transmitter b) in the channel
   c) in information source d) at destination

12) One of the following types of noise becomes of great importance at high frequencies that is
   a) shot noise b) random noise
   c) impulse noise d) transit time noise

13) _____ is the most reliable measurement for comparing amplifier noise characteristic.
   a) Signal to noise ratio b) Noise factor
   c) Shot noise d) Thermal noise

14) In a low level AM system, amplifiers following the modulated stage must be
   a) linear devices b) harmonic devices
   c) class C amplifier d) nonlinear devices

_____

SLR-TC – 453

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**
   1) Define amplitude modulation, modulation index and different components of AM wave.
   2) Calculate the percentage power saving when the carrier and one of the side bands are suppressed in an AM wave modulated to a depth of
      a) 100 % b) 50%.
   3) Define and classify noise. Describe each type of noise with each of example.
   4) Differentiate between SSB and VSB.
   5) Explain concept of pre-emphasis and de-emphasis.

3. Attempt **any two** questions : **(6×2=12)**
   1) Draw and explain working of Armstrong frequency modulation system.
   2) Explain the generation of SSB signal using phase shift method.
   3) The antenna current of an AM transmitter is 8 A when only the carrier is sent, but it increases to 8.93 A when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain the working of PAM modulation circuit.
   2) Explain convolution and binary cyclic codes with each of example.
   3) State and explain sampling theorem and its significance.

4) Explain generation of Differential Pulse Code Modulation (DPCM).

5) Describe the generation of M arry QAM.

5. Attempt **any 2** : **(6×2=12)**

1) Define quantization process and explain its types in detail.

2) Define and differentiate between PAM, PPM and PWM.

3) Write a short note on :

a) Encoders and decoders

b) Hamming codes.

———————

SLR-TC – 453

Seat No.	

Set **S**

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) ASK is a result of combination of shift keying and _____ modulation.
a) digital b) analog c) amplitude d) none

2) OSI reference model defines a networking framework to implement protocols in _____ layer.
a) 5 b) 7 c) 10 d) 11

3) FSK is used mostly in
a) telephony b) telegraphy
c) radio transmission d) none of the above

4) QAM uses _____ as the dimensions.
a) in phase b) quadrature c) both a and b d) none

5) The noise that affects PCM is _____ noise.
a) transmission b) quantizing c) transit d) both a and b

6) In a communication system noise is affects the signal
a) at the transmitter b) in the channel
c) in information source d) at destination

7) One of the following types of noise becomes of great importance at high frequencies that is
a) shot noise b) random noise
c) impulse noise d) transit time noise

P.T.O.

8) _____ is the most reliable measurement for comparing amplifier noise characteristic.
   a) Signal to noise ratio
   b) Noise factor
   c) Shot noise
   d) Thermal noise

9) In a low level AM system, amplifiers following the modulated stage must be
   a) linear devices
   b) harmonic devices
   c) class C amplifier
   d) nonlinear devices

10) _____ is the ratio of modulating power to total power at 100 percent modulation.
   a) 1 : 3
   b) 1 : 2
   c) 2 : 3
   d) none

11) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
   a) unchanged
   b) halved
   c) doubled
   d) increase by 50%

12) _____ is an indirect way of generating FM.
   a) Reactance FET modulator
   b) Varactor diode modulator
   c) Armstrong modulator
   d) Reactance bipolar modulator

13) _____ pulse modulation system is analog.
   a) PCM
   b) Differential PCM
   c) PWM
   d) Delta

14) Channel coding is used to
   a) secure the channel
   b) minimize interference
   c) protect information against noise
   d) protect against unnecessary fapping of signal

_____

SLR-TC – 453

Seat No.	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**
   1) Define amplitude modulation, modulation index and different components of AM wave.
   2) Calculate the percentage power saving when the carrier and one of the side bands are suppressed in an AM wave modulated to a depth of
      a) 100 % b) 50%.
   3) Define and classify noise. Describe each type of noise with each of example.
   4) Differentiate between SSB and VSB.
   5) Explain concept of pre-emphasis and de-emphasis.

3. Attempt **any two** questions : **(6×2=12)**
   1) Draw and explain working of Armstrong frequency modulation system.
   2) Explain the generation of SSB signal using phase shift method.
   3) The antenna current of an AM transmitter is 8 A when only the carrier is sent, but it increases to 8.93 A when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain the working of PAM modulation circuit.
   2) Explain convolution and binary cyclic codes with each of example.
   3) State and explain sampling theorem and its significance.

4) Explain generation of Differential Pulse Code Modulation (DPCM).

5) Describe the generation of M arry QAM.

5. Attempt **any 2** : **(6×2=12)**

1) Define quantization process and explain its types in detail.

2) Define and differentiate between PAM, PPM and PWM.

3) Write a short note on :

a) Encoders and decoders

b) Hamming codes.

———————

SLR-TC – 454

Seat No.	

Set **P**

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The area under the curve $\int_{-\infty}^{+\infty} \delta(t)dt$ is

a) ∞ b) Unity
c) 0 d) Undefined

2) Given $x(n) = a^{|n|}$, $|a| < 1$ is
a) An energy signal b) Power signal
c) Neither a) nor b) d) Both a) and b)

3) The discrete-time signal $x(n) = (-1)^n$ is periodic with fundamental period
a) 6 b) 4
c) 2 d) 0

4) The autocorrelation of a rectangular pulse is _____ pulse.
a) Another rectangle b) Square
c) Triangular d) Sinc

5) The Fourier series of a real, even periodic signal will contain only _____ terms.
a) Cosine b) Sine
c) Even d) Odd harmonics

P.T.O.

6) Odd signal satisfies x(t) =
   a) x(– t) b) – x (– t)
   c) – x (t + T/2) d) x(t + T/2)

7) The DTFS coefficients of a real and even periodic signal are
   a) Real and odd b) Imaginary and even
   c) Real and even d) Imaginary and odd

8) Fourier transform of a d.c. signal with unity strength is
   a) Zero b) 1
   c) $2\pi\delta(w)$ d) $2\delta(w)$

9) The DTFT is periodic with period
   a) π b) 2π
   c) $\pi/2$ d) $\pi/4$

10) Z transform converts convolution of time signals to
   a) Addition b) Multiplication
   c) Subtraction d) Division

11) The step response of a LTI system when the impulse response h(n) is unit step u(n) is
   a) n + 1 b) n
   c) n – 1 d) n^2

12) The z transform of $\delta(n - m)$ is
   a) z^{-n} b) z^{-m}
   c) $\frac{1}{z-n}$ d) $\frac{1}{z-m}$

13) The fourier series representation are based on using
   a) Constant coefficient b) Only cosine functions
   c) Only sine functions d) Orthogonal functions

14) Periodic signals are
   a) x(t + T) = x (t) b) x(t – T) = x(t)
   c) x(n = mN) = x(n) d) All the above

SLR-TC – 454

Seat No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) State and explain sampling theorem.

   2) Define following terms with each example.
      a) Time variant and time invariant system
      b) Linear system and non-linear system.

   3) The output of an LTI system in response to an input $x(t) = e^{-2t}\, u(t)$ is $y(t) = e^{-t}\, u(t)$. Find the frequency response and impulse response of this system.

   4) Show that the convolution of two odd function is an even function.

   5) Find even and odd components of the signal $x(t) = e^{-2t} \cos(t)$.

3. Attempt **any two** questions : **(6×2=12)**

   1) Find the convolution of two sequences.
      a) $x(n) = e^{-n^2}$, for all n and $h(n) = 3n^2$ for all n.
      b) $x(n) = u(n-1)$ and $h(n) = \alpha^n u(n-1)$.

   2) Draw the waveforms of the following signals.
      a) $x_1(t) = u(t+2)$
      b) $x_2(t) = u(t-2)$

   3) Determine whether following signals are power or energy signals or neither.
      a) $x(t) = A \sin t, \; -\infty < t < +\infty$
      b) $x(t) = e^{-a|t|}, \; a > 0$
      c) $x(t) = A[u(t+a) - u(t-a)], \; a > 0$.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Find the fourier transform of the signal g(t) defined by $g(t) = te^{-at}\, u(t)$.

2) Find the z transform and ROC of signal given

$$g(n) = a^{n/3} u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, \ldots \\ 0, & \text{elsewhere} \end{cases} \text{ where } |a| < 1.$$

3) Define and derive correlation property of z transform.

4) Prove periodicity property of Discrete Time Fourier Transform (DTFT).

5) State and explain Parseval's theorem in detail.

5. Attempt **any two** questions : **(2×6=12)**

1) Determine the unilateral z transform of the following signals :

a) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

b) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$
$\uparrow$

2) Define following properties of Discrete Fourier Transform (DFT)

a) Linearity

b) Time reversal

c) Frequency shifting.

3) Determine the z transform and pole-zero plot for the given signal,

$$x(n) = \begin{cases} a^n, & 0 \le n \le N-1 \\ 0, & \text{elsewhere} \end{cases} \text{ where } a > 0.$$

SLR-TC – 454

Seat No.	

Set **Q**

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Fourier transform of a d.c. signal with unity strength is
   a) Zero b) 1
   c) $2\pi\delta(w)$ d) $2\delta(w)$

2) The DTFT is periodic with period
   a) π b) 2π
   c) $\pi/2$ d) $\pi/4$

3) Z transform converts convolution of time signals to
   a) Addition b) Multiplication
   c) Subtraction d) Division

4) The step response of a LTI system when the impulse response h(n) is unit step u(n) is
   a) n + 1 b) n
   c) n – 1 d) n^2

5) The z transform of $\delta(n - m)$ is
   a) z^{-n} b) z^{-m}
   c) $\frac{1}{z-n}$ d) $\frac{1}{z-m}$

6) The fourier series representation are based on using
   a) Constant coefficient
   b) Only cosine functions
   c) Only sine functions
   d) Orthogonal functions

7) Periodic signals are
   a) $x(t + T) = x(t)$
   b) $x(t - T) = x(t)$
   c) $x(n = mN) = x(n)$
   d) All the above

8) The area under the curve $\int_{-\infty}^{+\infty} \delta(t)dt$ is
   a) ∞
   b) Unity
   c) 0
   d) Undefined

9) Given $x(n) = a^{|n|}$, $|a| < 1$ is
   a) An energy signal
   b) Power signal
   c) Neither a) nor b)
   d) Both a) and b)

10) The discrete-time signal $x(n) = (-1)^n$ is periodic with fundamental period
   a) 6
   b) 4
   c) 2
   d) 0

11) The autocorrelation of a rectangular pulse is _____ pulse.
   a) Another rectangle
   b) Square
   c) Triangular
   d) Sinc

12) The Fourier series of a real, even periodic signal will contain only _____ terms.
   a) Cosine
   b) Sine
   c) Even
   d) Odd harmonics

13) Odd signal satisfies $x(t) =$
   a) $x(-t)$
   b) $-x(-t)$
   c) $-x(t + T/2)$
   d) $x(t + T/2)$

14) The DTFS coefficients of a real and even periodic signal are
   a) Real and odd
   b) Imaginary and even
   c) Real and even
   d) Imaginary and odd

_____

SLR-TC – 454

Seat No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) State and explain sampling theorem.

   2) Define following terms with each example.
      a) Time variant and time invariant system
      b) Linear system and non-linear system.

   3) The output of an LTI system in response to an input $x(t) = e^{-2t}\, u(t)$ is $y(t) = e^{-t}\, u(t)$. Find the frequency response and impulse response of this system.

   4) Show that the convolution of two odd function is an even function.

   5) Find even and odd components of the signal $x(t) = e^{-2t} \cos(t)$.

3. Attempt **any two** questions : **(6×2=12)**

   1) Find the convolution of two sequences.
      a) $x(n) = e^{-n^2}$, for all n and $h(n) = 3n^2$ for all n.
      b) $x(n) = u(n-1)$ and $h(n) = \alpha^n u(n-1)$.

   2) Draw the waveforms of the following signals.
      a) $x_1(t) = u(t+2)$
      b) $x_2(t) = u(t-2)$

   3) Determine whether following signals are power or energy signals or neither.
      a) $x(t) = A \sin t, \; -\infty < t < +\infty$
      b) $x(t) = e^{-a|t|}, \; a > 0$
      c) $x(t) = A[u(t+a) - u(t-a)], \; a > 0$.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Find the fourier transform of the signal g(t) defined by $g(t) = te^{-at}\, u(t)$.

2) Find the z transform and ROC of signal given

$$g(n) = a^{n/3} u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, \ldots \\ 0, & \text{elsewhere} \end{cases} \text{ where } |a| < 1.$$

3) Define and derive correlation property of z transform.

4) Prove periodicity property of Discrete Time Fourier Transform (DTFT).

5) State and explain Parseval's theorem in detail.

5. Attempt **any two** questions : **(2×6=12)**

1) Determine the unilateral z transform of the following signals :

a) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

b) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$
$\uparrow$

2) Define following properties of Discrete Fourier Transform (DFT)

a) Linearity

b) Time reversal

c) Frequency shifting.

3) Determine the z transform and pole-zero plot for the given signal,

$$x(n) = \begin{cases} a^n, & 0 \le n \le N-1 \\ 0, & \text{elsewhere} \end{cases} \text{ where } a > 0.$$

SLR-TC – 454

Seat No.	

Set **R**

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The Fourier series of a real, even periodic signal will contain only _____ terms.
   a) Cosine b) Sine
   c) Even d) Odd harmonics

2) Odd signal satisfies x(t) =
   a) x(– t) b) – x (– t)
   c) – x (t + T/2) d) x(t + T/2)

3) The DTFS coefficients of a real and even periodic signal are
   a) Real and odd b) Imaginary and even
   c) Real and even d) Imaginary and odd

4) Fourier transform of a d.c. signal with unity strength is
   a) Zero b) 1
   c) $2\pi\delta(w)$ d) $2\delta(w)$

5) The DTFT is periodic with period
   a) π b) 2π
   c) $\pi/2$ d) $\pi/4$

P.T.O.

6) Z transform converts convolution of time signals to
   a) Addition
   b) Multiplication
   c) Subtraction
   d) Division

7) The step response of a LTI system when the impulse response h(n) is unit step u(n) is
   a) n + 1
   b) n
   c) n – 1
   d) n^2

8) The z transform of $\delta(n - m)$ is
   a) z^{-n}
   b) z^{-m}
   c) $\frac{1}{z-n}$
   d) $\frac{1}{z-m}$

9) The fourier series representation are based on using
   a) Constant coefficient
   b) Only cosine functions
   c) Only sine functions
   d) Orthogonal functions

10) Periodic signals are
   a) x(t + T) = x (t)
   b) x(t – T) = x(t)
   c) x(n = mN) = x(n)
   d) All the above

11) The area under the curve $\int_{-\infty}^{+\infty} \delta(t)dt$ is
   a) ∞
   b) Unity
   c) 0
   d) Undefined

12) Given $x(n) = a^{|n|}$, $|a| < 1$ is
   a) An energy signal
   b) Power signal
   c) Neither a) nor b)
   d) Both a) and b)

13) The discrete-time signal $x(n) = (-1)^n$ is periodic with fundamental period
   a) 6
   b) 4
   c) 2
   d) 0

14) The autocorrelation of a rectangular pulse is _____ pulse.
   a) Another rectangle
   b) Square
   c) Triangular
   d) Sinc

_____

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Seat No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) State and explain sampling theorem.

   2) Define following terms with each example.
      a) Time variant and time invariant system
      b) Linear system and non-linear system.

   3) The output of an LTI system in response to an input $x(t) = e^{-2t}\, u(t)$ is $y(t) = e^{-t}\, u(t)$. Find the frequency response and impulse response of this system.

   4) Show that the convolution of two odd function is an even function.

   5) Find even and odd components of the signal $x(t) = e^{-2t} \cos(t)$.

3. Attempt **any two** questions : **(6×2=12)**

   1) Find the convolution of two sequences.
      a) $x(n) = e^{-n^2}$, for all n and $h(n) = 3n^2$ for all n.
      b) $x(n) = u(n-1)$ and $h(n) = \alpha^n u(n-1)$.

   2) Draw the waveforms of the following signals.
      a) $x_1(t) = u(t+2)$
      b) $x_2(t) = u(t-2)$

   3) Determine whether following signals are power or energy signals or neither.
      a) $x(t) = A \sin t, \; -\infty < t < +\infty$
      b) $x(t) = e^{-a|t|}, \; a > 0$
      c) $x(t) = A[u(t+a) - u(t-a)], \; a > 0$.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Find the fourier transform of the signal g(t) defined by $g(t) = te^{-at}\, u(t)$.

2) Find the z transform and ROC of signal given

$$g(n) = a^{n/3} u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, \ldots \\ 0, & \text{elsewhere} \end{cases} \text{ where } |a| < 1.$$

3) Define and derive correlation property of z transform.

4) Prove periodicity property of Discrete Time Fourier Transform (DTFT).

5) State and explain Parseval's theorem in detail.

5. Attempt **any two** questions : **(2×6=12)**

1) Determine the unilateral z transform of the following signals :

a) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

b) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$
$\uparrow$

2) Define following properties of Discrete Fourier Transform (DFT)

a) Linearity

b) Time reversal

c) Frequency shifting.

3) Determine the z transform and pole-zero plot for the given signal,

$$x(n) = \begin{cases} a^n, & 0 \le n \le N-1 \\ 0, & \text{elsewhere} \end{cases} \text{ where } a > 0.$$

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Seat No.	

Set **S**

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Z transform converts convolution of time signals to
   a) Addition b) Multiplication
   c) Subtraction d) Division

2) The step response of a LTI system when the impulse response h(n) is unit step u(n) is
   a) n + 1 b) n
   c) n – 1 d) n^2

3) The z transform of $\delta(n - m)$ is
   a) z^{-n} b) z^{-m}
   c) $\frac{1}{z-n}$ d) $\frac{1}{z-m}$

4) The fourier series representation are based on using
   a) Constant coefficient b) Only cosine functions
   c) Only sine functions d) Orthogonal functions

5) Periodic signals are
   a) x(t + T) = x (t) b) x(t – T) = x(t)
   c) x(n = mN) = x(n) d) All the above

P.T.O.

6) The area under the curve $\int_{-\infty}^{+\infty} \delta(t)dt$ is

a) ∞ b) Unity
c) 0 d) Undefined

7) Given $x(n) = a^{|n|}$, $|a| < 1$ is
a) An energy signal b) Power signal
c) Neither a) nor b) d) Both a) and b)

8) The discrete-time signal $x(n) = (-1)^n$ is periodic with fundamental period
a) 6 b) 4
c) 2 d) 0

9) The autocorrelation of a rectangular pulse is _____ pulse.
a) Another rectangle b) Square
c) Triangular d) Sinc

10) The Fourier series of a real, even periodic signal will contain only _____ terms.
a) Cosine b) Sine
c) Even d) Odd harmonics

11) Odd signal satisfies x(t) =
a) x(– t) b) – x (– t)
c) – x (t + T/2) d) x(t + T/2)

12) The DTFS coefficients of a real and even periodic signal are
a) Real and odd b) Imaginary and even
c) Real and even d) Imaginary and odd

13) Fourier transform of a d.c. signal with unity strength is
a) Zero b) 1
c) $2\pi\delta(w)$ d) $2\delta(w)$

14) The DTFT is periodic with period
a) π b) 2π
c) $\pi/2$ d) $\pi/4$

_____

SLR-TC – 454

Seat No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018
SIGNALS AND SYSTEM

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4×4=16)**

   1) State and explain sampling theorem.

   2) Define following terms with each example.
      a) Time variant and time invariant system
      b) Linear system and non-linear system.

   3) The output of an LTI system in response to an input $x(t) = e^{-2t}\, u(t)$ is $y(t) = e^{-t}\, u(t)$. Find the frequency response and impulse response of this system.

   4) Show that the convolution of two odd function is an even function.

   5) Find even and odd components of the signal $x(t) = e^{-2t} \cos(t)$.

3. Attempt **any two** questions : **(6×2=12)**

   1) Find the convolution of two sequences.
      a) $x(n) = e^{-n^2}$, for all n and $h(n) = 3n^2$ for all n.
      b) $x(n) = u(n-1)$ and $h(n) = \alpha^n u(n-1)$.

   2) Draw the waveforms of the following signals.
      a) $x_1(t) = u(t+2)$
      b) $x_2(t) = u(t-2)$

   3) Determine whether following signals are power or energy signals or neither.
      a) $x(t) = A \sin t, \; -\infty < t < +\infty$
      b) $x(t) = e^{-a|t|}, \; a > 0$
      c) $x(t) = A[u(t+a) - u(t-a)], \; a > 0$.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Find the fourier transform of the signal g(t) defined by $g(t) = te^{-at}\, u(t)$.

2) Find the z transform and ROC of signal given

$$g(n) = a^{n/3} u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, \ldots \\ 0, & \text{elsewhere} \end{cases} \text{ where } |a| < 1.$$

3) Define and derive correlation property of z transform.

4) Prove periodicity property of Discrete Time Fourier Transform (DTFT).

5) State and explain Parseval's theorem in detail.

5. Attempt **any two** questions : **(2×6=12)**

1) Determine the unilateral z transform of the following signals :

a) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

b) $x(n) = \{1, 2, 5, 4, 0, 3\}$
$\uparrow$

c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$
$\uparrow$

2) Define following properties of Discrete Fourier Transform (DFT)

a) Linearity

b) Time reversal

c) Frequency shifting.

3) Determine the z transform and pole-zero plot for the given signal,

$$x(n) = \begin{cases} a^n, & 0 \le n \le N-1 \\ 0, & \text{elsewhere} \end{cases} \text{ where } a > 0.$$

SLR-TC – 455

Seat No.	

Set P

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Fill in the blanks : **(1×14=14)**

1) _____ are designed to measure and record foetal heart rate on beat to beat.
   a) Cardiotocograph b) GSR
   c) Doppler d) Oscillometers

2) Range of threshold of perception of electric shock is about _____mA.
   a) 2 b) 4 c) 3 d) 1

3) _____ shock is experienced by the subject by an accidental contact with the electric wiring.
   a) Micro b) Macro c) Minute d) Gross

4) The respiratory cycle is accomplished by _____ in the thoracic volume.
   a) air b) volume c) capacity d) changes

5) The most prominent EEG wave pattern of an awake, relaxed adult whose eyes are closed is _____
   a) alpha b) theta c) delta d) beta

P.T.O.

6) A telemedicine program consists of a 2 way _____
   a) communication b) analysis c) categories d) conduction

7) Bioelectric potentials are generated at a _____ level.
   a) muscular b) cellular c) refractory d) depolarization

8) Motion artifact is reduced to a negligible magnitude by _____ abrasion.
   a) motion b) skin c) gel d) membrane

9) The _____ method of pressure measurement is used when the highest degree of absolute accuracy is required.
   a) invasive b) polarized c) direct d) indirect

10) The Rheographic method utilizes _____ electrodes for attaching the cuff.
   a) 2 b) 3 c) 4 d) 5

11) The phonocardiograph is an instrument used for recording the _____ connected with the pumping action of the heart.
   a) conduction b) indirect B.P. c) pumping d) circulation

12) The first heart sound is _____ in pitch than second heart sound.
   a) lower b) medium c) very low d) higher

13) If an external stimulus is applied to a sensory area of the _____ its response is called as evoked conduction.
   a) spinal cord b) midbrain c) brain d) ear

14) Apnoea is the _____ of breathing that precede the arrest of the heart and circulation.
   a) pumping b) conduction c) cessation d) circulation

_____

Seat No.	

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m to 5.30 p.m.

***Instruction** : Figures to the **right** indicate **full** marks.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Draw and explain process of generation of pacemaker and muscle action potential.
   2) Draw EEG waveform recorded for 10 – 20 configurations and label it.
   3) Explain the generation of heart sound and mention each sound's significance.
   4) Explain designing criteria of instrumentation amplifier for EEG and ERG recording techniques.
   5) Define blood pressure. Explain any one B.P. measurement technique using indirect method.

3. Attempt **any two** : **(2×6=12)**
   1) Explain 10 – 20 electrode placements with the help of neat diagram and also explain the working of EEG machine.
   2) Explain using suitable diagram of 12 lead ECG recording systems and define Einthoven's triangle.
   3) Explain the technique used for measurement of body temperature with suitable diagram.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain working of fetal scalp pH measurement with necessary diagram.
   2) Define micro, gross and leakage current, explain its occurrence.

3) Describe working of ECG transmitter with necessary diagram.

4) Explain working of cardiotocograph in detail.

5) Explain working of EEG biofeed system with necessary diagram.

5. Attempt **any two** : **(2×6=12)**

1) Explain various patient grounding techniques and precautions with necessary diagram.

2) Explain working of ambulatory monitoring system.

3) Differentiate between working, construction and applications of baby incubator and infant warmer.

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Seat No.	

SLR-TC – 455

Set Q

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Total Marks : 70
Time : 2.30 p.m to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Fill in the blanks : **(1×14=14)**

1) Motion artifact is reduced to a negligible magnitude by _____ abrasion.
a) motion b) skin c) gel d) membrane

2) The _____ method of pressure measurement is used when the highest degree of absolute accuracy is required.
a) invasive b) polarized c) direct d) indirect

3) The Rheographic method utilizes _____ electrodes for attaching the cuff.
a) 2 b) 3 c) 4 d) 5

4) The phonocardiograph is an instrument used for recording the _____ connected with the pumping action of the heart.
a) conduction b) indirect B.P. c) pumping d) circulation

5) The first heart sound is _____ in pitch than second heart sound.
a) lower b) medium c) very low d) higher

6) If an external stimulus is applied to a sensory area of the _____ its response is called as evoked conduction.
   a) spinal cord b) midbrain c) brain d) ear

7) Apnoea is the _____ of breathing that precede the arrest of the heart and circulation.
   a) pumping b) conduction c) cessation d) circulation

8) _____ are designed to measure and record foetal heart rate on beat to beat.
   a) Cardiotocograph b) GSR
   c) Doppler d) Oscillometers

9) Range of threshold of perception of electric shock is about _____mA.
   a) 2 b) 4 c) 3 d) 1

10) _____ shock is experienced by the subject by an accidental contact with the electric wiring.
   a) Micro b) Macro c) Minute d) Gross

11) The respiratory cycle is accomplished by _____ in the thoracic volume.
   a) air b) volume c) capacity d) changes

12) The most prominent EEG wave pattern of an awake, relaxed adult whose eyes are closed is _____
   a) alpha b) theta c) delta d) beta

13) A telemedicine program consists of a 2 way _____
   a) communication b) analysis c) categories d) conduction

14) Bioelectric potentials are generated at a _____ level.
   a) muscular b) cellular c) refractory d) depolarization

_____

Seat No.	

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m to 5.30 p.m.

***Instruction** : Figures to the **right** indicate **full** marks.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Draw and explain process of generation of pacemaker and muscle action potential.
   2) Draw EEG waveform recorded for 10 – 20 configurations and label it.
   3) Explain the generation of heart sound and mention each sound's significance.
   4) Explain designing criteria of instrumentation amplifier for EEG and ERG recording techniques.
   5) Define blood pressure. Explain any one B.P. measurement technique using indirect method.

3. Attempt **any two** : **(2×6=12)**
   1) Explain 10 – 20 electrode placements with the help of neat diagram and also explain the working of EEG machine.
   2) Explain using suitable diagram of 12 lead ECG recording systems and define Einthoven's triangle.
   3) Explain the technique used for measurement of body temperature with suitable diagram.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain working of fetal scalp pH measurement with necessary diagram.
   2) Define micro, gross and leakage current, explain its occurrence.

3) Describe working of ECG transmitter with necessary diagram.

4) Explain working of cardiotocograph in detail.

5) Explain working of EEG biofeed system with necessary diagram.

5. Attempt **any two** : **(2×6=12)**

1) Explain various patient grounding techniques and precautions with necessary diagram.

2) Explain working of ambulatory monitoring system.

3) Differentiate between working, construction and applications of baby incubator and infant warmer.

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Seat No.	

SLR-TC – 455

Set R

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Total Marks : 70
Time : 2.30 p.m to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Fill in the blanks : **(1×14=14)**

1) The most prominent EEG wave pattern of an awake, relaxed adult whose eyes are closed is _____
a) alpha b) theta c) delta d) beta

2) A telemedicine program consists of a 2 way _____
a) communication b) analysis c) categories d) conduction

3) Bioelectric potentials are generated at a _____ level.
a) muscular b) cellular c) refractory d) depolarization

4) Motion artifact is reduced to a negligible magnitude by _____ abrasion.
a) motion b) skin c) gel d) membrane

5) The _____ method of pressure measurement is used when the highest degree of absolute accuracy is required.
a) invasive b) polarized c) direct d) indirect

6) The Rheographic method utilizes _____ electrodes for attaching the cuff.
   a) 2 b) 3 c) 4 d) 5

7) The phonocardiograph is an instrument used for recording the _____ connected with the pumping action of the heart.
   a) conduction b) indirect B.P. c) pumping d) circulation

8) The first heart sound is _____ in pitch than second heart sound.
   a) lower b) medium c) very low d) higher

9) If an external stimulus is applied to a sensory area of the _____ its response is called as evoked conduction.
   a) spinal cord b) midbrain c) brain d) ear

10) Apnoea is the _____ of breathing that precede the arrest of the heart and circulation.
   a) pumping b) conduction c) cessation d) circulation

11) _____ are designed to measure and record foetal heart rate on beat to beat.
   a) Cardiotocograph b) GSR
   c) Doppler d) Oscillometers

12) Range of threshold of perception of electric shock is about _____mA.
   a) 2 b) 4 c) 3 d) 1

13) _____ shock is experienced by the subject by an accidental contact with the electric wiring.
   a) Micro b) Macro c) Minute d) Gross

14) The respiratory cycle is accomplished by _____ in the thoracic volume.
   a) air b) volume c) capacity d) changes

_____

Seat No.	

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m to 5.30 p.m.

***Instruction** : Figures to the **right** indicate **full** marks.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Draw and explain process of generation of pacemaker and muscle action potential.
   2) Draw EEG waveform recorded for 10 – 20 configurations and label it.
   3) Explain the generation of heart sound and mention each sound's significance.
   4) Explain designing criteria of instrumentation amplifier for EEG and ERG recording techniques.
   5) Define blood pressure. Explain any one B.P. measurement technique using indirect method.

3. Attempt **any two** : **(2×6=12)**
   1) Explain 10 – 20 electrode placements with the help of neat diagram and also explain the working of EEG machine.
   2) Explain using suitable diagram of 12 lead ECG recording systems and define Einthoven's triangle.
   3) Explain the technique used for measurement of body temperature with suitable diagram.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain working of fetal scalp pH measurement with necessary diagram.
   2) Define micro, gross and leakage current, explain its occurrence.

3) Describe working of ECG transmitter with necessary diagram.

4) Explain working of cardiotocograph in detail.

5) Explain working of EEG biofeed system with necessary diagram.

5. Attempt **any two** : **(2×6=12)**

1) Explain various patient grounding techniques and precautions with necessary diagram.

2) Explain working of ambulatory monitoring system.

3) Differentiate between working, construction and applications of baby incubator and infant warmer.

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Seat No.	

SLR-TC – 455

Set S

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Total Marks : 70
Time : 2.30 p.m to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Fill in the blanks : **(1×14=14)**

1) The Rheographic method utilizes _____ electrodes for attaching the cuff.
a) 2 b) 3 c) 4 d) 5

2) The phonocardiograph is an instrument used for recording the _____ connected with the pumping action of the heart.
a) conduction b) indirect B.P. c) pumping d) circulation

3) The first heart sound is _____ in pitch than second heart sound.
a) lower b) medium c) very low d) higher

4) If an external stimulus is applied to a sensory area of the _____ its response is called as evoked conduction.
a) spinal cord b) midbrain c) brain d) ear

5) Apnoea is the _____ of breathing that precede the arrest of the heart and circulation.
a) pumping b) conduction c) cessation d) circulation

6) _____ are designed to measure and record foetal heart rate on beat to beat.
   a) Cardiotocograph b) GSR
   c) Doppler d) Oscillometers

7) Range of threshold of perception of electric shock is about _____mA.
   a) 2 b) 4 c) 3 d) 1

8) _____ shock is experienced by the subject by an accidental contact with the electric wiring.
   a) Micro b) Macro c) Minute d) Gross

9) The respiratory cycle is accomplished by _____ in the thoracic volume.
   a) air b) volume c) capacity d) changes

10) The most prominent EEG wave pattern of an awake, relaxed adult whose eyes are closed is _____
   a) alpha b) theta c) delta d) beta

11) A telemedicine program consists of a 2 way _____
   a) communication b) analysis c) categories d) conduction

12) Bioelectric potentials are generated at a _____ level.
   a) muscular b) cellular c) refractory d) depolarization

13) Motion artifact is reduced to a negligible magnitude by _____ abrasion.
   a) motion b) skin c) gel d) membrane

14) The _____ method of pressure measurement is used when the highest degree of absolute accuracy is required.
   a) invasive b) polarized c) direct d) indirect

_____

Seat No.	

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instruction** : Figures to the **right** indicate **full** marks.*

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Draw and explain process of generation of pacemaker and muscle action potential.
   2) Draw EEG waveform recorded for 10 – 20 configurations and label it.
   3) Explain the generation of heart sound and mention each sound's significance.
   4) Explain designing criteria of instrumentation amplifier for EEG and ERG recording techniques.
   5) Define blood pressure. Explain any one B.P. measurement technique using indirect method.

3. Attempt **any two** : **(2×6=12)**
   1) Explain 10 – 20 electrode placements with the help of neat diagram and also explain the working of EEG machine.
   2) Explain using suitable diagram of 12 lead ECG recording systems and define Einthoven's triangle.
   3) Explain the technique used for measurement of body temperature with suitable diagram.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain working of fetal scalp pH measurement with necessary diagram.
   2) Define micro, gross and leakage current, explain its occurrence.

3) Describe working of ECG transmitter with necessary diagram.

4) Explain working of cardiotocograph in detail.

5) Explain working of EEG biofeed system with necessary diagram.

5. Attempt **any two** : **(2×6=12)**

1) Explain various patient grounding techniques and precautions with necessary diagram.

2) Explain working of ambulatory monitoring system.

3) Differentiate between working, construction and applications of baby incubator and infant warmer.

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SLR-TC – 456

Seat No.	

Set **P**

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) An object which _____ all radiation incident upon it at all wavelengths is called a black body.

a) radiates b) incidents c) scatter d) absorbs

2) A bolometer is a _____ detector heated by incident radiation.

a) radiation b) energy c) heat d) thermal

3) A figure of merit for the thermographic imaging system is the _____ equivalent temperature difference.

a) noise b) temperature
c) heat d) energy

4) Pulse echo imaging is performed by a _____ transducer.

a) rotating b) stationary c) flexible d) spectral

5) Phased array ultrasound scanner is useful for _____ scanning.

a) nerves b) lever c) stomach d) cardiac

P.T.O.

6) The characteristic impedance of ultrasound determines degree of _____ and refraction.

a) incidence b) transmission c) reflection d) intensity

7) Ultrasonic energy is transmitted through a medium is like a _____

a) radiation b) wave motion c) reflection d) conduction

8) _____ is calculated estimate of temperature increase with tissue absorption of ultrasound.

a) thermal index b) acoustic impedance

c) mechanical index d) wavelength index

9) The penetrating ability of an X-ray beam is governed by _____

a) Kilovoltage or wavelength b) Time

c) Milliamperage d) Source-to-film distance

10) The voltage and waveform applied to the X-ray tube by a high-voltage transformer primarily determines the _____

a) Quantity of radiation b) Duration of exposure

c) Penetrating ability d) X-ray beam divergence

11) In small capacity X-ray machines _____ tubes are used.

a) stationary b) rotating c) steady d) circular

12) Collimators are usually provided with _____ a by which the X-ray field can be exactly simulated by a light field.

a) grids b) strips

c) optical device d) light source

13) Fluoroscopy image is always observed in _____ room.

a) vacuum b) dark c) brighter d) evacuated

14) The infrared rays are electromagnetic waves with a frequency _____ than the radio frequencies.

a) lower b) higher c) moderate d) none of above

_____

SLR-TC – 456

Seat No.	

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Describe the continuous and pulsed wave Doppler ultrasound machine.

   2) List the properties of X-ray and ultrasound waves.

   3) Explain various modes of ultrasound scanning system.

   4) Mention any 5 front panel controls of X-ray machine.

   5) Draw and explain detailed constructional diagram of ultrasound transducer.

3. Attempt **any two** : **(2×6=12)**

   1) Explain filament circuit and high voltage circuit of X-ray generator in short.

   2) Describe various types and applications of collimators used in X-ray machine.

   3) Draw and explain working of X-ray machine.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Distinguish between image intensifier and fluoroscopy including their applications.

   2) Mention any five applications of thermography.

   3) Draw and explain the components and working of endoscopy with its applications in medicine.

   4) Explain working of image intensifier with necessary diagram.

   5) Explain the need, application and process of angiography technique.

5. Attempt **any two** : **(2×6=12)**

   1) Explain principle and working of computed radiographic system.

   2) Draw and explain principle and working of digital mammography machine.

   3) Draw and explain principle and working of thermograph machine.

SLR-TC – 456

Seat No.	

Set **Q**

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) _____ is calculated estimate of temperature increase with tissue absorption of ultrasound.

a) thermal index b) acoustic impedance

c) mechanical index d) wavelength index

2) The penetrating ability of an X-ray beam is governed by _____

a) Kilovoltage or wavelength b) Time

c) Milliamperage d) Source-to-film distance

3) The voltage and waveform applied to the X-ray tube by a high-voltage transformer primarily determines the _____

a) Quantity of radiation b) Duration of exposure

c) Penetrating ability d) X-ray beam divergence

4) In small capacity X-ray machines _____ tubes are used.

a) stationary b) rotating c) steady d) circular

5) Collimators are usually provided with _____ a by which the X-ray field can be exactly simulated by a light field.
   a) grids b) strips
   c) optical device d) light source

6) Fluoroscopy image is always observed in _____ room.
   a) vacuum b) dark c) brighter d) evacuated

7) The infrared rays are electromagnetic waves with a frequency _____ than the radio frequencies.
   a) lower b) higher c) moderate d) none of above

8) An object which _____ all radiation incident upon it at all wavelengths is called a black body.
   a) radiates b) incidents c) scatter d) absorbs

9) A bolometer is a _____ detector heated by incident radiation.
   a) radiation b) energy c) heat d) thermal

10) A figure of merit for the thermographic imaging system is the _____ equivalent temperature difference.
   a) noise b) temperature
   c) heat d) energy

11) Pulse echo imaging is performed by a _____ transducer.
   a) rotating b) stationary c) flexible d) spectral

12) Phased array ultrasound scanner is useful for _____ scanning.
   a) nerves b) lever c) stomach d) cardiac

13) The characteristic impedance of ultrasound determines degree of _____ and refraction.
   a) incidence b) transmission c) reflection d) intensity

14) Ultrasonic energy is transmitted through a medium is like a _____
   a) radiation b) wave motion c) reflection d) conduction

_____

SLR-TC – 456

Seat No.	

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Describe the continuous and pulsed wave Doppler ultrasound machine.

2) List the properties of X-ray and ultrasound waves.

3) Explain various modes of ultrasound scanning system.

4) Mention any 5 front panel controls of X-ray machine.

5) Draw and explain detailed constructional diagram of ultrasound transducer.

3. Attempt **any two** : **(2×6=12)**

1) Explain filament circuit and high voltage circuit of X-ray generator in short.

2) Describe various types and applications of collimators used in X-ray machine.

3) Draw and explain working of X-ray machine.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Distinguish between image intensifier and fluoroscopy including their applications.

   2) Mention any five applications of thermography.

   3) Draw and explain the components and working of endoscopy with its applications in medicine.

   4) Explain working of image intensifier with necessary diagram.

   5) Explain the need, application and process of angiography technique.

5. Attempt **any two** : **(2×6=12)**

   1) Explain principle and working of computed radiographic system.

   2) Draw and explain principle and working of digital mammography machine.

   3) Draw and explain principle and working of thermograph machine.

SLR-TC – 456

Seat No.	

Set **R**

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Phased array ultrasound scanner is useful for _____ scanning.

a) nerves b) lever c) stomach d) cardiac

2) The characteristic impedance of ultrasound determines degree of _____ and refraction.

a) incidence b) transmission c) reflection d) intensity

3) Ultrasonic energy is transmitted through a medium is like a _____

a) radiation b) wave motion c) reflection d) conduction

4) _____ is calculated estimate of temperature increase with tissue absorption of ultrasound.

a) thermal index b) acoustic impedance

c) mechanical index d) wavelength index

5) The penetrating ability of an X-ray beam is governed by _____

a) Kilovoltage or wavelength b) Time

c) Milliamperage d) Source-to-film distance

P.T.O.

6) The voltage and waveform applied to the X-ray tube by a high-voltage transformer primarily determines the _____

a) Quantity of radiation b) Duration of exposure

c) Penetrating ability d) X-ray beam divergence

7) In small capacity X-ray machines _____ tubes are used.

a) stationary b) rotating c) steady d) circular

8) Collimators are usually provided with _____ a by which the X-ray field can be exactly simulated by a light field.

a) grids b) strips

c) optical device d) light source

9) Fluoroscopy image is always observed in _____ room.

a) vacuum b) dark c) brighter d) evacuated

10) The infrared rays are electromagnetic waves with a frequency _____ than the radio frequencies.

a) lower b) higher c) moderate d) none of above

11) An object which _____ all radiation incident upon it at all wavelengths is called a black body.

a) radiates b) incidents c) scatter d) absorbs

12) A bolometer is a _____ detector heated by incident radiation.

a) radiation b) energy c) heat d) thermal

13) A figure of merit for the thermographic imaging system is the _____ equivalent temperature difference.

a) noise b) temperature

c) heat d) energy

14) Pulse echo imaging is performed by a _____ transducer.

a) rotating b) stationary c) flexible d) spectral

_____

SLR-TC – 456

Seat No.	

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

1) Describe the continuous and pulsed wave Doppler ultrasound machine.

2) List the properties of X-ray and ultrasound waves.

3) Explain various modes of ultrasound scanning system.

4) Mention any 5 front panel controls of X-ray machine.

5) Draw and explain detailed constructional diagram of ultrasound transducer.

3. Attempt **any two** : **(2×6=12)**

1) Explain filament circuit and high voltage circuit of X-ray generator in short.

2) Describe various types and applications of collimators used in X-ray machine.

3) Draw and explain working of X-ray machine.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Distinguish between image intensifier and fluoroscopy including their applications.

   2) Mention any five applications of thermography.

   3) Draw and explain the components and working of endoscopy with its applications in medicine.

   4) Explain working of image intensifier with necessary diagram.

   5) Explain the need, application and process of angiography technique.

5. Attempt **any two** : **(2×6=12)**

   1) Explain principle and working of computed radiographic system.

   2) Draw and explain principle and working of digital mammography machine.

   3) Draw and explain principle and working of thermograph machine.

SLR-TC – 456

Seat No.	

Set **S**

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The voltage and waveform applied to the X-ray tube by a high-voltage transformer primarily determines the _____
   a) Quantity of radiation b) Duration of exposure
   c) Penetrating ability d) X-ray beam divergence

2) In small capacity X-ray machines _____ tubes are used.
   a) stationary b) rotating c) steady d) circular

3) Collimators are usually provided with _____ a by which the X-ray field can be exactly simulated by a light field.
   a) grids b) strips
   c) optical device d) light source

4) Fluoroscopy image is always observed in _____ room.
   a) vacuum b) dark c) brighter d) evacuated

5) The infrared rays are electromagnetic waves with a frequency _____ than the radio frequencies.
   a) lower b) higher c) moderate d) none of above

6) An object which _____ all radiation incident upon it at all wavelengths is called a black body.

a) radiates b) incidents c) scatter d) absorbs

7) A bolometer is a _____ detector heated by incident radiation.

a) radiation b) energy c) heat d) thermal

8) A figure of merit for the thermographic imaging system is the _____ equivalent temperature difference.

a) noise b) temperature

c) heat d) energy

9) Pulse echo imaging is performed by a _____ transducer.

a) rotating b) stationary c) flexible d) spectral

10) Phased array ultrasound scanner is useful for _____ scanning.

a) nerves b) lever c) stomach d) cardiac

11) The characteristic impedance of ultrasound determines degree of _____ and refraction.

a) incidence b) transmission c) reflection d) intensity

12) Ultrasonic energy is transmitted through a medium is like a _____

a) radiation b) wave motion c) reflection d) conduction

13) _____ is calculated estimate of temperature increase with tissue absorption of ultrasound.

a) thermal index b) acoustic impedance

c) mechanical index d) wavelength index

14) The penetrating ability of an X-ray beam is governed by _____

a) Kilovoltage or wavelength b) Time

c) Milliamperage d) Source-to-film distance

_____

SLR-TC – 456

Seat No.	

T.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2018
MEDICAL IMAGING – I

Day and Date : Wednesday, 16-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Describe the continuous and pulsed wave Doppler ultrasound machine.

   2) List the properties of X-ray and ultrasound waves.

   3) Explain various modes of ultrasound scanning system.

   4) Mention any 5 front panel controls of X-ray machine.

   5) Draw and explain detailed constructional diagram of ultrasound transducer.

3. Attempt **any two** : **(2×6=12)**

   1) Explain filament circuit and high voltage circuit of X-ray generator in short.

   2) Describe various types and applications of collimators used in X-ray machine.

   3) Draw and explain working of X-ray machine.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Distinguish between image intensifier and fluoroscopy including their applications.

   2) Mention any five applications of thermography.

   3) Draw and explain the components and working of endoscopy with its applications in medicine.

   4) Explain working of image intensifier with necessary diagram.

   5) Explain the need, application and process of angiography technique.

5. Attempt **any two** : **(2×6=12)**

   1) Explain principle and working of computed radiographic system.

   2) Draw and explain principle and working of digital mammography machine.

   3) Draw and explain principle and working of thermograph machine.

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SLR-TC – 457

Seat No.	

Set **P**

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) By using _____ element mechanical translational systems are obtained.

a) mass b) spring c) dash pot d) all above

2) Transient state analysis deals with

a) magnitude of error b) nature of response

c) both a) and b) d) none of the above

3) _____ is the type of closed loop system for the plant transfer function $G(s) = \frac{k}{s^2}(1+s)$ and with unity feedback.

a) 1 b) 2 c) 3 d) 0

4) Lead compensator is used to improve

a) transient response b) steady state response

c) both a) and b) d) none of the above

5) Adding a pole to a system transfer function in terms of compensator represents a _____ compensator.

a) lead b) lag

c) lead-lag d) lag-lead

6) For type I system with parabolic input, the steady state error is

a) zero b) finite constant

c) infinite d) indeterminate

7) A system is stable for

a) G.M. and P.M. both +ve b) G.M. and P.M. both –ve

c) G.M. –ve d) P.M. –ve

8) Number of roots in left hand of s-plane if characteristic equation is $s^3 – 4s^2 + s + 6 = 0$ is

a) 1 b) 2 c) 3 d) 0

9) The value of gain margin of the system having $G(s)\,H(s) = 8/(s + 2)^3$ is

a) 8 b) 2 c) 6 d) 4

10) Find the order of system $G(s) = \dfrac{s+6}{s(s-2)(s-4)}$.

a) 2 b) 3 c) 4 d) 5

11) Slope of asymptote in Bode plot of 2nd order system is _____ per octave.

a) 18 dB b) 12 dB c) 6 dB d) 3 dB

12) Settling time for 5% tolerance band is

a) 3 T b) 4 T c) 5 T d) 2 T

13) For the polynomial $P(s) = 2s^5 + s^4 + 4s^3 + 2s^2 + 3s + 15$, number of roots which lie in right half plane of s-plane is

a) 4 b) 2 c) 3 d) 1

14) Electrical analogous element for damper element in mechanical translational system is

a) capacitor b) inductor c) resistor d) any of above

_____

SLR-TC – 457

Seat No.	

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

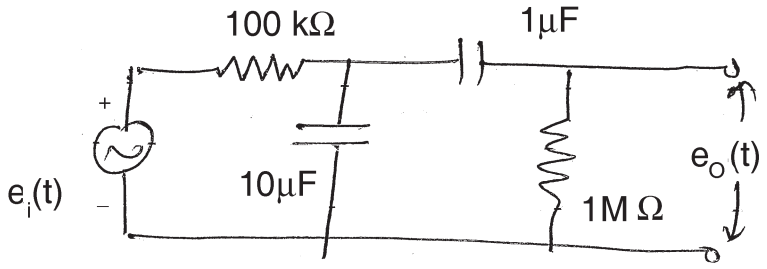
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between translational and rotational system with each of example.

2) Derive the transfer function of simple closed loop system.

3) Draw the block diagram for given electric circuit and hence evaluate the transfer function $E_O(s)/E_i(s)$.



4) Describe any four properties of signal flow graph.

5) Define and compare between relative stability and absolute stability.

3. Attempt **any two** questions : **(6×2=12)**

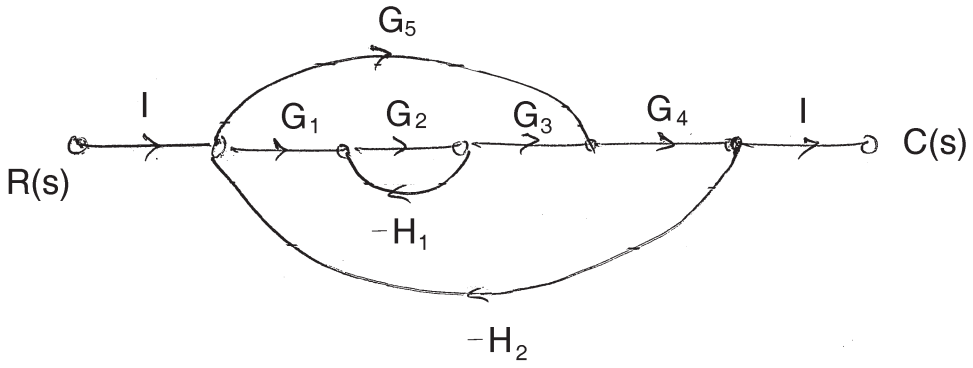
1) Find the range of values of 'k' for which the following system is stable.

a) $s^4 + ks^3 + s^2 + s + 1 = 0$

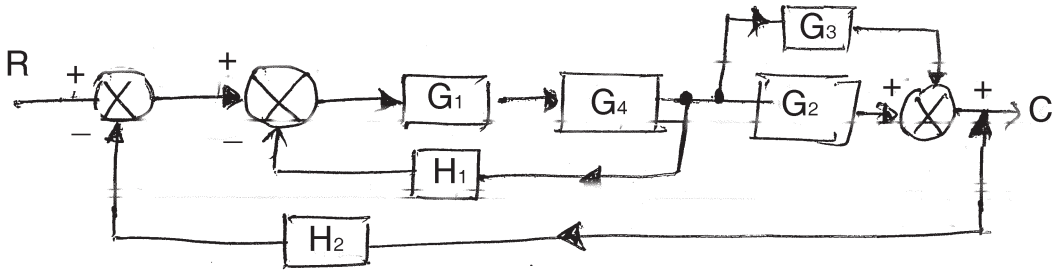
b) $G(s)\,H(s) = \dfrac{k}{(s+2)\,(s+4)\,(s^2+6s+25)}$.

Set P

2) Find $\frac{C(s)}{R(s)}$ by using Mason's gain formula.



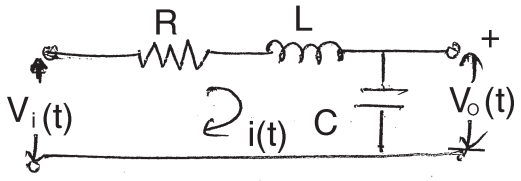
3) Determine the transfer function C(s)/R(s) of system shown in fig.



SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

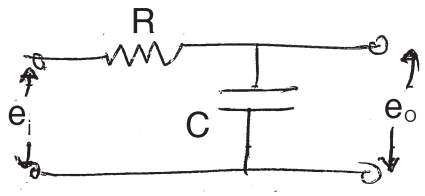
1) Define state variables and state model concept and obtain the state model for given electrical system.



2) Explain the angle and magnitude conditions of the root locus.

3) Define G.M. and P.M. and draw the Bode plot of stable system showing G.M. and P.M.

4) Draw the polar plot of a RC filter circuit shown below



5) Describe lag and lead-lag compensating networks with necessary figure.

5. Attempt **any 2** questions : **(6×2=12)**

1) Draw the Nyquist plot for a system with $G(s)\,H(s) = \dfrac{10(s+3)}{s(s-1)}$ and comment on the closed loop stability.

2) Sketch the Bode plot for following transfer function and determine the system gain cross over frequency and phase cross over frequency $G(s)\,H(s) = \dfrac{80(s+5)}{s^2(s+50)}$.

3) Sketch the root locus for system with $G(s)\,H(s) = \dfrac{k(s+4)}{s(s^2+2s+2)}$.

Set P

SLR-TC – 457

Seat No.	

Set **Q**

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Number of roots in left hand of s-plane if characteristic equation is $s^3 - 4s^2 + s + 6 = 0$ is

a) 1 b) 2 c) 3 d) 0

2) The value of gain margin of the system having $G(s)\,H(s) = 8/(s+2)^3$ is

a) 8 b) 2 c) 6 d) 4

3) Find the order of system $G(s) = \dfrac{s+6}{s(s-2)(s-4)}$.

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4) Slope of asymptote in Bode plot of 2nd order system is _____ per octave.

a) 18 dB b) 12 dB c) 6 dB d) 3 dB

5) Settling time for 5% tolerance band is

a) 3 T b) 4 T c) 5 T d) 2 T

6) For the polynomial $P(s) = 2s^5 + s^4 + 4s^3 + 2s^2 + 3s + 15$, number of roots which lie in right half plane of s-plane is

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P.T.O.

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8) By using _____ element mechanical translational systems are obtained.

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9) Transient state analysis deals with

a) magnitude of error b) nature of response

c) both a) and b) d) none of the above

10) _____ is the type of closed loop system for the plant transfer function $G(s) = \frac{k}{s^2}(1+s)$ and with unity feedback.

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11) Lead compensator is used to improve

a) transient response b) steady state response

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12) Adding a pole to a system transfer function in terms of compensator represents a _____ compensator.

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_____

SLR-TC – 457

Seat No.	

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

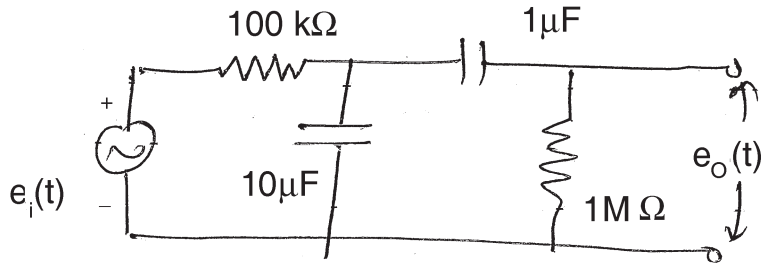
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between translational and rotational system with each of example.

2) Derive the transfer function of simple closed loop system.

3) Draw the block diagram for given electric circuit and hence evaluate the transfer function $E_O(s)/E_i(s)$.



4) Describe any four properties of signal flow graph.

5) Define and compare between relative stability and absolute stability.

3. Attempt **any two** questions : **(6×2=12)**

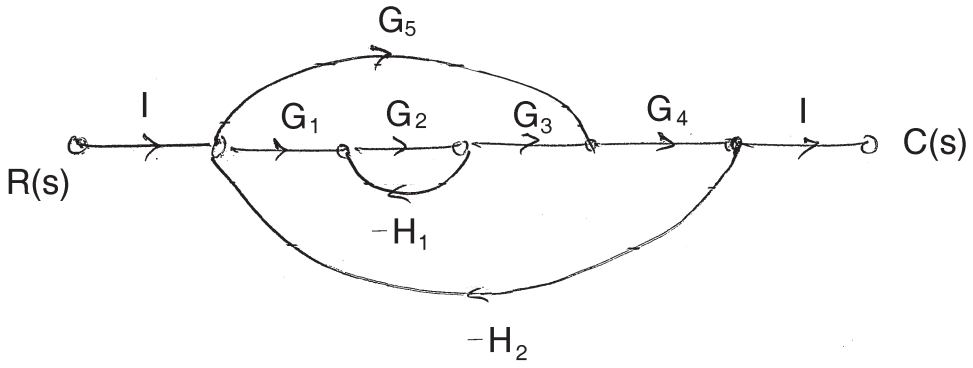
1) Find the range of values of 'k' for which the following system is stable.

a) $s^4 + ks^3 + s^2 + s + 1 = 0$

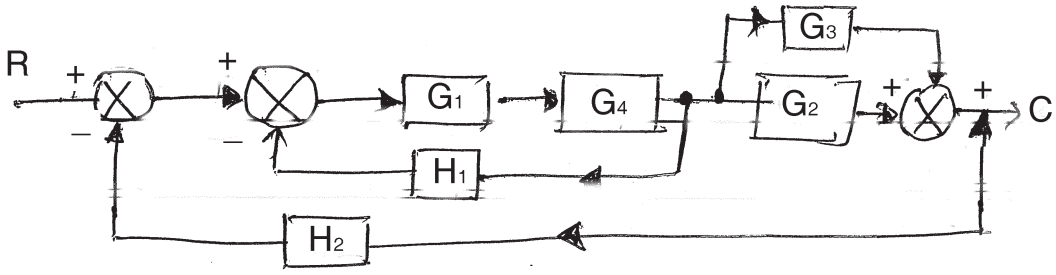
b) $G(s)\,H(s) = \dfrac{k}{(s+2)\,(s+4)\,(s^2+6s+25)}$.

Set Q

2) Find $\frac{C(s)}{R(s)}$ by using Mason's gain formula.



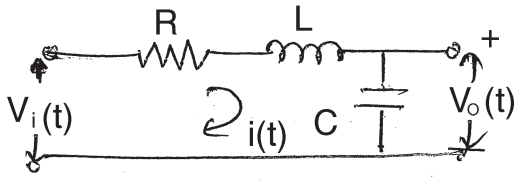
3) Determine the transfer function C(s)/R(s) of system shown in fig.



SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

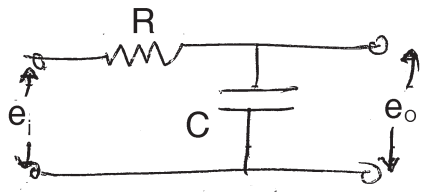
1) Define state variables and state model concept and obtain the state model for given electrical system.



2) Explain the angle and magnitude conditions of the root locus.

3) Define G.M. and P.M. and draw the Bode plot of stable system showing G.M. and P.M.

4) Draw the polar plot of a RC filter circuit shown below



5) Describe lag and lead-lag compensating networks with necessary figure.

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1) Draw the Nyquist plot for a system with $G(s)\,H(s) = \dfrac{10(s+3)}{s(s-1)}$ and comment on the closed loop stability.

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Set Q

SLR-TC – 457

Seat No.	

Set R

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Adding a pole to a system transfer function in terms of compensator represents a _____ compensator.

a) lead b) lag

c) lead-lag d) lag-lead

2) For type I system with parabolic input, the steady state error is

a) zero b) finite constant

c) infinite d) indeterminate

3) A system is stable for

a) G.M. and P.M. both +ve b) G.M. and P.M. both –ve

c) G.M. –ve d) P.M. –ve

4) Number of roots in left hand of s-plane if characteristic equation is $s^3 – 4s^2 + s + 6 = 0$ is

a) 1 b) 2 c) 3 d) 0

5) The value of gain margin of the system having $G(s)\,H(s) = 8/(s + 2)^3$ is

a) 8 b) 2 c) 6 d) 4

P.T.O.

6) Find the order of system $G(s) = \frac{s+6}{s(s-2)(s-4)}$.

a) 2 b) 3 c) 4 d) 5

7) Slope of asymptote in Bode plot of 2nd order system is _____ per octave.

a) 18 dB b) 12 dB c) 6 dB d) 3 dB

8) Settling time for 5% tolerance band is

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9) For the polynomial $P(s) = 2s^5 + s^4 + 4s^3 + 2s^2 + 3s + 15$, number of roots which lie in right half plane of s-plane is

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12) Transient state analysis deals with

a) magnitude of error b) nature of response

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13) _____ is the type of closed loop system for the plant transfer function $G(s) = \frac{k}{s^2}(1+s)$ and with unity feedback.

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_____

SLR-TC – 457

Seat No.	

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

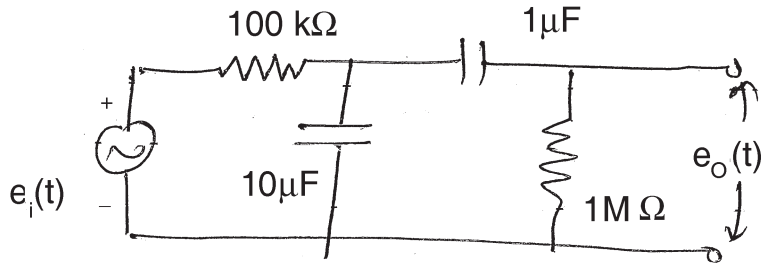
SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

1) Define and differentiate between translational and rotational system with each of example.

2) Derive the transfer function of simple closed loop system.

3) Draw the block diagram for given electric circuit and hence evaluate the transfer function $E_O(s)/E_i(s)$.



4) Describe any four properties of signal flow graph.

5) Define and compare between relative stability and absolute stability.

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1) Find the range of values of 'k' for which the following system is stable.

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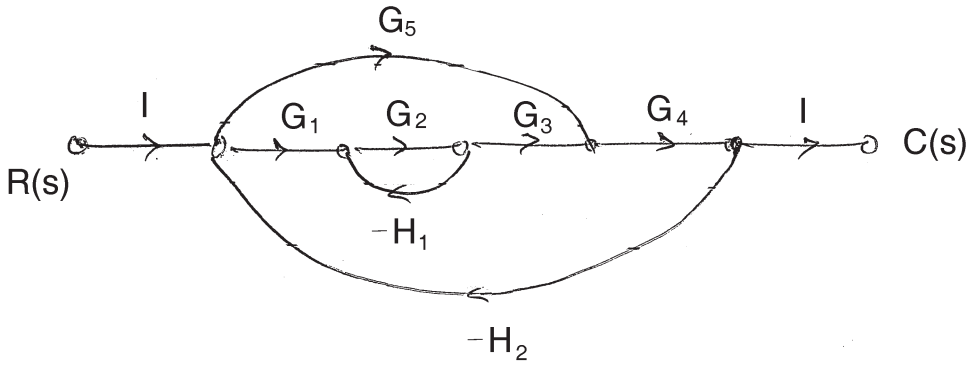
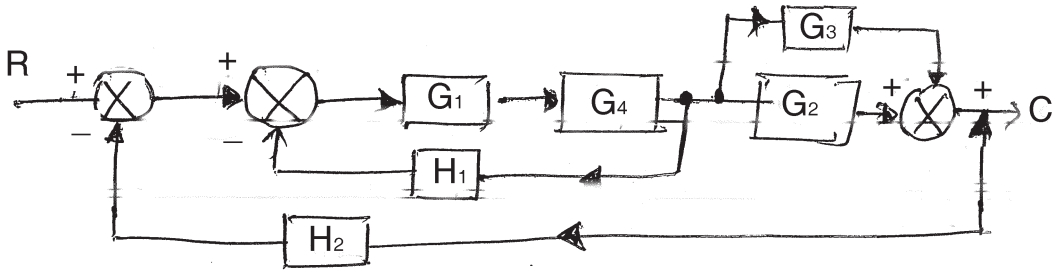
2) Find $\frac{C(s)}{R(s)}$ by using Mason's gain formula.



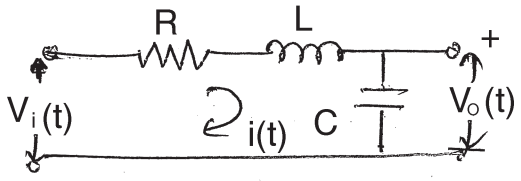
3) Determine the transfer function C(s)/R(s) of system shown in fig.



SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Define state variables and state model concept and obtain the state model for given electrical system.



2) Explain the angle and magnitude conditions of the root locus.

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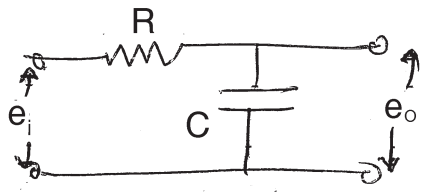

5) Describe lag and lead-lag compensating networks with necessary figure.

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1) Draw the Nyquist plot for a system with $G(s)\,H(s) = \dfrac{10(s+3)}{s(s-1)}$ and comment on the closed loop stability.

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Set R

SLR-TC – 457

Seat No.	

Set S

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Find the order of system $G(s) = \frac{s+6}{s(s-2)(s-4)}$.

a) 2 b) 3 c) 4 d) 5

2) Slope of asymptote in Bode plot of 2nd order system is _____ per octave.

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_____

SLR-TC – 457

Seat No.	

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018
CONTROL SYSTEMS

Day and Date : Friday, 18-05-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

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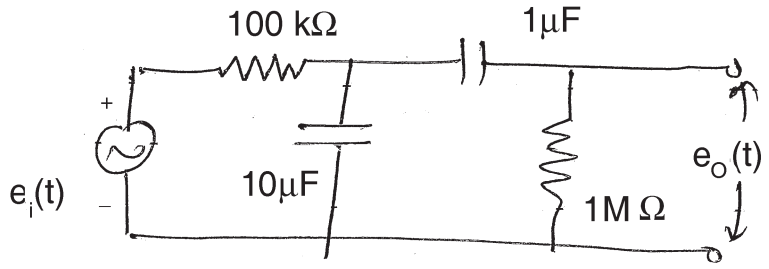

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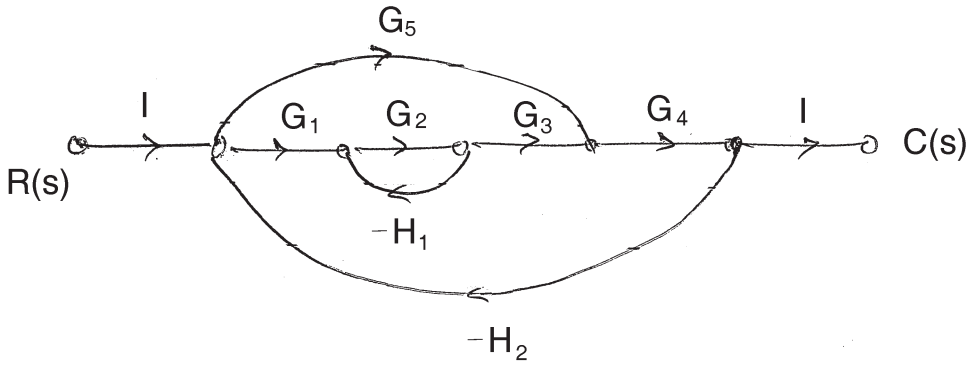

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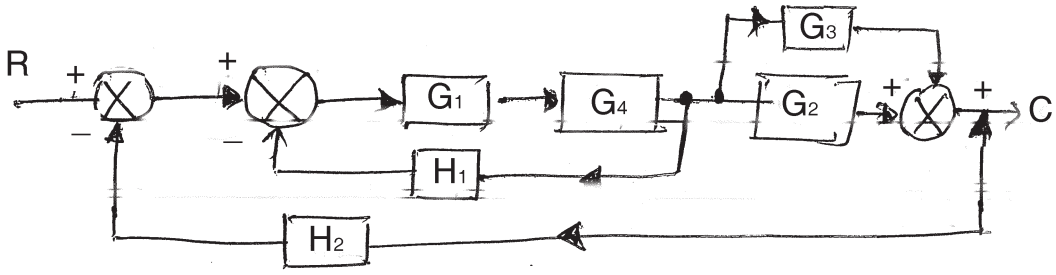

SECTION – II

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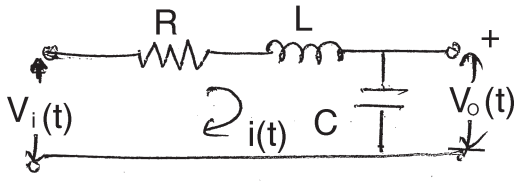

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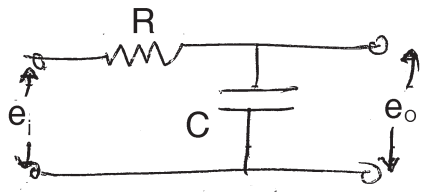

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2) Sketch the Bode plot for following transfer function and determine the system gain cross over frequency and phase cross over frequency $G(s)\,H(s) = \dfrac{80(s+5)}{s^2(s+50)}$.

3) Sketch the root locus for system with $G(s)\,H(s) = \dfrac{k(s+4)}{s(s^2+2s+2)}$.

Set S

SLR-TC – 458

Seat No.	

Set P

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Total Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The region of convergence of $x/(1+2x+x^2)$ is _____

a) 0 b) 1 c) Negative d) Positive

2) The transforming relations performed by DTFT are _____

a) Linearity b) Modulation

c) Shifting and convolution d) All above

3) The circular convolution of the sequences $X_1(n) = \{2, 1, 2, 1\}$ and $X_2(n) = \{1, 2, 3, 4\}$ is _____

a) {14, 14, 16, 16} b) {16, 16, 14, 14}

c) {2, 3, 6, 4} d) {14, 16, 14, 16}

4) To reduce side lobes in _____ region of the filter the frequency specification has to be optimised.

a) Stop band b) Pass band

c) Transition band d) None of above

P.T.O.

5) The values of cut off frequencies in general depend on _____
   a) Type of the window
   b) Length of the window
   c) None of above
   d) Both a) and b)

6) The equation for frequency WK in the frequency response of an FIR filter is _____
   a) $\frac{\pi}{M}(K+\alpha)$ b) $\frac{4\pi}{M}(K+\alpha)$ c) $\frac{8\pi}{M}(K+\alpha)$ d) $\frac{2\pi}{M}(K+\alpha)$

7) IJR filters are of _____ nature.
   a) Recursive
   b) Non-recursive
   c) Reversive
   d) Non-reversive

8) In frequency sampling method transition band is a multiple of _____
   a) $\frac{\pi}{M}$ b) $\frac{2\pi}{M}$ c) $\frac{\pi}{2M}$ d) $2\pi M$

9) _____filters exhibit their dependency upon the system design for the stability purpose.
   a) DFT b) FIR c) IIR d) FFT

10) The sensitivity of filter coefficient quantization for FIR filter is _____
   a) Low b) Moderate c) High d) Unpredictable

11) For a linear phase filter, if Z, is zero then, the value of Z^{-1}, or 1/Z, is _____
   a) Zero b) Unity c) Infinity d) Unpredictable

12) If x(n) and x(k) are an N-point DFT pair, the X(K + N) = _____ ?
   a) X (– K) b) – X (K) c) X (K) d) None of above

13) ROC does not have _____
   a) Zeros
   b) Poles
   c) Negative value
   d) Positive values

14) Time shifting of discrete time signal means _____
   a) Y (n] = X (n – k]
   b) Y(n] = X (– n – k]
   c) Y(n] = – X (n – k]
   d) Y(n] = X (n + k]

_____

SLR-TC – 458

Seat No.	

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I **(4×4=16)**

2. 1) List any five properties of DFT and describe any two of it.
   2) Find the DFT of following finite duration sequence of length L.

$$x(n) = \begin{cases} A, & \text{for } 0 \le n \le 2-1 \\ 0, & \text{otherwise} \end{cases}.$$

   3) Given x (n) = {0, 1, 2, 3}. Find x (k) using DITFFT algorithm.
   4) Distinguish between linear circular convulsion of two sequences with an example.
   5) Explain any two FIR filter realisation methods.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Obtain direct form and cascade form realisation for the transfer function of FIR system given by $H(z) = \left(1 - \frac{1}{4}Z^{-1} + \frac{3}{8}Z^{-2}\right)\left(1 - \frac{1}{8}Z^{-1} - \frac{1}{2}Z^{-2}\right)$.
   2) Determine DFT (8 point) for continuous time signal x(t) = sin(2πft) with f = 50 Hz.
   3) Define and explain following term :
      a) Auto correlation
      b) Cross correlation
      c) Circular correlation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.

2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{n=0}^{M=1/2} h(n) \sin\omega (T-n) = 0$.

3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s+0.2}{(s+0.2)^2+9}$.

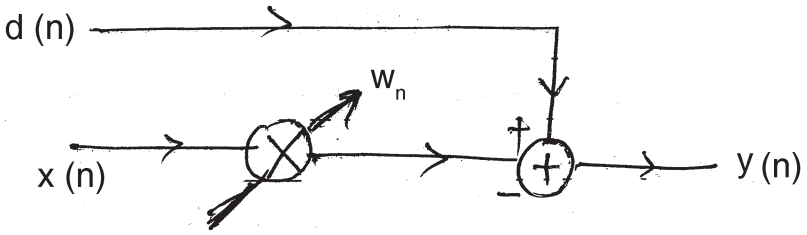
4) Compare between rectangular window and Hanning window.

5) Determine the unit sample response of the ideal low pass filter and mention why it is not realisable ?

5. Attempt **any 2** questions : **(6×2=12)**

1) Determine the parallel realization of IIR digital filter transfer function $H(z) = \frac{3(2z^2+5z+4)}{(2z+1)(z+2)}$.

2) Consider the single weight adoption filter as shown :



a) Write down the LMS algorithm for updating weight w.

3) Write a short note on :
   a) Sign error LMS algorithm
   b) Exponentially weighted LMS algorithm.

SLR-TC – 458

Seat No.	

Set Q

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) In frequency sampling method transition band is a multiple of _____

a) $\frac{\pi}{M}$ b) $\frac{2\pi}{M}$ c) $\frac{\pi}{2M}$ d) $2\pi M$

2) _____filters exhibit their dependency upon the system design for the stability purpose.

a) DFT b) FIR c) IIR d) FFT

3) The sensitivity of filter coefficient quantization for FIR filter is _____

a) Low b) Moderate c) High d) Unpredictable

4) For a linear phase filter, if Z, is zero then, the value of Z^{-1}, or 1/Z, is _____

a) Zero b) Unity c) Infinity d) Unpredictable

5) If x(n) and x(k) are an N-point DFT pair, the X(K + N) = _____ ?

a) X (– K) b) – X (K) c) X (K) d) None of above

6) ROC does not have _____

a) Zeros b) Poles

c) Negative value d) Positive values

P.T.O.

7) Time shifting of discrete time signal means _____

a) Y (n] = X (n – k] b) Y(n] = X (– n – k]

c) Y(n] = – X (n – k] d) Y(n] = X (n + k]

8) The region of convergence of $x/(1+2x+x^2)$ is _____

a) 0 b) 1 c) Negative d) Positive

9) The transforming relations performed by DTFT are _____

a) Linearity b) Modulation

c) Shifting and convolution d) All above

10) The circular convolution of the sequences $X_1(n) = \{2, 1, 2, 1\}$ and $X_2(n) = \{1, 2, 3, 4\}$ is _____

a) {14, 14, 16, 16} b) {16, 16, 14, 14}

c) {2, 3, 6, 4} d) {14, 16, 14, 16}

11) To reduce side lobes in _____ region of the filter the frequency specification has to be optimised.

a) Stop band b) Pass band

c) Transition band d) None of above

12) The values of cut off frequencies in general depend on _____

a) Type of the window b) Length of the window

c) None of above d) Both a) and b)

13) The equation for frequency WK in the frequency response of an FIR filter is _____

a) $\frac{\pi}{M}(K+\alpha)$ b) $\frac{4\pi}{M}(K+\alpha)$ c) $\frac{8\pi}{M}(K+\alpha)$ d) $\frac{2\pi}{M}(K+\alpha)$

14) IJR filters are of _____ nature.

a) Recursive b) Non-recursive

c) Reversive d) Non-reversive

_____

SLR-TC – 458

Seat No.	

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I **(4×4=16)**

2. 1) List any five properties of DFT and describe any two of it.
   2) Find the DFT of following finite duration sequence of length L.

$$x(n) = \begin{cases} A, & \text{for } 0 \le n \le 2-1 \\ 0, & \text{otherwise} \end{cases}.$$

   3) Given x (n) = {0, 1, 2, 3}. Find x (k) using DITFFT algorithm.
   4) Distinguish between linear circular convulsion of two sequences with an example.
   5) Explain any two FIR filter realisation methods.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Obtain direct form and cascade form realisation for the transfer function of FIR system given by $H(z) = \left(1 - \frac{1}{4}Z^{-1} + \frac{3}{8}Z^{-2}\right)\left(1 - \frac{1}{8}Z^{-1} - \frac{1}{2}Z^{-2}\right)$.
   2) Determine DFT (8 point) for continuous time signal x(t) = sin(2πft) with f = 50 Hz.
   3) Define and explain following term :
      a) Auto correlation
      b) Cross correlation
      c) Circular correlation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.

2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{n=0}^{M=1/2} h(n) \sin\omega (T-n) = 0$.

3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s+0.2}{(s+0.2)^2+9}$.

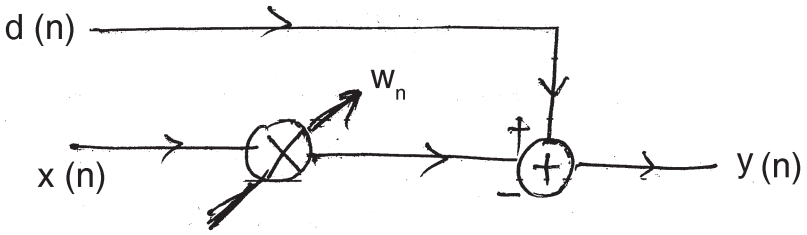
4) Compare between rectangular window and Hanning window.

5) Determine the unit sample response of the ideal low pass filter and mention why it is not realisable ?

5. Attempt **any 2** questions : **(6×2=12)**

1) Determine the parallel realization of IIR digital filter transfer function $H(z) = \frac{3(2z^2+5z+4)}{(2z+1)(z+2)}$.

2) Consider the single weight adoption filter as shown :



a) Write down the LMS algorithm for updating weight w.

3) Write a short note on :
   a) Sign error LMS algorithm
   b) Exponentially weighted LMS algorithm.

SLR-TC – 458

Seat No.	

Set R

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Total Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The values of cut off frequencies in general depend on _____

a) Type of the window b) Length of the window

c) None of above d) Both a) and b)

2) The equation for frequency WK in the frequency response of an FIR filter is _____

a) $\frac{\pi}{M}(K+\alpha)$ b) $\frac{4\pi}{M}(K+\alpha)$ c) $\frac{8\pi}{M}(K+\alpha)$ d) $\frac{2\pi}{M}(K+\alpha)$

3) IJR filters are of _____ nature.

a) Recursive b) Non-recursive

c) Reversive d) Non-reversive

4) In frequency sampling method transition band is a multiple of _____

a) $\frac{\pi}{M}$ b) $\frac{2\pi}{M}$ c) $\frac{\pi}{2M}$ d) $2\pi M$

5) _____filters exhibit their dependency upon the system design for the stability purpose.

a) DFT b) FIR c) IIR d) FFT

P.T.O.

6) The sensitivity of filter coefficient quantization for FIR filter is _____
   a) Low b) Moderate c) High d) Unpredictable

7) For a linear phase filter, if Z, is zero then, the value of Z^{-1}, or 1/Z, is _____
   a) Zero b) Unity c) Infinity d) Unpredictable

8) If x(n) and x(k) are an N-point DFT pair, the X(K + N) = _____ ?
   a) X (– K) b) – X (K) c) X (K) d) None of above

9) ROC does not have _____
   a) Zeros b) Poles
   c) Negative value d) Positive values

10) Time shifting of discrete time signal means _____
   a) Y (n] = X (n – k] b) Y(n] = X (– n – k]
   c) Y(n] = – X (n – k] d) Y(n] = X (n + k]

11) The region of convergence of $x/(1+2x+x^2)$ is _____
   a) 0 b) 1 c) Negative d) Positive

12) The transforming relations performed by DTFT are _____
   a) Linearity b) Modulation
   c) Shifting and convolution d) All above

13) The circular convolution of the sequences $X_1(n) = \{2, 1, 2, 1\}$ and $X_2(n) = \{1, 2, 3, 4\}$ is _____
   a) {14, 14, 16, 16} b) {16, 16, 14, 14}
   c) {2, 3, 6, 4} d) {14, 16, 14, 16}

14) To reduce side lobes in _____ region of the filter the frequency specification has to be optimised.
   a) Stop band b) Pass band
   c) Transition band d) None of above

_____

SLR-TC – 458

Seat No.	

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I **(4×4=16)**

2. 1) List any five properties of DFT and describe any two of it.

   2) Find the DFT of following finite duration sequence of length L.

   $$x(n) = \begin{cases} A, & \text{for } 0 \le n \le 2-1 \\ 0, & \text{otherwise} \end{cases}.$$

   3) Given x (n) = {0, 1, 2, 3}. Find x (k) using DITFFT algorithm.

   4) Distinguish between linear circular convulsion of two sequences with an example.

   5) Explain any two FIR filter realisation methods.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Obtain direct form and cascade form realisation for the transfer function of FIR system given by $H(z) = \left(1 - \frac{1}{4}Z^{-1} + \frac{3}{8}Z^{-2}\right)\left(1 - \frac{1}{8}Z^{-1} - \frac{1}{2}Z^{-2}\right)$.

   2) Determine DFT (8 point) for continuous time signal x(t) = sin(2π ft) with f = 50 Hz.

   3) Define and explain following term :

      a) Auto correlation

      b) Cross correlation

      c) Circular correlation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.

2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{n=0}^{M=1/2} h(n) \sin\omega (T-n) = 0$.

3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s+0.2}{(s+0.2)^2+9}$.

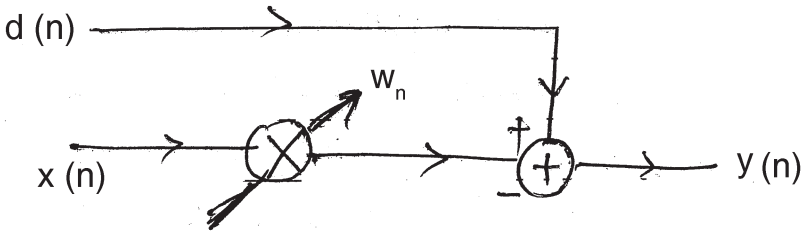
4) Compare between rectangular window and Hanning window.

5) Determine the unit sample response of the ideal low pass filter and mention why it is not realisable ?

5. Attempt **any 2** questions : **(6×2=12)**

1) Determine the parallel realization of IIR digital filter transfer function $H(z) = \frac{3(2z^2+5z+4)}{(2z+1)(z+2)}$.

2) Consider the single weight adoption filter as shown :



a) Write down the LMS algorithm for updating weight w.

3) Write a short note on :

a) Sign error LMS algorithm

b) Exponentially weighted LMS algorithm.

SLR-TC – 458

Seat No.	

Set S

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Total Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The sensitivity of filter coefficient quantization for FIR filter is _____

a) Low b) Moderate c) High d) Unpredictable

2) For a linear phase filter, if Z, is zero then, the value of Z^{-1}, or 1/Z, is _____

a) Zero b) Unity c) Infinity d) Unpredictable

3) If x(n) and x(k) are an N-point DFT pair, the X(K + N) = _____ ?

a) X (– K) b) – X (K) c) X (K) d) None of above

4) ROC does not have _____

a) Zeros b) Poles

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a) Y (n] = X (n – k] b) Y(n] = X (– n – k]

c) Y(n] = – X (n – k] d) Y(n] = X (n + k]

6) The region of convergence of $x/(1+2x+x^2)$ is _____

a) 0 b) 1 c) Negative d) Positive

7) The transforming relations performed by DTFT are _____

a) Linearity b) Modulation

c) Shifting and convolution d) All above

8) The circular convolution of the sequences $X_1(n) = \{2, 1, 2, 1\}$ and $X_2(n) = \{1, 2, 3, 4\}$ is _____

a) {14, 14, 16, 16} b) {16, 16, 14, 14}

c) {2, 3, 6, 4} d) {14, 16, 14, 16}

9) To reduce side lobes in _____ region of the filter the frequency specification has to be optimised.

a) Stop band b) Pass band

c) Transition band d) None of above

10) The values of cut off frequencies in general depend on _____

a) Type of the window b) Length of the window

c) None of above d) Both a) and b)

11) The equation for frequency WK in the frequency response of an FIR filter is _____

a) $\frac{\pi}{M}(K+\alpha)$ b) $\frac{4\pi}{M}(K+\alpha)$ c) $\frac{8\pi}{M}(K+\alpha)$ d) $\frac{2\pi}{M}(K+\alpha)$

12) IJR filters are of _____ nature.

a) Recursive b) Non-recursive

c) Reversive d) Non-reversive

13) In frequency sampling method transition band is a multiple of _____

a) $\frac{\pi}{M}$ b) $\frac{2\pi}{M}$ c) $\frac{\pi}{2M}$ d) $2\pi M$

14) _____filters exhibit their dependency upon the system design for the stability purpose.

a) DFT b) FIR c) IIR d) FFT

_____

SLR-TC – 458

Seat No.	

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018
DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I **(4×4=16)**

2. 1) List any five properties of DFT and describe any two of it.

   2) Find the DFT of following finite duration sequence of length L.

   $$x(n) = \begin{cases} A, & \text{for } 0 \le n \le 2-1 \\ 0, & \text{otherwise} \end{cases}.$$

   3) Given x (n) = {0, 1, 2, 3}. Find x (k) using DITFFT algorithm.

   4) Distinguish between linear circular convulsion of two sequences with an example.

   5) Explain any two FIR filter realisation methods.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Obtain direct form and cascade form realisation for the transfer function of FIR system given by $H(z) = \left(1 - \frac{1}{4}Z^{-1} + \frac{3}{8}Z^{-2}\right)\left(1 - \frac{1}{8}Z^{-1} - \frac{1}{2}Z^{-2}\right)$.

   2) Determine DFT (8 point) for continuous time signal x(t) = sin(2π ft) with f = 50 Hz.

   3) Define and explain following term :

      a) Auto correlation

      b) Cross correlation

      c) Circular correlation.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**

1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.

2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{n=0}^{M=1/2} h(n) \sin\omega (T-n) = 0$.

3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s+0.2}{(s+0.2)^2+9}$.

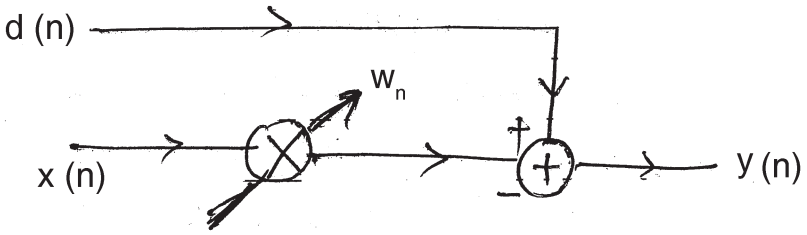
4) Compare between rectangular window and Hanning window.

5) Determine the unit sample response of the ideal low pass filter and mention why it is not realisable ?

5. Attempt **any 2** questions : **(6×2=12)**

1) Determine the parallel realization of IIR digital filter transfer function $H(z) = \frac{3(2z^2+5z+4)}{(2z+1)(z+2)}$.

2) Consider the single weight adoption filter as shown :



a) Write down the LMS algorithm for updating weight w.

3) Write a short note on :

a) Sign error LMS algorithm

b) Exponentially weighted LMS algorithm.

SLR-TC – 459

Seat No.	

Set **P**

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) What are the essential tight constraint/s related to the design metrics of an embedded system ?
   a) Ability to fit on a single chip
   b) Low power consumption
   c) Fast data processing for real-time operations
   d) All of the above

2) Which abstraction level undergo the compilation process by converting a sequential program into finite-state machine and register transfers while designing an embedded system ?
   a) System b) Behaviour c) RT d) Logic

3) Which memory storage is widely used in PCs and Embedded Systems ?
   a) SRAM b) DRAM c) Flash memory d) EEPROM

4) Which type of non-privileged processor mode is entered due to raising of high priority of an interrupt ?
   a) User mode b) Fast Interrupt Mode (FIQ)
   c) Interrupt Mode (IRQ) d) Supervisor Mode (SVQ)

5) Which parameter/s is/are included in 'Time to market' design metric of an embedded system ?
   a) Time to prototype b) Time to refine
   c) Time to produce in bulk d) All of the above

6) SCI stands for
   a) Serial Communication Internet b) Serial Connect Interface
   c) System Connection Interface d) None

7) In a time-sharing operating system, when the time slot given to a process is completed, the process goes from the running state to the
   a) Blocked state b) Ready state
   c) Suspended state d) Terminated state

8) What kind of memory does an OTP have ?
   a) SRAM b) RAM c) EPROM d) DRAM

9) Which of the following algorithms tends to minimize the process flow time ?
   a) First Come First Served b) Shortest Job First
   c) Earliest Deadline First d) Longest Job First

10) If the resources are always preempted from the same process, _____ can occur.
   a) Deadlock b) System crash c) Aging d) Starvation

11) The problem of priority inversion can be solved by
   a) Priority inheritance protocol b) Priority inversion protocol
   c) Both a) and b) d) None of the mentioned

12) What will happen if a non-recursive mutex is locked more than once ?
   a) Starvation b) Deadlock c) Aging d) Signaling

13) The _____ keeps state information about the use of I/O components.
   a) CPU b) OS c) Kernel d) Shell

14) μCOS-II task scheduling mechanism is
   a) Cooperative as well as preemptive
   b) Cyclic only
   c) Preemptive only
   d) Preemptive as well as time slicing round robin

_____

SLR-TC – 459

Seat No.	

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** : **(4×3=12)**
   1) What are the different processor used in embedded system ? Explain with their advantages and disadvantages.
   2) Draw and explain bus architecture of ARM processor.
   3) Explain in detail memory allocation program segment and data segment.
   4) What is pipelining ? Explain with an example and how it is advantage in processor ?
   5) Explain different memory devices and selection of memory for an Embedded system.

3. Answer **any two** : **(2×8=16)**
   1) Draw the Embedded system hardware ? Explain each hardware unit of the embedded system in detail.
   2) Explain the following :
      i) Watchdog timer
      ii) USB
      iii) Interrupt
      iv) RTC.
   3) Explain the following in detail :
      i) I2C communication protocol
      ii) Application of Embedded System in digital camera.

SECTION – II

4. Answer **any four** : **(4×3=12)**

   1) Explain different C programing elements.
   2) Explain inter task communication in RTOS.
   3) Define task and explain different task states with diagram.
   4) Draw and explain kernel structure of μCOS-II.
   5) Explain in detail operation of timer and memory management in RTOS.

5. Answer **any two** : **(2×8=16)**

   1) Draw and explain in detail interfacing of touch screen input to the embedded system.
   2) Explain the following :
      i) Semaphore
      ii) Priority inversion problems.
   3) Write short note on :
      a) Embedded communication using GSM modem.
      b) Interrupt Service Routine in an RTOS.

SLR-TC – 459

Seat No.	

Set **Q**

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) What kind of memory does an OTP have ?
a) SRAM b) RAM c) EPROM d) DRAM

2) Which of the following algorithms tends to minimize the process flow time ?
a) First Come First Served b) Shortest Job First
c) Earliest Deadline First d) Longest Job First

3) If the resources are always preempted from the same process, _____ can occur.
a) Deadlock b) System crash c) Aging d) Starvation

4) The problem of priority inversion can be solved by
a) Priority inheritance protocol b) Priority inversion protocol
c) Both a) and b) d) None of the mentioned

5) What will happen if a non-recursive mutex is locked more than once ?
a) Starvation b) Deadlock c) Aging d) Signaling

6) The _____ keeps state information about the use of I/O components.
a) CPU b) OS c) Kernel d) Shell

7) μCOS-II task scheduling mechanism is
a) Cooperative as well as preemptive
b) Cyclic only
c) Preemptive only
d) Preemptive as well as time slicing round robin

8) What are the essential tight constraint/s related to the design metrics of an embedded system ?
   a) Ability to fit on a single chip
   b) Low power consumption
   c) Fast data processing for real-time operations
   d) All of the above

9) Which abstraction level undergo the compilation process by converting a sequential program into finite-state machine and register transfers while designing an embedded system ?
   a) System b) Behaviour c) RT d) Logic

10) Which memory storage is widely used in PCs and Embedded Systems ?
   a) SRAM b) DRAM c) Flash memory d) EEPROM

11) Which type of non-privileged processor mode is entered due to raising of high priority of an interrupt ?
   a) User mode b) Fast Interrupt Mode (FIQ)
   c) Interrupt Mode (IRQ) d) Supervisor Mode (SVQ)

12) Which parameter/s is/are included in 'Time to market' design metric of an embedded system ?
   a) Time to prototype b) Time to refine
   c) Time to produce in bulk d) All of the above

13) SCI stands for
   a) Serial Communication Internet b) Serial Connect Interface
   c) System Connection Interface d) None

14) In a time-sharing operating system, when the time slot given to a process is completed, the process goes from the running state to the
   a) Blocked state b) Ready state
   c) Suspended state d) Terminated state

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SLR-TC – 459

Seat No.	

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** : **(4×3=12)**
   1) What are the different processor used in embedded system ? Explain with their advantages and disadvantages.
   2) Draw and explain bus architecture of ARM processor.
   3) Explain in detail memory allocation program segment and data segment.
   4) What is pipelining ? Explain with an example and how it is advantage in processor ?
   5) Explain different memory devices and selection of memory for an Embedded system.

3. Answer **any two** : **(2×8=16)**
   1) Draw the Embedded system hardware ? Explain each hardware unit of the embedded system in detail.
   2) Explain the following :
      i) Watchdog timer
      ii) USB
      iii) Interrupt
      iv) RTC.
   3) Explain the following in detail :
      i) I2C communication protocol
      ii) Application of Embedded System in digital camera.

SECTION – II

4. Answer **any four** : **(4×3=12)**

   1) Explain different C programing elements.
   2) Explain inter task communication in RTOS.
   3) Define task and explain different task states with diagram.
   4) Draw and explain kernel structure of μCOS-II.
   5) Explain in detail operation of timer and memory management in RTOS.

5. Answer **any two** : **(2×8=16)**

   1) Draw and explain in detail interfacing of touch screen input to the embedded system.
   2) Explain the following :
      i) Semaphore
      ii) Priority inversion problems.
   3) Write short note on :
      a) Embedded communication using GSM modem.
      b) Interrupt Service Routine in an RTOS.

SLR-TC – 459

Seat No.	

Set **R**

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Which parameter/s is/are included in 'Time to market' design metric of an embedded system ?
   a) Time to prototype b) Time to refine
   c) Time to produce in bulk d) All of the above

2) SCI stands for
   a) Serial Communication Internet b) Serial Connect Interface
   c) System Connection Interface d) None

3) In a time-sharing operating system, when the time slot given to a process is completed, the process goes from the running state to the
   a) Blocked state b) Ready state
   c) Suspended state d) Terminated state

4) What kind of memory does an OTP have ?
   a) SRAM b) RAM c) EPROM d) DRAM

5) Which of the following algorithms tends to minimize the process flow time ?
   a) First Come First Served b) Shortest Job First
   c) Earliest Deadline First d) Longest Job First

6) If the resources are always preempted from the same process, _____ can occur.
   a) Deadlock b) System crash c) Aging d) Starvation

7) The problem of priority inversion can be solved by
   a) Priority inheritance protocol b) Priority inversion protocol
   c) Both a) and b) d) None of the mentioned

8) What will happen if a non-recursive mutex is locked more than once ?
   a) Starvation b) Deadlock c) Aging d) Signaling

9) The _____ keeps state information about the use of I/O components.
   a) CPU b) OS c) Kernel d) Shell

10) μCOS-II task scheduling mechanism is
   a) Cooperative as well as preemptive
   b) Cyclic only
   c) Preemptive only
   d) Preemptive as well as time slicing round robin

11) What are the essential tight constraint/s related to the design metrics of an embedded system ?
   a) Ability to fit on a single chip
   b) Low power consumption
   c) Fast data processing for real-time operations
   d) All of the above

12) Which abstraction level undergo the compilation process by converting a sequential program into finite-state machine and register transfers while designing an embedded system ?
   a) System b) Behaviour c) RT d) Logic

13) Which memory storage is widely used in PCs and Embedded Systems ?
   a) SRAM b) DRAM c) Flash memory d) EEPROM

14) Which type of non-privileged processor mode is entered due to raising of high priority of an interrupt ?
   a) User mode b) Fast Interrupt Mode (FIQ)
   c) Interrupt Mode (IRQ) d) Supervisor Mode (SVQ)

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SLR-TC – 459

Seat No.	

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** : **(4×3=12)**
   1) What are the different processor used in embedded system ? Explain with their advantages and disadvantages.
   2) Draw and explain bus architecture of ARM processor.
   3) Explain in detail memory allocation program segment and data segment.
   4) What is pipelining ? Explain with an example and how it is advantage in processor ?
   5) Explain different memory devices and selection of memory for an Embedded system.

3. Answer **any two** : **(2×8=16)**
   1) Draw the Embedded system hardware ? Explain each hardware unit of the embedded system in detail.
   2) Explain the following :
      i) Watchdog timer
      ii) USB
      iii) Interrupt
      iv) RTC.
   3) Explain the following in detail :
      i) I2C communication protocol
      ii) Application of Embedded System in digital camera.

SECTION – II

4. Answer **any four** : **(4×3=12)**

   1) Explain different C programing elements.
   2) Explain inter task communication in RTOS.
   3) Define task and explain different task states with diagram.
   4) Draw and explain kernel structure of μCOS-II.
   5) Explain in detail operation of timer and memory management in RTOS.

5. Answer **any two** : **(2×8=16)**

   1) Draw and explain in detail interfacing of touch screen input to the embedded system.
   2) Explain the following :
      i) Semaphore
      ii) Priority inversion problems.
   3) Write short note on :
      a) Embedded communication using GSM modem.
      b) Interrupt Service Routine in an RTOS.

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SLR-TC – 459

Seat No.	

Set **S**

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) If the resources are always preempted from the same process, _____ can occur.
   a) Deadlock b) System crash c) Aging d) Starvation

2) The problem of priority inversion can be solved by
   a) Priority inheritance protocol b) Priority inversion protocol
   c) Both a) and b) d) None of the mentioned

3) What will happen if a non-recursive mutex is locked more than once ?
   a) Starvation b) Deadlock c) Aging d) Signaling

4) The _____ keeps state information about the use of I/O components.
   a) CPU b) OS c) Kernel d) Shell

5) μCOS-II task scheduling mechanism is
   a) Cooperative as well as preemptive
   b) Cyclic only
   c) Preemptive only
   d) Preemptive as well as time slicing round robin

6) What are the essential tight constraint/s related to the design metrics of an embedded system ?
   a) Ability to fit on a single chip
   b) Low power consumption
   c) Fast data processing for real-time operations
   d) All of the above

7) Which abstraction level undergo the compilation process by converting a sequential program into finite-state machine and register transfers while designing an embedded system ?
   a) System b) Behaviour c) RT d) Logic

8) Which memory storage is widely used in PCs and Embedded Systems ?
   a) SRAM b) DRAM c) Flash memory d) EEPROM

9) Which type of non-privileged processor mode is entered due to raising of high priority of an interrupt ?
   a) User mode b) Fast Interrupt Mode (FIQ)
   c) Interrupt Mode (IRQ) d) Supervisor Mode (SVQ)

10) Which parameter/s is/are included in 'Time to market' design metric of an embedded system ?
   a) Time to prototype b) Time to refine
   c) Time to produce in bulk d) All of the above

11) SCI stands for
   a) Serial Communication Internet b) Serial Connect Interface
   c) System Connection Interface d) None

12) In a time-sharing operating system, when the time slot given to a process is completed, the process goes from the running state to the
   a) Blocked state b) Ready state
   c) Suspended state d) Terminated state

13) What kind of memory does an OTP have ?
   a) SRAM b) RAM c) EPROM d) DRAM

14) Which of the following algorithms tends to minimize the process flow time ?
   a) First Come First Served b) Shortest Job First
   c) Earliest Deadline First d) Longest Job First

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SLR-TC – 459

Seat No.	

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018
EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** : **(4×3=12)**
   1) What are the different processor used in embedded system ? Explain with their advantages and disadvantages.
   2) Draw and explain bus architecture of ARM processor.
   3) Explain in detail memory allocation program segment and data segment.
   4) What is pipelining ? Explain with an example and how it is advantage in processor ?
   5) Explain different memory devices and selection of memory for an Embedded system.

3. Answer **any two** : **(2×8=16)**
   1) Draw the Embedded system hardware ? Explain each hardware unit of the embedded system in detail.
   2) Explain the following :
      i) Watchdog timer
      ii) USB
      iii) Interrupt
      iv) RTC.
   3) Explain the following in detail :
      i) I2C communication protocol
      ii) Application of Embedded System in digital camera.

SECTION – II

4. Answer **any four** : **(4×3=12)**

   1) Explain different C programing elements.
   2) Explain inter task communication in RTOS.
   3) Define task and explain different task states with diagram.
   4) Draw and explain kernel structure of μCOS-II.
   5) Explain in detail operation of timer and memory management in RTOS.

5. Answer **any two** : **(2×8=16)**

   1) Draw and explain in detail interfacing of touch screen input to the embedded system.
   2) Explain the following :
      i) Semaphore
      ii) Priority inversion problems.
   3) Write short note on :
      a) Embedded communication using GSM modem.
      b) Interrupt Service Routine in an RTOS.

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Seat No.	

SLR-TC – 460

Set **P**

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) A _____ is used to improve the spatial resolution of a gamma camera.
   a) Grids b) Digital camera
   c) Scanner d) Collimator

2) Attenuation describes both absorption and scattering of
   a) resolution b) radiation c) specificity d) dose

3) Absorbed dose is the radiation energy absorbed per unit mass of _____ material.
   a) absorbing b) radiating c) scattering d) reflecting

4) Exposure expresses the _____ of an gamma ray beam.
   a) dose b) intensity c) quality d) resolution

5) The isotope of radioactive elements are usually produced
   a) reactor b) cyclotron c) radio tracer d) PHA

6) The SPECT technique uses a _____ to record images at a series of angles around the patient.
   a) rectilinear scanner b) gamma camera
   c) multiscanner d) collimator

7) PET is an imaging modality for obtaining _____ cross sectional images.
   a) invitro b) invivo c) planer d) linear

8) SPECT cameras detects only _____ that produce a cascaded emission of single photon.
   a) Single image b) Slice of images
   c) Radio nuclides d) SD image

9) The half life of a radioactive isotope is given by $t^{1/2}$ = _____
   a) $\frac{\lambda}{0.693}$ b) $\frac{0.693}{\lambda}$ c) $\frac{2\times10^5}{\lambda}$ d) $\frac{\lambda}{2\times10^5}$

10) Gamma particles constitutes _____ radiation that travels at the speed of light.
   a) ultraviolet b) infrared
   c) electromagnetic d) light

11) A scintillator is a _____ substance which purchases minute flashes of light invisible range.
   a) magnetic b) crystalline c) gaseous d) diffused

12) The gamma camera is a stationary imaging device for the
   a) Organ of interest b) Collimation
   c) Resolution d) Organ depth

13) The gamma emission change in nucleon number is
   a) zero b) definate
   c) increase by 1 d) decrease by 1

14) Radioactive decay is a _____ process.
   a) random b) nonspontaneous
   c) regular d) massive

_____

SLR-TC – 460

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe photo electric effect and compton effect process.
   2) The half life of $^{99m}T_C$ is 6 hours. After how much time will $1/16^{th}$ of radio isotope remains ?
   3) Derive the relationship between the decay constant and the half life.
   4) Describe process of gamma ray spectrometry.
   5) Explain working of scintillation detector with necessary diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) List and explain all types of collimators in detail.
   2) Explain working of thyroid uptake monitoring system and compare it with kidney uptake monitoring system.
   3) Draw and explain working of gamma counting system for invivo measurement.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain back projection technique for image reconstruction of PET scan.
   2) Define and explain internal and external radiation hazards.
   3) Explain various quality control functions of PET or SPECT.
   4) Differentiate between PET and SPECT modality.
   5) Explain working of liquid scintillation system.

Set P

5. Attempt **any 2** questions : **(6×2=12)**

   1) Describe various biological effects of radiation exposure.

   2) Explain working of RIA systems and mention its any 2 applications.

   3) Describe principle and working of PET system. Also mention various radiotracers used for it.

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SLR-TC – 460

Seat No.	

Set Q

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) SPECT cameras detects only _____ that produce a cascaded emission of single photon.
   a) Single image b) Slice of images
   c) Radio nuclides d) SD image

2) The half life of a radioactive isotope is given by $t^{1/2}$ = _____
   a) $\frac{\lambda}{0.693}$ b) $\frac{0.693}{\lambda}$ c) $\frac{2\times10^5}{\lambda}$ d) $\frac{\lambda}{2\times10^5}$

3) Gamma particles constitutes _____ radiation that travels at the speed of light.
   a) ultraviolet b) infrared
   c) electromagnetic d) light

4) A scintillator is a _____ substance which purchases minute flashes of light invisible range.
   a) magnetic b) crystalline c) gaseous d) diffused

5) The gamma camera is a stationary imaging device for the
   a) Organ of interest b) Collimation
   c) Resolution d) Organ depth

P.T.O.

6) The gamma emission change in nucleon number is
   a) zero b) definate
   c) increase by 1 d) decrease by 1

7) Radioactive decay is a _____ process.
   a) random b) nonspontaneous
   c) regular d) massive

8) A _____ is used to improve the spatial resolution of a gamma camera.
   a) Grids b) Digital camera
   c) Scanner d) Collimator

9) Attenuation describes both absorption and scattering of
   a) resolution b) radiation c) specificity d) dose

10) Absorbed dose is the radiation energy absorbed per unit mass of _____ material.
   a) absorbing b) radiating c) scattering d) reflecting

11) Exposure expresses the _____ of an gamma ray beam.
   a) dose b) intensity c) quality d) resolution

12) The isotope of radioactive elements are usually produced
   a) reactor b) cyclotron c) radio tracer d) PHA

13) The SPECT technique uses a _____ to record images at a series of angles around the patient.
   a) rectilinear scanner b) gamma camera
   c) multiscanner d) collimator

14) PET is an imaging modality for obtaining _____ cross sectional images.
   a) invitro b) invivo c) planer d) linear

_____

SLR-TC – 460

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe photo electric effect and compton effect process.
   2) The half life of $^{99m}T_C$ is 6 hours. After how much time will $1/16^{th}$ of radio isotope remains ?
   3) Derive the relationship between the decay constant and the half life.
   4) Describe process of gamma ray spectrometry.
   5) Explain working of scintillation detector with necessary diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) List and explain all types of collimators in detail.
   2) Explain working of thyroid uptake monitoring system and compare it with kidney uptake monitoring system.
   3) Draw and explain working of gamma counting system for invivo measurement.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain back projection technique for image reconstruction of PET scan.
   2) Define and explain internal and external radiation hazards.
   3) Explain various quality control functions of PET or SPECT.
   4) Differentiate between PET and SPECT modality.
   5) Explain working of liquid scintillation system.

Set Q

5. Attempt **any 2** questions : **(6×2=12)**

   1) Describe various biological effects of radiation exposure.

   2) Explain working of RIA systems and mention its any 2 applications.

   3) Describe principle and working of PET system. Also mention various radiotracers used for it.

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SLR-TC – 460

Seat No.	

Set R

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The isotope of radioactive elements are usually produced
a) reactor b) cyclotron c) radio tracer d) PHA

2) The SPECT technique uses a _____ to record images at a series of angles around the patient.
a) rectilinear scanner b) gamma camera
c) multiscanner d) collimator

3) PET is an imaging modality for obtaining _____ cross sectional images.
a) invitro b) invivo c) planer d) linear

4) SPECT cameras detects only _____ that produce a cascaded emission of single photon.
a) Single image b) Slice of images
c) Radio nuclides d) SD image

5) The half life of a radioactive isotope is given by $t_{½}$ = _____
a) $\frac{\lambda}{0.693}$ b) $\frac{0.693}{\lambda}$ c) $\frac{2\times10^5}{\lambda}$ d) $\frac{\lambda}{2\times10^5}$

P.T.O.

6) Gamma particles constitutes _____ radiation that travels at the speed of light.
   a) ultraviolet b) infrared
   c) electromagnetic d) light

7) A scintillator is a _____ substance which purchases minute flashes of light invisible range.
   a) magnetic b) crystalline c) gaseous d) diffused

8) The gamma camera is a stationary imaging device for the
   a) Organ of interest b) Collimation
   c) Resolution d) Organ depth

9) The gamma emission change in nucleon number is
   a) zero b) definate
   c) increase by 1 d) decrease by 1

10) Radioactive decay is a _____ process.
   a) random b) nonspontaneous
   c) regular d) massive

11) A _____ is used to improve the spatial resolution of a gamma camera.
   a) Grids b) Digital camera
   c) Scanner d) Collimator

12) Attenuation describes both absorption and scattering of
   a) resolution b) radiation c) specificity d) dose

13) Absorbed dose is the radiation energy absorbed per unit mass of _____ material.
   a) absorbing b) radiating c) scattering d) reflecting

14) Exposure expresses the _____ of an gamma ray beam.
   a) dose b) intensity c) quality d) resolution

_____

SLR-TC – 460

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe photo electric effect and compton effect process.
   2) The half life of $^{99m}T_C$ is 6 hours. After how much time will $1/16^{th}$ of radio isotope remains ?
   3) Derive the relationship between the decay constant and the half life.
   4) Describe process of gamma ray spectrometry.
   5) Explain working of scintillation detector with necessary diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) List and explain all types of collimators in detail.
   2) Explain working of thyroid uptake monitoring system and compare it with kidney uptake monitoring system.
   3) Draw and explain working of gamma counting system for invivo measurement.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain back projection technique for image reconstruction of PET scan.
   2) Define and explain internal and external radiation hazards.
   3) Explain various quality control functions of PET or SPECT.
   4) Differentiate between PET and SPECT modality.
   5) Explain working of liquid scintillation system.

Set R

5. Attempt **any 2** questions : **(6×2=12)**

   1) Describe various biological effects of radiation exposure.

   2) Explain working of RIA systems and mention its any 2 applications.

   3) Describe principle and working of PET system. Also mention various radiotracers used for it.

———————

Seat No.	

SLR-TC – 460

Set S

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Gamma particles constitutes _____ radiation that travels at the speed of light.
   a) ultraviolet b) infrared
   c) electromagnetic d) light

2) A scintillator is a _____ substance which purchases minute flashes of light invisible range.
   a) magnetic b) crystalline c) gaseous d) diffused

3) The gamma camera is a stationary imaging device for the
   a) Organ of interest b) Collimation
   c) Resolution d) Organ depth

4) The gamma emission change in nucleon number is
   a) zero b) definate
   c) increase by 1 d) decrease by 1

5) Radioactive decay is a _____ process.
   a) random b) nonspontaneous
   c) regular d) massive

P.T.O.

6) A _____ is used to improve the spatial resolution of a gamma camera.
   a) Grids b) Digital camera
   c) Scanner d) Collimator

7) Attenuation describes both absorption and scattering of
   a) resolution b) radiation c) specificity d) dose

8) Absorbed dose is the radiation energy absorbed per unit mass of _____ material.
   a) absorbing b) radiating c) scattering d) reflecting

9) Exposure expresses the _____ of an gamma ray beam.
   a) dose b) intensity c) quality d) resolution

10) The isotope of radioactive elements are usually produced
   a) reactor b) cyclotron c) radio tracer d) PHA

11) The SPECT technique uses a _____ to record images at a series of angles around the patient.
   a) rectilinear scanner b) gamma camera
   c) multiscanner d) collimator

12) PET is an imaging modality for obtaining _____ cross sectional images.
   a) invitro b) invivo c) planer d) linear

13) SPECT cameras detects only _____ that produce a cascaded emission of single photon.
   a) Single image b) Slice of images
   c) Radio nuclides d) SD image

14) The half life of a radioactive isotope is given by $t^{1/2}$ = _____
   a) $\frac{\lambda}{0.693}$ b) $\frac{0.693}{\lambda}$ c) $\frac{2\times10^5}{\lambda}$ d) $\frac{\lambda}{2\times10^5}$

SLR-TC – 460

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
NUCLEAR MEDICINE

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) Describe photo electric effect and compton effect process.
   2) The half life of $^{99m}T_C$ is 6 hours. After how much time will $1/16^{th}$ of radio isotope remains ?
   3) Derive the relationship between the decay constant and the half life.
   4) Describe process of gamma ray spectrometry.
   5) Explain working of scintillation detector with necessary diagram.

3. Attempt **any two** questions : **(6×2=12)**
   1) List and explain all types of collimators in detail.
   2) Explain working of thyroid uptake monitoring system and compare it with kidney uptake monitoring system.
   3) Draw and explain working of gamma counting system for invivo measurement.

SECTION – II

4. Attempt **any 4** questions : **(4×4=16)**
   1) Explain back projection technique for image reconstruction of PET scan.
   2) Define and explain internal and external radiation hazards.
   3) Explain various quality control functions of PET or SPECT.
   4) Differentiate between PET and SPECT modality.
   5) Explain working of liquid scintillation system.

Set S

5. Attempt **any 2** questions : **(6×2=12)**

   1) Describe various biological effects of radiation exposure.

   2) Explain working of RIA systems and mention its any 2 applications.

   3) Describe principle and working of PET system. Also mention various radiotracers used for it.

SLR-TC – 461

Seat No.	

Set **P**

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) PHC stands for

a) Programmable Health Centre b) Primary Hospital Centre

c) Primary Health Centre d) Programmable Hospital Centre

2) Among these not type of network topology

a) Ring b) Bus c) Star d) Hash

3) HMIS fails because of _____

a) Incomplete entering of data

b) Lack of communication

c) Difficult up gradation in hardware and software

d) All of the above

4) Among these which is not type of knowledge in expert system.

a) Declarative knowledge b) Procedural knowledge

c) Heuristic knowledge d) Standard knowledge

P.T.O.

5) _____ is the heart of WEB browser.
   a) HTTP b) WWW c) HTML d) CGI

6) Which is not related to blood bank module.
   a) Inventory b) Donors
   c) Storage d) Performance

7) This step is not involved in the development of HMIS.
   a) Feasibility b) Design
   c) Coding d) Conversion

8) Public grievances and feedback function is considered in _____
   a) Inventory module b) Communication module
   c) General information module d) Administration module

9) Render means _____
   a) Convert a numerical representation of an object into visual representation
   b) Convert visual representation of an object into numerical representation
   c) Both a) and b)
   d) None

10) The best tele-medicine tool available on _____
   a) TV b) Telephone
   c) Mobile d) Internet

11) Auto-analyzers can carry out _____
   a) 20 or more, 150 b) 20 or less, 150
   c) 2, 150 d) 2,15

12) Tele-medicine includes _____
   a) Video conferencing b) Digital image transmission
   c) Both a) and b) d) None

13) CST stands for _____
   a) Cost-Saver Technology b) Client Server Technology
   c) Computer Server Technology d) None

14) Simultaneous viewing of images by many consultants and distant institution in the benefits of _____
   a) ASP b) PACS c) POE d) AI

_____

SLR-TC – 461

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any three** questions : **(3×4=12)**

   1) Explain different applications of medical information.

   2) What is HMIS ? Write their benefits in MI.

   3) Explain in detail the information of operation theater module of HIMS.

   4) Explain the different human resources are available in surgical simulator.

3. Attempt **any two** questions : **(2×8=16)**

   1) List and explain in detail different prospects of medical informatics.

   2) Explain why HIMS fails ? Give the different factors affecting maintenance and development of HIMS.

   3) Write short note on the following :

      i) Bioinformatics

      ii) OPD/Consultant clinic module of HIMS.

SECTION – II

4. Attempt **any three** questions : **(3×4=12)**

   1) What is expert system ? Explain different knowledge representation required in ES ? Explain any one of them.

   2) Explain robotic surgery.

3) What is AI ? Draw and explain each branches of AI.

4) Write advantages and disadvantages of tele-surgery.

5. Attempt **any two** questions : **(2×8=16)**

1) Write a note on :

i) Expectation for CPR

ii) Legal, security and privacy issues in CPR.

2) Write accuracy cautions of 3-D navigation system. Also explain intra-operative imaging for 3-D navigation system.

3) Write and explain different types of data transferred used in telemedicine.

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SLR-TC – 461

Seat No.	

Set Q

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Public grievances and feedback function is considered in _____
   a) Inventory module b) Communication module
   c) General information module d) Administration module

2) Render means _____
   a) Convert a numerical representation of an object into visual representation
   b) Convert visual representation of an object into numerical representation
   c) Both a) and b)
   d) None

3) The best tele-medicine tool available on _____
   a) TV b) Telephone
   c) Mobile d) Internet

4) Auto-analyzers can carry out _____
   a) 20 or more, 150 b) 20 or less, 150
   c) 2, 150 d) 2,15

P.T.O.

5) Tele-medicine includes _____
   a) Video conferencing b) Digital image transmission
   c) Both a) and b) d) None
6) CST stands for _____
   a) Cost-Saver Technology b) Client Server Technology
   c) Computer Server Technology d) None
7) Simultaneous viewing of images by many consultants and distant institution in the benefits of _____
   a) ASP b) PACS c) POE d) AI
8) PHC stands for
   a) Programmable Health Centre b) Primary Hospital Centre
   c) Primary Health Centre d) Programmable Hospital Centre
9) Among these not type of network topology
   a) Ring b) Bus c) Star d) Hash
10) HMIS fails because of _____
   a) Incomplete entering of data
   b) Lack of communication
   c) Difficult up gradation in hardware and software
   d) All of the above
11) Among these which is not type of knowledge in expert system.
   a) Declarative knowledge b) Procedural knowledge
   c) Heuristic knowledge d) Standard knowledge
12) _____ is the heart of WEB browser.
   a) HTTP b) WWW c) HTML d) CGI
13) Which is not related to blood bank module.
   a) Inventory b) Donors
   c) Storage d) Performance
14) This step is not involved in the development of HMIS.
   a) Feasibility b) Design
   c) Coding d) Conversion

SLR-TC – 461

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any three** questions : **(3×4=12)**

   1) Explain different applications of medical information.

   2) What is HMIS ? Write their benefits in MI.

   3) Explain in detail the information of operation theater module of HIMS.

   4) Explain the different human resources are available in surgical simulator.

3. Attempt **any two** questions : **(2×8=16)**

   1) List and explain in detail different prospects of medical informatics.

   2) Explain why HIMS fails ? Give the different factors affecting maintenance and development of HIMS.

   3) Write short note on the following :

      i) Bioinformatics

      ii) OPD/Consultant clinic module of HIMS.

SECTION – II

4. Attempt **any three** questions : **(3×4=12)**

   1) What is expert system ? Explain different knowledge representation required in ES ? Explain any one of them.

   2) Explain robotic surgery.

3) What is AI ? Draw and explain each branches of AI.

4) Write advantages and disadvantages of tele-surgery.

5. Attempt **any two** questions : **(2×8=16)**

1) Write a note on :

i) Expectation for CPR

ii) Legal, security and privacy issues in CPR.

2) Write accuracy cautions of 3-D navigation system. Also explain intra-operative imaging for 3-D navigation system.

3) Write and explain different types of data transferred used in telemedicine.

———————

SLR-TC – 461

Seat No.	

Set **R**

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) _____ is the heart of WEB browser.
a) HTTP b) WWW c) HTML d) CGI

2) Which is not related to blood bank module.
a) Inventory b) Donors
c) Storage d) Performance

3) This step is not involved in the development of HMIS.
a) Feasibility b) Design
c) Coding d) Conversion

4) Public grievances and feedback function is considered in _____
a) Inventory module b) Communication module
c) General information module d) Administration module

5) Render means _____
a) Convert a numerical representation of an object into visual representation
b) Convert visual representation of an object into numerical representation
c) Both a) and b)
d) None

P.T.O.

6) The best tele-medicine tool available on _____
   a) TV b) Telephone
   c) Mobile d) Internet

7) Auto-analyzers can carry out _____
   a) 20 or more, 150 b) 20 or less, 150
   c) 2, 150 d) 2,15

8) Tele-medicine includes _____
   a) Video conferencing b) Digital image transmission
   c) Both a) and b) d) None

9) CST stands for _____
   a) Cost-Saver Technology b) Client Server Technology
   c) Computer Server Technology d) None

10) Simultaneous viewing of images by many consultants and distant institution in the benefits of _____
   a) ASP b) PACS c) POE d) AI

11) PHC stands for
   a) Programmable Health Centre b) Primary Hospital Centre
   c) Primary Health Centre d) Programmable Hospital Centre

12) Among these not type of network topology
   a) Ring b) Bus c) Star d) Hash

13) HMIS fails because of _____
   a) Incomplete entering of data
   b) Lack of communication
   c) Difficult up gradation in hardware and software
   d) All of the above

14) Among these which is not type of knowledge in expert system.
   a) Declarative knowledge b) Procedural knowledge
   c) Heuristic knowledge d) Standard knowledge

_____

SLR-TC – 461

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any three** questions : **(3×4=12)**

   1) Explain different applications of medical information.

   2) What is HMIS ? Write their benefits in MI.

   3) Explain in detail the information of operation theater module of HIMS.

   4) Explain the different human resources are available in surgical simulator.

3. Attempt **any two** questions : **(2×8=16)**

   1) List and explain in detail different prospects of medical informatics.

   2) Explain why HIMS fails ? Give the different factors affecting maintenance and development of HIMS.

   3) Write short note on the following :

      i) Bioinformatics

      ii) OPD/Consultant clinic module of HIMS.

SECTION – II

4. Attempt **any three** questions : **(3×4=12)**

   1) What is expert system ? Explain different knowledge representation required in ES ? Explain any one of them.

   2) Explain robotic surgery.

3) What is AI ? Draw and explain each branches of AI.

4) Write advantages and disadvantages of tele-surgery.

5. Attempt **any two** questions : **(2×8=16)**

1) Write a note on :

i) Expectation for CPR

ii) Legal, security and privacy issues in CPR.

2) Write accuracy cautions of 3-D navigation system. Also explain intra-operative imaging for 3-D navigation system.

3) Write and explain different types of data transferred used in telemedicine.

———————

SLR-TC – 461

Seat No.	

Set S

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The best tele-medicine tool available on _____
   a) TV b) Telephone
   c) Mobile d) Internet

2) Auto-analyzers can carry out _____
   a) 20 or more, 150 b) 20 or less, 150
   c) 2, 150 d) 2,15

3) Tele-medicine includes _____
   a) Video conferencing b) Digital image transmission
   c) Both a) and b) d) None

4) CST stands for _____
   a) Cost-Saver Technology b) Client Server Technology
   c) Computer Server Technology d) None

5) Simultaneous viewing of images by many consultants and distant institution in the benefits of _____
   a) ASP b) PACS c) POE d) AI

P.T.O.

6) PHC stands for

a) Programmable Health Centre b) Primary Hospital Centre

c) Primary Health Centre d) Programmable Hospital Centre

7) Among these not type of network topology

a) Ring b) Bus c) Star d) Hash

8) HMIS fails because of _____

a) Incomplete entering of data

b) Lack of communication

c) Difficult up gradation in hardware and software

d) All of the above

9) Among these which is not type of knowledge in expert system.

a) Declarative knowledge b) Procedural knowledge

c) Heuristic knowledge d) Standard knowledge

10) _____ is the heart of WEB browser.

a) HTTP b) WWW c) HTML d) CGI

11) Which is not related to blood bank module.

a) Inventory b) Donors

c) Storage d) Performance

12) This step is not involved in the development of HMIS.

a) Feasibility b) Design

c) Coding d) Conversion

13) Public grievances and feedback function is considered in _____

a) Inventory module b) Communication module

c) General information module d) Administration module

14) Render means _____

a) Convert a numerical representation of an object into visual representation

b) Convert visual representation of an object into numerical representation

c) Both a) and b)

d) None

_____

SLR-TC – 461

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
MEDICAL INFORMATICS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any three** questions : **(3×4=12)**

   1) Explain different applications of medical information.

   2) What is HMIS ? Write their benefits in MI.

   3) Explain in detail the information of operation theater module of HIMS.

   4) Explain the different human resources are available in surgical simulator.

3. Attempt **any two** questions : **(2×8=16)**

   1) List and explain in detail different prospects of medical informatics.

   2) Explain why HIMS fails ? Give the different factors affecting maintenance and development of HIMS.

   3) Write short note on the following :

      i) Bioinformatics

      ii) OPD/Consultant clinic module of HIMS.

SECTION – II

4. Attempt **any three** questions : **(3×4=12)**

   1) What is expert system ? Explain different knowledge representation required in ES ? Explain any one of them.

   2) Explain robotic surgery.

3) What is AI ? Draw and explain each branches of AI.

4) Write advantages and disadvantages of tele-surgery.

5. Attempt **any two** questions : **(2×8=16)**

1) Write a note on :

i) Expectation for CPR

ii) Legal, security and privacy issues in CPR.

2) Write accuracy cautions of 3-D navigation system. Also explain intra-operative imaging for 3-D navigation system.

3) Write and explain different types of data transferred used in telemedicine.

SLR-TC – 462

Seat No.	

Set **P**

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) In a _____ approximately 4000 v is initially applied to the patient.
   a) Pace maker b) Shortwave diathermy
   c) Ultrasonic diathermy d) Defibrillator

2) Ventricular fibrillation is a serious cardiac emergency resulting from _____ contraction of the heart muscle.
   a) Synchronous b) Asynchronous c) S.A. node d) Pericardium

3) Haemodialysis removes _____ other than harmful wastes.
   a) Protein b) Salt c) Insulin d) Glycogen

4) Faradic current is a sequences of _____with a defined shape and current intensity.
   a) Period b) Pulses c) Cycles d) Waves

5) A condition in which the necessary synchronism is lost is known as
   a) Fibrillation b) Heart block c) Heart attack d) Tachycardia

6) Surgical diathermy machine consists of a _____ power oscillator.
   a) low frequency b) high voltage
   c) high frequency d) medium frequency

7) Ultrasonic generators are constructed on _____ effect.
   a) EMF b) Faraday c) Piezoelectric d) Magnetic

8) The coil type dialyzer consists of a tube made up of the _____ material wound into a coil.
   a) Transparent b) Biocompatiable
   c) Semipermeable membrane d) Hollow fiber

9) Heart block occurs whenever the conduction system fails to transmit the _____ impulses from the atria to the ventricles property.
   a) Signal b) Pulse c) Fibrillation d) Pacing

10) _____ is the clinical state resulting from renal failure.
   a) Uremia b) Chronic renal failure
   c) Kidney failure d) None of the above

11) _____ is the exchange of things dissolved in fluid across the membrane due to difference in amount of solutes.
   a) Drift b) Osmosis c) Ultrafilteration d) Diffusion

12) In _____ coagulation electric arcs intentionally generated between the electrode and tissue.
   a) Spray b) Soft c) Forced d) Spark

13) An external pacemaker may apply upto _____ pulses through 50 cm^2 electrode on the chest.
   a) 80 mA b) 8 A c) 40 mA d) 100 mA

14) The hazards associated with _____ units is burns caused by excess current density at a rate other than at which it is to be present.
   a) Electrosurgery b) Defibrillator
   c) Heart rate meter d) Pacemaker

_____

SLR-TC – 462

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) With the help of neat diagram explain various application techniques of short wave therapy.
   2) Explain various power sources used for pacemakers.
   3) Explain circus motion theory of fibrillation for pacemaker.
   4) Explain working of surgical diathermy analyzer with necessary diagram.
   5) Explain construction and working of infrared and ultraviolet lamps.

3. Attempt **any 2** questions : **(6×2=12)**
   1) Differentiate between internal and external pacemaker. Also explain construction of electrodes used for each of pacemaker.
   2) Draw and explain working of cut and LOAG circuits of ESU.
   3) With the help of circuit diagram explain working of ultrasonic therapy unit.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define and differentiate between atrial and ventricular fibrillation occurrence and how to overcome it.
   2) Explain working of portable type dialysis machine in detail.
   3) List various medical laser types and their medical applications.
   4) Draw and explain working of defibrillator analyzers.
   5) Describe the principle of dialysis machine.

5. Attempt **any 2** questions : **(6×2=12)**
   1) Describe process of working of artificial kidney machine.
   2) Explain with the help of neat circuit diagram of INST mode of defibrillator.
   3) Draw circuit diagram of heart rate variability meter and explain its working also mention its applications.

Set P

SLR-TC – 462

Seat No.	

Set **Q**

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The coil type dialyzer consists of a tube made up of the _____ material wound into a coil.
   a) Transparent b) Biocompatiable
   c) Semipermeable membrane d) Hollow fiber

2) Heart block occurs whenever the conduction system fails to transmit the _____ impulses from the atria to the ventricles property.
   a) Signal b) Pulse c) Fibrillation d) Pacing

3) _____ is the clinical state resulting from renal failure.
   a) Uremia b) Chronic renal failure
   c) Kidney failure d) None of the above

4) _____ is the exchange of things dissolved in fluid across the membrane due to difference in amount of solutes.
   a) Drift b) Osmosis c) Ultrafilteration d) Diffusion

5) In _____ coagulation electric arcs intentionally generated between the electrode and tissue.
   a) Spray b) Soft c) Forced d) Spark

6) An external pacemaker may apply upto _____ pulses through 50 cm^2 electrode on the chest.
   a) 80 mA b) 8 A c) 40 mA d) 100 mA

P.T.O.

7) The hazards associated with _____ units is burns caused by excess current density at a rate other than at which it is to be present.
   a) Electrosurgery b) Defibrillator
   c) Heart rate meter d) Pacemaker

8) In a _____ approximately 4000 v is initially applied to the patient.
   a) Pace maker b) Shortwave diathermy
   c) Ultrasonic diathermy d) Defibrillator

9) Ventricular fibrillation is a serious cardiac emergency resulting from _____ contraction of the heart muscle.
   a) Synchronous b) Asynchronous c) S.A. node d) Pericardium

10) Haemodialysis removes _____ other than harmful wastes.
   a) Protein b) Salt c) Insulin d) Glycogen

11) Faradic current is a sequences of _____with a defined shape and current intensity.
   a) Period b) Pulses c) Cycles d) Waves

12) A condition in which the necessary synchronism is lost is known as
   a) Fibrillation b) Heart block c) Heart attack d) Tachycardia

13) Surgical diathermy machine consists of a _____ power oscillator.
   a) low frequency b) high voltage
   c) high frequency d) medium frequency

14) Ultrasonic generators are constructed on _____ effect.
   a) EMF b) Faraday c) Piezoelectric d) Magnetic

_____

SLR-TC – 462

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) With the help of neat diagram explain various application techniques of short wave therapy.
   2) Explain various power sources used for pacemakers.
   3) Explain circus motion theory of fibrillation for pacemaker.
   4) Explain working of surgical diathermy analyzer with necessary diagram.
   5) Explain construction and working of infrared and ultraviolet lamps.

3. Attempt **any 2** questions : **(6×2=12)**
   1) Differentiate between internal and external pacemaker. Also explain construction of electrodes used for each of pacemaker.
   2) Draw and explain working of cut and LOAG circuits of ESU.
   3) With the help of circuit diagram explain working of ultrasonic therapy unit.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define and differentiate between atrial and ventricular fibrillation occurrence and how to overcome it.
   2) Explain working of portable type dialysis machine in detail.
   3) List various medical laser types and their medical applications.
   4) Draw and explain working of defibrillator analyzers.
   5) Describe the principle of dialysis machine.

5. Attempt **any 2** questions : **(6×2=12)**
   1) Describe process of working of artificial kidney machine.
   2) Explain with the help of neat circuit diagram of INST mode of defibrillator.
   3) Draw circuit diagram of heart rate variability meter and explain its working also mention its applications.

Set Q

Set Q

SLR-TC – 462

Seat No.	

Set **R**

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) A condition in which the necessary synchronism is lost is known as
a) Fibrillation b) Heart block c) Heart attack d) Tachycardia

2) Surgical diathermy machine consists of a _____ power oscillator.
a) low frequency b) high voltage
c) high frequency d) medium frequency

3) Ultrasonic generators are constructed on _____ effect.
a) EMF b) Faraday c) Piezoelectric d) Magnetic

4) The coil type dialyzer consists of a tube made up of the _____ material wound into a coil.
a) Transparent b) Biocompatiable
c) Semipermeable membrane d) Hollow fiber

5) Heart block occurs whenever the conduction system fails to transmit the _____ impulses from the atria to the ventricles property.
a) Signal b) Pulse c) Fibrillation d) Pacing

6) _____ is the clinical state resulting from renal failure.
a) Uremia b) Chronic renal failure
c) Kidney failure d) None of the above

7) _____ is the exchange of things dissolved in fluid across the membrane due to difference in amount of solutes.
a) Drift b) Osmosis c) Ultrafilteration d) Diffusion

P.T.O.

8) In _____ coagulation electric arcs intentionally generated between the electrode and tissue.
   a) Spray b) Soft c) Forced d) Spark

9) An external pacemaker may apply upto _____ pulses through 50 cm^2 electrode on the chest.
   a) 80 mA b) 8 A c) 40 mA d) 100 mA

10) The hazards associated with _____ units is burns caused by excess current density at a rate other than at which it is to be present.
   a) Electrosurgery b) Defibrillator
   c) Heart rate meter d) Pacemaker

11) In a _____ approximately 4000 v is initially applied to the patient.
   a) Pace maker b) Shortwave diathermy
   c) Ultrasonic diathermy d) Defibrillator

12) Ventricular fibrillation is a serious cardiac emergency resulting from _____ contraction of the heart muscle.
   a) Synchronous b) Asynchronous c) S.A. node d) Pericardium

13) Haemodialysis removes _____ other than harmful wastes.
   a) Protein b) Salt c) Insulin d) Glycogen

14) Faradic current is a sequences of _____with a defined shape and current intensity.
   a) Period b) Pulses c) Cycles d) Waves

_____

SLR-TC – 462

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) With the help of neat diagram explain various application techniques of short wave therapy.
   2) Explain various power sources used for pacemakers.
   3) Explain circus motion theory of fibrillation for pacemaker.
   4) Explain working of surgical diathermy analyzer with necessary diagram.
   5) Explain construction and working of infrared and ultraviolet lamps.

3. Attempt **any 2** questions : **(6×2=12)**
   1) Differentiate between internal and external pacemaker. Also explain construction of electrodes used for each of pacemaker.
   2) Draw and explain working of cut and LOAG circuits of ESU.
   3) With the help of circuit diagram explain working of ultrasonic therapy unit.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define and differentiate between atrial and ventricular fibrillation occurrence and how to overcome it.
   2) Explain working of portable type dialysis machine in detail.
   3) List various medical laser types and their medical applications.
   4) Draw and explain working of defibrillator analyzers.
   5) Describe the principle of dialysis machine.

5. Attempt **any 2** questions : **(6×2=12)**
   1) Describe process of working of artificial kidney machine.
   2) Explain with the help of neat circuit diagram of INST mode of defibrillator.
   3) Draw circuit diagram of heart rate variability meter and explain its working also mention its applications.

Set R

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Seat No.	

Set **S**

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) _____ is the clinical state resulting from renal failure.
   a) Uremia b) Chronic renal failure
   c) Kidney failure d) None of the above

2) _____ is the exchange of things dissolved in fluid across the membrane due to difference in amount of solutes.
   a) Drift b) Osmosis c) Ultrafilteration d) Diffusion

3) In _____ coagulation electric arcs intentionally generated between the electrode and tissue.
   a) Spray b) Soft c) Forced d) Spark

4) An external pacemaker may apply upto _____ pulses through 50 cm^2 electrode on the chest.
   a) 80 mA b) 8 A c) 40 mA d) 100 mA

5) The hazards associated with _____ units is burns caused by excess current density at a rate other than at which it is to be present.
   a) Electrosurgery b) Defibrillator
   c) Heart rate meter d) Pacemaker

6) In a _____ approximately 4000 v is initially applied to the patient.
   a) Pace maker b) Shortwave diathermy
   c) Ultrasonic diathermy d) Defibrillator

7) Ventricular fibrillation is a serious cardiac emergency resulting from _____ contraction of the heart muscle.
   a) Synchronous b) Asynchronous c) S.A. node d) Pericardium

8) Haemodialysis removes _____ other than harmful wastes.
   a) Protein b) Salt c) Insulin d) Glycogen

9) Faradic current is a sequences of _____with a defined shape and current intensity.
   a) Period b) Pulses c) Cycles d) Waves

10) A condition in which the necessary synchronism is lost is known as
   a) Fibrillation b) Heart block c) Heart attack d) Tachycardia

11) Surgical diathermy machine consists of a _____ power oscillator.
   a) low frequency b) high voltage
   c) high frequency d) medium frequency

12) Ultrasonic generators are constructed on _____ effect.
   a) EMF b) Faraday c) Piezoelectric d) Magnetic

13) The coil type dialyzer consists of a tube made up of the _____ material wound into a coil.
   a) Transparent b) Biocompatiable
   c) Semipermeable membrane d) Hollow fiber

14) Heart block occurs whenever the conduction system fails to transmit the _____ impulses from the atria to the ventricles property.
   a) Signal b) Pulse c) Fibrillation d) Pacing

_____

SLR-TC – 462

Seat No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018
BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   1) With the help of neat diagram explain various application techniques of short wave therapy.
   2) Explain various power sources used for pacemakers.
   3) Explain circus motion theory of fibrillation for pacemaker.
   4) Explain working of surgical diathermy analyzer with necessary diagram.
   5) Explain construction and working of infrared and ultraviolet lamps.

3. Attempt **any 2** questions : **(6×2=12)**
   1) Differentiate between internal and external pacemaker. Also explain construction of electrodes used for each of pacemaker.
   2) Draw and explain working of cut and LOAG circuits of ESU.
   3) With the help of circuit diagram explain working of ultrasonic therapy unit.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   1) Define and differentiate between atrial and ventricular fibrillation occurrence and how to overcome it.
   2) Explain working of portable type dialysis machine in detail.
   3) List various medical laser types and their medical applications.
   4) Draw and explain working of defibrillator analyzers.
   5) Describe the principle of dialysis machine.

5. Attempt **any 2** questions : **(6×2=12)**
   1) Describe process of working of artificial kidney machine.
   2) Explain with the help of neat circuit diagram of INST mode of defibrillator.
   3) Draw circuit diagram of heart rate variability meter and explain its working also mention its applications.

Set S

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Seat No.	

Set P

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Digital image with intensity level in range of [0, L – 1] is called
a) k_{map} b) histogram c) graph d) truth table

2) Image can be blurred using
a) low pass filtering b) contouring
c) erosion d) high pass filter

3) In M × N, M is a number of
a) intensity levels b) colors c) rows d) columns

4) A continuous image is digitized at _____ points.
a) random b) vertex c) contour d) sampling

5) _____ is the tool used in tasks such as zooming, shrinking, rotating etc.
a) Sampling b) Interpolation c) Filters d) None of above

6) The difference in intensity between the highest and the lowest intensity levels in an image is _____
a) Noise b) Saturation c) Contrast d) Brightness

P.T.O.

7) Enhancement of differences between images is based on the principle of
   a) Additivity b) Homogeneity
   c) Subtraction d) None of the above

8) Image processing approaches operating directly on pixels of input image work directly in
   a) transform domain b) spatial domain
   c) inverse transformation d) none of the above

9) Median filters belong to _____ category of filter.
   a) linear spatial b) frequency domain
   c) order static d) sharpening

10) In _____ type of slicing, highlighting a specific range of gray levels in an image often is desired.
   a) gray level slicing b) bit plane slicing
   c) contrast stretching d) byte level slicing

11) _____ of the following occurs in unsharp masking.
   a) Blurring original image
   b) Adding mask to original image
   c) Subtracting blurred image from original
   d) All above

12) _____ is a second order derivative operator.
   a) Histogram b) Laplacian c) Gaussian d) None of above

13) What is accepting or rejecting certain frequency components called as
   a) filtering b) eliminating c) slicing d) none of above

14) _____ is a process of moving a filter mask over the image and computing the sum of products at each location.
   a) Convolution b) Correlation
   c) Linear and spatial filtering d) Nonlinear spatial filtering

_____

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Seat No.	

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain with a block diagram the components of an image processing system.

   2) What is the transform matrix for N = 4 to discrete cosine transform ?

   3) Describe concept of region oriented segmentation with an example.

   4) Explain any 2 properties with expression of 2D DFT.

   5) Explain following terms with diagram :

      a) Neighbours of pixel

      b) Connectivity

      c) Adjacency

      d) Path.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Explain homomorphic filters with the help of a neat diagram.

   2) Apply low pass filter and high pass filter on the given image and show the intermediate results.

4	3	7
1	6	3
1	4	6

   3) What is histogram ? State the difference between histogram equalization and histogram matching.

Set P

SECTION – II

4. Attempt **any four** questions: **(4×4=16)**
   1) Differentiate between lossy and lossless compression.
   2) Explain following morphological operation :
      i) Dilation
      ii) Erosion
      iii) Opening
      iv) Closing.
   3) Explain the basic concept of Harr transform and their applications.
   4) Explain the concept process and application of run length encoding.
   5) Discuss transform coding and predictive coding with their application.

5. Attempt **any 2** questions : **(6×2=12)**
   1) What is Hadomard transform ? Calculate Hadomard transform of following image.

4	1	3	2
1	5	2	3
3	2	1	2
2	3	2	1

   2) Explain discrete cosine transform and compute DCT for the given image.

f(x, y) =

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

   3) Write a short note on :
      a) Boundary extraction methods and application.
      b) Skeletonization and its application.
      c) Hit and miss transform.

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Seat No.	

Set Q

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Image processing approaches operating directly on pixels of input image work directly in
   a) transform domain b) spatial domain
   c) inverse transformation d) none of the above

2) Median filters belong to _____ category of filter.
   a) linear spatial b) frequency domain
   c) order static d) sharpening

3) In _____ type of slicing, highlighting a specific range of gray levels in an image often is desired.
   a) gray level slicing b) bit plane slicing
   c) contrast stretching d) byte level slicing

4) _____ of the following occurs in unsharp masking.
   a) Blurring original image
   b) Adding mask to original image
   c) Subtracting blurred image from original
   d) All above

5) _____ is a second order derivative operator.
   a) Histogram b) Laplacian c) Gaussian d) None of above

6) What is accepting or rejecting certain frequency components called as
   a) filtering b) eliminating c) slicing d) none of above

7) _____ is a process of moving a filter mask over the image and computing the sum of products at each location.
   a) Convolution b) Correlation
   c) Linear and spatial filtering d) Nonlinear spatial filtering

8) Digital image with intensity level in range of [0, L – 1] is called
   a) k_{map} b) histogram c) graph d) truth table

9) Image can be blurred using
   a) low pass filtering b) contouring
   c) erosion d) high pass filter

10) In M × N, M is a number of
   a) intensity levels b) colors c) rows d) columns

11) A continuous image is digitized at _____ points.
   a) random b) vertex c) contour d) sampling

12) _____ is the tool used in tasks such as zooming, shrinking, rotating etc.
   a) Sampling b) Interpolation c) Filters d) None of above

13) The difference in intensity between the highest and the lowest intensity levels in an image is _____
   a) Noise b) Saturation c) Contrast d) Brightness

14) Enhancement of differences between images is based on the principle of
   a) Additivity b) Homogeneity
   c) Subtraction d) None of the above

_____

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Seat No.	

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain with a block diagram the components of an image processing system.

   2) What is the transform matrix for N = 4 to discrete cosine transform ?

   3) Describe concept of region oriented segmentation with an example.

   4) Explain any 2 properties with expression of 2D DFT.

   5) Explain following terms with diagram :

      a) Neighbours of pixel

      b) Connectivity

      c) Adjacency

      d) Path.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Explain homomorphic filters with the help of a neat diagram.

   2) Apply low pass filter and high pass filter on the given image and show the intermediate results.

4	3	7
1	6	3
1	4	6

   3) What is histogram ? State the difference between histogram equalization and histogram matching.

Set Q

SECTION – II

4. Attempt **any four** questions: **(4×4=16)**
   1) Differentiate between lossy and lossless compression.
   2) Explain following morphological operation :
      i) Dilation
      ii) Erosion
      iii) Opening
      iv) Closing.
   3) Explain the basic concept of Harr transform and their applications.
   4) Explain the concept process and application of run length encoding.
   5) Discuss transform coding and predictive coding with their application.

5. Attempt **any 2** questions : **(6×2=12)**
   1) What is Hadomard transform ? Calculate Hadomard transform of following image.

4	1	3	2
1	5	2	3
3	2	1	2
2	3	2	1

   2) Explain discrete cosine transform and compute DCT for the given image.

f(x, y) =

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

   3) Write a short note on :
      a) Boundary extraction methods and application.
      b) Skeletonization and its application.
      c) Hit and miss transform.

Set Q

SLR-TC – 463

Seat No.	

Set R

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ is the tool used in tasks such as zooming, shrinking, rotating etc.
a) Sampling b) Interpolation c) Filters d) None of above

2) The difference in intensity between the highest and the lowest intensity levels in an image is _____
a) Noise b) Saturation c) Contrast d) Brightness

3) Enhancement of differences between images is based on the principle of
a) Additivity b) Homogeneity
c) Subtraction d) None of the above

4) Image processing approaches operating directly on pixels of input image work directly in
a) transform domain b) spatial domain
c) inverse transformation d) none of the above

5) Median filters belong to _____ category of filter.
a) linear spatial b) frequency domain
c) order static d) sharpening

6) In _____ type of slicing, highlighting a specific range of gray levels in an image often is desired.
   a) gray level slicing b) bit plane slicing
   c) contrast stretching d) byte level slicing

7) _____ of the following occurs in unsharp masking.
   a) Blurring original image
   b) Adding mask to original image
   c) Subtracting blurred image from original
   d) All above

8) _____ is a second order derivative operator.
   a) Histogram b) Laplacian c) Gaussian d) None of above

9) What is accepting or rejecting certain frequency components called as
   a) filtering b) eliminating c) slicing d) none of above

10) _____ is a process of moving a filter mask over the image and computing the sum of products at each location.
   a) Convolution b) Correlation
   c) Linear and spatial filtering d) Nonlinear spatial filtering

11) Digital image with intensity level in range of [0, L – 1] is called
   a) k_{map} b) histogram c) graph d) truth table

12) Image can be blurred using
   a) low pass filtering b) contouring
   c) erosion d) high pass filter

13) In M × N, M is a number of
   a) intensity levels b) colors c) rows d) columns

14) A continuous image is digitized at _____ points.
   a) random b) vertex c) contour d) sampling

_____

SLR-TC – 463

Seat No.	

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain with a block diagram the components of an image processing system.

   2) What is the transform matrix for N = 4 to discrete cosine transform ?

   3) Describe concept of region oriented segmentation with an example.

   4) Explain any 2 properties with expression of 2D DFT.

   5) Explain following terms with diagram :

      a) Neighbours of pixel

      b) Connectivity

      c) Adjacency

      d) Path.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Explain homomorphic filters with the help of a neat diagram.

   2) Apply low pass filter and high pass filter on the given image and show the intermediate results.

4	3	7
1	6	3
1	4	6

   3) What is histogram ? State the difference between histogram equalization and histogram matching.

Set R

SECTION – II

4. Attempt **any four** questions: **(4×4=16)**

   1) Differentiate between lossy and lossless compression.

   2) Explain following morphological operation :

      i) Dilation

      ii) Erosion

      iii) Opening

      iv) Closing.

   3) Explain the basic concept of Harr transform and their applications.

   4) Explain the concept process and application of run length encoding.

   5) Discuss transform coding and predictive coding with their application.

5. Attempt **any 2** questions : **(6×2=12)**

   1) What is Hadomard transform ? Calculate Hadomard transform of following image.

4	1	3	2
1	5	2	3
3	2	1	2
2	3	2	1

   2) Explain discrete cosine transform and compute DCT for the given image.

f(x, y) =

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

   3) Write a short note on :

      a) Boundary extraction methods and application.

      b) Skeletonization and its application.

      c) Hit and miss transform.

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Seat No.	

Set S

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In _____ type of slicing, highlighting a specific range of gray levels in an image often is desired.

a) gray level slicing b) bit plane slicing
c) contrast stretching d) byte level slicing

2) _____ of the following occurs in unsharp masking.

a) Blurring original image
b) Adding mask to original image
c) Subtracting blurred image from original
d) All above

3) _____ is a second order derivative operator.

a) Histogram b) Laplacian c) Gaussian d) None of above

4) What is accepting or rejecting certain frequency components called as

a) filtering b) eliminating c) slicing d) none of above

P.T.O.

5) _____ is a process of moving a filter mask over the image and computing the sum of products at each location.
   a) Convolution b) Correlation
   c) Linear and spatial filtering d) Nonlinear spatial filtering

6) Digital image with intensity level in range of [0, L – 1] is called
   a) k_{map} b) histogram c) graph d) truth table

7) Image can be blurred using
   a) low pass filtering b) contouring
   c) erosion d) high pass filter

8) In M × N, M is a number of
   a) intensity levels b) colors c) rows d) columns

9) A continuous image is digitized at _____ points.
   a) random b) vertex c) contour d) sampling

10) _____ is the tool used in tasks such as zooming, shrinking, rotating etc.
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11) The difference in intensity between the highest and the lowest intensity levels in an image is _____
   a) Noise b) Saturation c) Contrast d) Brightness

12) Enhancement of differences between images is based on the principle of
   a) Additivity b) Homogeneity
   c) Subtraction d) None of the above

13) Image processing approaches operating directly on pixels of input image work directly in
   a) transform domain b) spatial domain
   c) inverse transformation d) none of the above

14) Median filters belong to _____ category of filter.
   a) linear spatial b) frequency domain
   c) order static d) sharpening

_____

SLR-TC – 463

Seat No.	

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018
PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Explain with a block diagram the components of an image processing system.

   2) What is the transform matrix for N = 4 to discrete cosine transform ?

   3) Describe concept of region oriented segmentation with an example.

   4) Explain any 2 properties with expression of 2D DFT.

   5) Explain following terms with diagram :

      a) Neighbours of pixel

      b) Connectivity

      c) Adjacency

      d) Path.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Explain homomorphic filters with the help of a neat diagram.

   2) Apply low pass filter and high pass filter on the given image and show the intermediate results.

4	3	7
1	6	3
1	4	6

   3) What is histogram ? State the difference between histogram equalization and histogram matching.

Set S

SECTION – II

4. Attempt **any four** questions: **(4×4=16)**

   1) Differentiate between lossy and lossless compression.

   2) Explain following morphological operation :

      i) Dilation

      ii) Erosion

      iii) Opening

      iv) Closing.

   3) Explain the basic concept of Harr transform and their applications.

   4) Explain the concept process and application of run length encoding.

   5) Discuss transform coding and predictive coding with their application.

5. Attempt **any 2** questions : **(6×2=12)**

   1) What is Hadomard transform ? Calculate Hadomard transform of following image.

4	1	3	2
1	5	2	3
3	2	1	2
2	3	2	1

   2) Explain discrete cosine transform and compute DCT for the given image.

f(x, y) =

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

   3) Write a short note on :

      a) Boundary extraction methods and application.

      b) Skeletonization and its application.

      c) Hit and miss transform.

SLR-TC – 464

Seat No.	

Set **P**

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Organization effectiveness comprises all except
   a) Productivity power
   b) Adaptability to change
   c) Flexibility in structure and strategy
   d) Rigidity in structure

2) Concept behind changing the role of hospital from indoor care includes all except
   a) Rising cost of hospital care
   b) Increase of hospital bed
   c) Shortage of hospital bed
   d) Economic importance

3) Which of the following is a basic of classification of hospital ?
   a) Hospital practice
   b) Length of stay of patient
   c) Educational purpose
   d) Medical staff

4) Which of the following is a function of emergency care ?
   a) First aid
   b) Dietary management
   c) Immediate resuscitation
   d) Hospitalization

5) Which of the following facility is not needed in emergency department ?
   a) Examination room
   b) Treatment room
   c) Observation area
   d) Cafeteria

6) What are the primary objectives of human resource management in hospital services ?
   a) To motivate the employees
   b) To create good organization relation
   c) Co-ordination
   d) Contribution of services

7) The _____ section performs quantitative and qualitative analysis of body fluids, secretions and substances found in tissues.
   a) Hematology b) Biochemistry
   c) Blood bank d) Histopathology

8) Gas sterilization is done using
   a) Ethylene oxide b) Ethylene dioxide
   c) Methylene oxide d) Steam

9) _____ is the skeleton of organization.
   a) Organizational function b) Organization structure
   c) Decentralization d) Co-ordination

10) Which is the nurse-patient ratio in general wards within a hospital ?
   a) 2 : 10 b) 2 : 6 c) 1 : 5 d) 1 : 3

11) The total process of collecting, handling, packing, storage, transportation and final treatment of waste is called
   a) Sewage b) Disposal of hospital waste
   c) Dustbin d) None

12) Which of the following should be included in efficient material management in hospital ?
   a) A list materials b) Procurement
   c) Taking an inventory d) All of the above

13) Which of the following is not a material used in hospital and community ?
   a) Drugs and medicine b) Transport
   c) Supplies d) Equipment and instrument

14) Which of the service is not part of preventive care ?
   a) Sentinel surveillance
   b) Nutritional counselling
   c) Non communicable disease prevention
   d) OPD prevention

SLR-TC – 464

Seat No.	

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   1) Write a short note on leadership and motivation.
   2) Write a short note on CIS and HIS.
   3) Explain about the planning of individual department.
   4) Explain about the role of H. R. Management.
   5) Explain about the planning of administrative service.
   6) Write a note on Time Management.

3. Answer **any two** questions : **(2×8=16)**
   1) Briefly explain about principles of management.
   2) Explain about the need and responsibilities and function of CEO in hospital.
   3) Explain about the classification of Hospitals based on various factors and associated norms.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**
   1) Explain about the basics of Hospital Budgeting.
   2) Explain the role of civil engineer.
   3) Explain about the quality assurance.
   4) Explain about the dietary (food services).
   5) Explain about the risk management.
   6) Explain the importance of pharmacy department in hospital.

5. Answer **any two** questions : **(2×8=16)**
   1) Explain about the economics and financial management in Hospital.
   2) Explain briefly about ICU departments and explain its categorization.
   3) Explain the role of electrical and mechanical engineering departments.

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Set P

Set P

SLR-TC – 464

Seat No.	

Set Q

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Gas sterilization is done using
a) Ethylene oxide b) Ethylene dioxide
c) Methylene oxide d) Steam

2) _____ is the skeleton of organization.
a) Organizational function b) Organization structure
c) Decentralization d) Co-ordination

3) Which is the nurse-patient ratio in general wards within a hospital ?
a) 2 : 10 b) 2 : 6 c) 1 : 5 d) 1 : 3

4) The total process of collecting, handling, packing, storage, transportation and final treatment of waste is called
a) Sewage b) Disposal of hospital waste
c) Dustbin d) None

5) Which of the following should be included in efficient material management in hospital ?
a) A list materials b) Procurement
c) Taking an inventory d) All of the above

6) Which of the following is not a material used in hospital and community ?
a) Drugs and medicine b) Transport
c) Supplies d) Equipment and instrument

P.T.O.

7) Which of the service is not part of preventive care ?
   a) Sentinel surveillance
   b) Nutritional counselling
   c) Non communicable disease prevention
   d) OPD prevention

8) Organization effectiveness comprises all except
   a) Productivity power
   b) Adaptability to change
   c) Flexibility in structure and strategy
   d) Rigidity in structure

9) Concept behind changing the role of hospital from indoor care includes all except
   a) Rising cost of hospital care
   b) Increase of hospital bed
   c) Shortage of hospital bed
   d) Economic importance

10) Which of the following is a basic of classification of hospital ?
   a) Hospital practice
   b) Length of stay of patient
   c) Educational purpose
   d) Medical staff

11) Which of the following is a function of emergency care ?
   a) First aid
   b) Dietary management
   c) Immediate resuscitation
   d) Hospitalization

12) Which of the following facility is not needed in emergency department ?
   a) Examination room
   b) Treatment room
   c) Observation area
   d) Cafeteria

13) What are the primary objectives of human resource management in hospital services ?
   a) To motivate the employees
   b) To create good organization relation
   c) Co-ordination
   d) Contribution of services

14) The _____ section performs quantitative and qualitative analysis of body fluids, secretions and substances found in tissues.
   a) Hematology
   b) Biochemistry
   c) Blood bank
   d) Histopathology

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SLR-TC – 464

Seat No.	

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   1) Write a short note on leadership and motivation.
   2) Write a short note on CIS and HIS.
   3) Explain about the planning of individual department.
   4) Explain about the role of H. R. Management.
   5) Explain about the planning of administrative service.
   6) Write a note on Time Management.

3. Answer **any two** questions : **(2×8=16)**
   1) Briefly explain about principles of management.
   2) Explain about the need and responsibilities and function of CEO in hospital.
   3) Explain about the classification of Hospitals based on various factors and associated norms.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**
   1) Explain about the basics of Hospital Budgeting.
   2) Explain the role of civil engineer.
   3) Explain about the quality assurance.
   4) Explain about the dietary (food services).
   5) Explain about the risk management.
   6) Explain the importance of pharmacy department in hospital.

5. Answer **any two** questions : **(2×8=16)**
   1) Explain about the economics and financial management in Hospital.
   2) Explain briefly about ICU departments and explain its categorization.
   3) Explain the role of electrical and mechanical engineering departments.

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Set Q

Set Q

SLR-TC – 464

Seat No.	

Set R

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Which of the following facility is not needed in emergency department ?
   a) Examination room b) Treatment room
   c) Observation area d) Cafeteria

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   a) To motivate the employees
   b) To create good organization relation
   c) Co-ordination
   d) Contribution of services

3) The _____ section performs quantitative and qualitative analysis of body fluids, secretions and substances found in tissues.
   a) Hematology b) Biochemistry
   c) Blood bank d) Histopathology

4) Gas sterilization is done using
   a) Ethylene oxide b) Ethylene dioxide
   c) Methylene oxide d) Steam

5) _____ is the skeleton of organization.
   a) Organizational function b) Organization structure
   c) Decentralization d) Co-ordination

P.T.O.

6) Which is the nurse-patient ratio in general wards within a hospital ?
a) 2 : 10 b) 2 : 6 c) 1 : 5 d) 1 : 3

7) The total process of collecting, handling, packing, storage, transportation and final treatment of waste is called
a) Sewage b) Disposal of hospital waste
c) Dustbin d) None

8) Which of the following should be included in efficient material management in hospital ?
a) A list materials b) Procurement
c) Taking an inventory d) All of the above

9) Which of the following is not a material used in hospital and community ?
a) Drugs and medicine b) Transport
c) Supplies d) Equipment and instrument

10) Which of the service is not part of preventive care ?
a) Sentinel surveillance
b) Nutritional counselling
c) Non communicable disease prevention
d) OPD prevention

11) Organization effectiveness comprises all except
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12) Concept behind changing the role of hospital from indoor care includes all except
a) Rising cost of hospital care b) Increase of hospital bed
c) Shortage of hospital bed d) Economic importance

13) Which of the following is a basic of classification of hospital ?
a) Hospital practice b) Length of stay of patient
c) Educational purpose d) Medical staff

14) Which of the following is a function of emergency care ?
a) First aid b) Dietary management
c) Immediate resuscitation d) Hospitalization

SLR-TC – 464

Seat No.	

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   1) Write a short note on leadership and motivation.
   2) Write a short note on CIS and HIS.
   3) Explain about the planning of individual department.
   4) Explain about the role of H. R. Management.
   5) Explain about the planning of administrative service.
   6) Write a note on Time Management.

3. Answer **any two** questions : **(2×8=16)**
   1) Briefly explain about principles of management.
   2) Explain about the need and responsibilities and function of CEO in hospital.
   3) Explain about the classification of Hospitals based on various factors and associated norms.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**
   1) Explain about the basics of Hospital Budgeting.
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   3) Explain about the quality assurance.
   4) Explain about the dietary (food services).
   5) Explain about the risk management.
   6) Explain the importance of pharmacy department in hospital.

5. Answer **any two** questions : **(2×8=16)**
   1) Explain about the economics and financial management in Hospital.
   2) Explain briefly about ICU departments and explain its categorization.
   3) Explain the role of electrical and mechanical engineering departments.

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Set R

Set R

SLR-TC – 464

Seat No.	

Set **S**

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Which is the nurse-patient ratio in general wards within a hospital ?
a) 2 : 10 b) 2 : 6 c) 1 : 5 d) 1 : 3

2) The total process of collecting, handling, packing, storage, transportation and final treatment of waste is called
a) Sewage b) Disposal of hospital waste
c) Dustbin d) None

3) Which of the following should be included in efficient material management in hospital ?
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   c) Blood bank
   d) Histopathology

13) Gas sterilization is done using
   a) Ethylene oxide
   b) Ethylene dioxide
   c) Methylene oxide
   d) Steam

14) _____ is the skeleton of organization.
   a) Organizational function
   b) Organization structure
   c) Decentralization
   d) Co-ordination

SLR-TC – 464

Seat No.	

B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018
HOSPITAL MANAGEMENT

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   1) Write a short note on leadership and motivation.
   2) Write a short note on CIS and HIS.
   3) Explain about the planning of individual department.
   4) Explain about the role of H. R. Management.
   5) Explain about the planning of administrative service.
   6) Write a note on Time Management.

3. Answer **any two** questions : **(2×8=16)**
   1) Briefly explain about principles of management.
   2) Explain about the need and responsibilities and function of CEO in hospital.
   3) Explain about the classification of Hospitals based on various factors and associated norms.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**
   1) Explain about the basics of Hospital Budgeting.
   2) Explain the role of civil engineer.
   3) Explain about the quality assurance.
   4) Explain about the dietary (food services).
   5) Explain about the risk management.
   6) Explain the importance of pharmacy department in hospital.

5. Answer **any two** questions : **(2×8=16)**
   1) Explain about the economics and financial management in Hospital.
   2) Explain briefly about ICU departments and explain its categorization.
   3) Explain the role of electrical and mechanical engineering departments.

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Set S

Set S

SLR-TC – 465

Seat No.	

Set P

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The 'filter' in filtered back projection refers to
   a) Bowtie filter between the beam and patient
   b) Conversion between attenuation and Hounsfield units
   c) Conversion between fan-beam and parallel geometry
   d) Fix for the blurring inherent to back projection

2) Dose in CT can be reduced by which of the following parameter adjustments (assuming other factors constant) ?
   a) Increasing kV b) Increasing mAs
   c) Increasing Pitch d) Increasing scan length

3) Increasing the number of rows in MDCT principally allows for
   a) Greater spatial resolution b) Greater temporal resolution
   c) Greater axial coverage d) Greater contrast resolution

4) If a signal is undersampled, aliasing will result and cause
   a) Amplitude misregistration b) Frequency misregistration
   c) Phase misregistration d) Noise

5) In MR imaging, matrix size determines
   a) Field of view b) Aliasing
   c) Resolution d) Bandwidth

P.T.O.

6) Protons in different molecules differ in all of the following ways except
   a) T1 b) T2
   c) Gyromagnetic ratio d) Precession frequency

7) The mathematical technique that involves the estimation of an unknown value from values on either side of its known as
   a) Filtering b) Interpolation
   c) Convolution d) Summation

8) The CT number (Hounsfield unit) of fat depends on
   a) kV b) mAs
   c) Reconstruction algorithm d) Nothing-it is constant

9) Which of the following is not commonly used as a CT scintillation detector ?
   a) Ceramic rare earth b) silver halide
   c) Bismuth germinate d) cadmium tungstate

10) _____ of the following it the primary interaction between x-ray photons and tissue during CT examination.
   a) Bremsstrahlung effect b) Characteristic effect
   c) Compton effect d) Coherent scatter

11) Ring artifacts on the CT image are associated with _____ of the following tube detector relationship.
   a) Rotate-Nutate b) Rotate-Stationary
   c) Rotate-Rotated d) Translate-Rotate

12) _____ of the following reconstruction methods is used by most modern CT scanners.
   a) Back projection b) Iterative method
   c) Fourier transforms d) Filtered back projection

13) Larmor frequency depends upon the
   a) individual nucleus b) magnetic flux density
   c) both a and b d) energetic flux unit

14) The process by which electrons are produced at the cathode of a CT x-ray tube is known as
   a) rectification b) anode heel effect
   c) thermionic emission d) isotropic emission

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SLR-TC – 465

Seat No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Differentiate between plain CT and spiral CT and explain different types of CT artifacts.

   2) Describe various detectors used in CT scanning.

   3) Draw and explain second and third generations of CT scan.

   4) State clinical applications of MR spectroscopy.

   5) Define CT number and state its significance.

3. Attempt **any two** : **(2×6=12)**

   1) Explain working of chemical shift imaging and water suppression techniques used in MRS.

   2) Describe different types of pulse sequences used in MRS.

   3) List various image reconstruction techniques used in CT imaging and explain Fourier reconstruction techniques with one example.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain the working principle of magnetic resonance imaging.

   2) Define angiography and explain the role of CT in imaging process.

3) Explain clinical applications of MRI imaging.

4) Describe working of Electrical Impedance Tomography in short.

5) Describe various superconducting magnets used in MRI.

5. Attempt **any two** : **(2×6=12)**

1) Explain phase and frequency encoding used in MRI with necessary diagrams.

2) Define hybrid imaging and its applications. Also explain PET/CT hybrid imaging technique in detail.

3) Describe the construction and detectors used in MDCET along with angiography technique.

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Seat No.	

SLR-TC – 465

Set Q

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The CT number (Hounsfield unit) of fat depends on
   a) kV b) mAs
   c) Reconstruction algorithm d) Nothing-it is constant

2) Which of the following is not commonly used as a CT scintillation detector ?
   a) Ceramic rare earth b) silver halide
   c) Bismuth germinate d) cadmium tungstate

3) _____ of the following it the primary interaction between x-ray photons and tissue during CT examination.
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4) Ring artifacts on the CT image are associated with _____ of the following tube detector relationship.
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   c) Rotate-Rotated d) Translate-Rotate

5) _____ of the following reconstruction methods is used by most modern CT scanners.
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   c) Fourier transforms d) Filtered back projection

6) Larmor frequency depends upon the
   a) individual nucleus
   b) magnetic flux density
   c) both a and b
   d) energetic flux unit

7) The process by which electrons are produced at the cathode of a CT x-ray tube is known as
   a) rectification
   b) anode heel effect
   c) thermionic emission
   d) isotropic emission

8) The 'filter' in filtered back projection refers to
   a) Bowtie filter between the beam and patient
   b) Conversion between attenuation and Hounsfield units
   c) Conversion between fan-beam and parallel geometry
   d) Fix for the blurring inherent to back projection

9) Dose in CT can be reduced by which of the following parameter adjustments (assuming other factors constant) ?
   a) Increasing kV
   b) Increasing mAs
   c) Increasing Pitch
   d) Increasing scan length

10) Increasing the number of rows in MDCT principally allows for
   a) Greater spatial resolution
   b) Greater temporal resolution
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   d) Greater contrast resolution

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   a) Amplitude misregistration
   b) Frequency misregistration
   c) Phase misregistration
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12) In MR imaging, matrix size determines
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   a) Filtering
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   c) Convolution
   d) Summation

SLR-TC – 465

Seat No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Differentiate between plain CT and spiral CT and explain different types of CT artifacts.

   2) Describe various detectors used in CT scanning.

   3) Draw and explain second and third generations of CT scan.

   4) State clinical applications of MR spectroscopy.

   5) Define CT number and state its significance.

3. Attempt **any two** : **(2×6=12)**

   1) Explain working of chemical shift imaging and water suppression techniques used in MRS.

   2) Describe different types of pulse sequences used in MRS.

   3) List various image reconstruction techniques used in CT imaging and explain Fourier reconstruction techniques with one example.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain the working principle of magnetic resonance imaging.

   2) Define angiography and explain the role of CT in imaging process.

Set Q

3) Explain clinical applications of MRI imaging.

4) Describe working of Electrical Impedance Tomography in short.

5) Describe various superconducting magnets used in MRI.

5. Attempt **any two** : **(2×6=12)**

1) Explain phase and frequency encoding used in MRI with necessary diagrams.

2) Define hybrid imaging and its applications. Also explain PET/CT hybrid imaging technique in detail.

3) Describe the construction and detectors used in MDCET along with angiography technique.

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SLR-TC – 465

Seat No.	

Set R

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In MR imaging, matrix size determines
   a) Field of view b) Aliasing
   c) Resolution d) Bandwidth

2) Protons in different molecules differ in all of the following ways except
   a) T1 b) T2
   c) Gyromagnetic ratio d) Precession frequency

3) The mathematical technique that involves the estimation of an unknown value from values on either side of its known as
   a) Filtering b) Interpolation
   c) Convolution d) Summation

4) The CT number (Hounsfield unit) of fat depends on
   a) kV b) mAs
   c) Reconstruction algorithm d) Nothing-it is constant

5) Which of the following is not commonly used as a CT scintillation detector ?
   a) Ceramic rare earth b) silver halide
   c) Bismuth germinate d) cadmium tungstate

6) _____ of the following it the primary interaction between x-ray photons and tissue during CT examination.
   a) Bremsstrahlung effect b) Characteristic effect
   c) Compton effect d) Coherent scatter

P.T.O.

7) Ring artifacts on the CT image are associated with _____ of the following tube detector relationship.
   a) Rotate-Nutate
   b) Rotate-Stationary
   c) Rotate-Rotated
   d) Translate-Rotate

8) _____ of the following reconstruction methods is used by most modern CT scanners.
   a) Back projection
   b) Iterative method
   c) Fourier transforms
   d) Filtered back projection

9) Larmor frequency depends upon the
   a) individual nucleus
   b) magnetic flux density
   c) both a and b
   d) energetic flux unit

10) The process by which electrons are produced at the cathode of a CT x-ray tube is known as
   a) rectification
   b) anode heel effect
   c) thermionic emission
   d) isotropic emission

11) The 'filter' in filtered back projection refers to
   a) Bowtie filter between the beam and patient
   b) Conversion between attenuation and Hounsfield units
   c) Conversion between fan-beam and parallel geometry
   d) Fix for the blurring inherent to back projection

12) Dose in CT can be reduced by which of the following parameter adjustments (assuming other factors constant) ?
   a) Increasing kV
   b) Increasing mAs
   c) Increasing Pitch
   d) Increasing scan length

13) Increasing the number of rows in MDCT principally allows for
   a) Greater spatial resolution
   b) Greater temporal resolution
   c) Greater axial coverage
   d) Greater contrast resolution

14) If a signal is undersampled, aliasing will result and cause
   a) Amplitude misregistration
   b) Frequency misregistration
   c) Phase misregistration
   d) Noise

_____

SLR-TC – 465

Seat No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Differentiate between plain CT and spiral CT and explain different types of CT artifacts.

   2) Describe various detectors used in CT scanning.

   3) Draw and explain second and third generations of CT scan.

   4) State clinical applications of MR spectroscopy.

   5) Define CT number and state its significance.

3. Attempt **any two** : **(2×6=12)**

   1) Explain working of chemical shift imaging and water suppression techniques used in MRS.

   2) Describe different types of pulse sequences used in MRS.

   3) List various image reconstruction techniques used in CT imaging and explain Fourier reconstruction techniques with one example.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain the working principle of magnetic resonance imaging.

   2) Define angiography and explain the role of CT in imaging process.

Set R

3) Explain clinical applications of MRI imaging.

4) Describe working of Electrical Impedance Tomography in short.

5) Describe various superconducting magnets used in MRI.

5. Attempt **any two** : **(2×6=12)**

1) Explain phase and frequency encoding used in MRI with necessary diagrams.

2) Define hybrid imaging and its applications. Also explain PET/CT hybrid imaging technique in detail.

3) Describe the construction and detectors used in MDCET along with angiography technique.

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SLR-TC – 465

Seat No.	

Set S

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ of the following it the primary interaction between x-ray photons and tissue during CT examination.
   a) Bremsstrahlung effect b) Characteristic effect
   c) Compton effect d) Coherent scatter

2) Ring artifacts on the CT image are associated with _____ of the following tube detector relationship.
   a) Rotate-Nutate b) Rotate-Stationary
   c) Rotate-Rotated d) Translate-Rotate

3) _____ of the following reconstruction methods is used by most modern CT scanners.
   a) Back projection b) Iterative method
   c) Fourier transforms d) Filtered back projection

4) Larmor frequency depends upon the
   a) individual nucleus b) magnetic flux density
   c) both a and b d) energetic flux unit

5) The process by which electrons are produced at the cathode of a CT x-ray tube is known as
   a) rectification b) anode heel effect
   c) thermionic emission d) isotropic emission

P.T.O.

6) The 'filter' in filtered back projection refers to
   a) Bowtie filter between the beam and patient
   b) Conversion between attenuation and Hounsfield units
   c) Conversion between fan-beam and parallel geometry
   d) Fix for the blurring inherent to back projection

7) Dose in CT can be reduced by which of the following parameter adjustments (assuming other factors constant) ?
   a) Increasing kV
   b) Increasing mAs
   c) Increasing Pitch
   d) Increasing scan length

8) Increasing the number of rows in MDCT principally allows for
   a) Greater spatial resolution
   b) Greater temporal resolution
   c) Greater axial coverage
   d) Greater contrast resolution

9) If a signal is undersampled, aliasing will result and cause
   a) Amplitude misregistration
   b) Frequency misregistration
   c) Phase misregistration
   d) Noise

10) In MR imaging, matrix size determines
   a) Field of view
   b) Aliasing
   c) Resolution
   d) Bandwidth

11) Protons in different molecules differ in all of the following ways except
   a) T1
   b) T2
   c) Gyromagnetic ratio
   d) Precession frequency

12) The mathematical technique that involves the estimation of an unknown value from values on either side of its known as
   a) Filtering
   b) Interpolation
   c) Convolution
   d) Summation

13) The CT number (Hounsfield unit) of fat depends on
   a) kV
   b) mAs
   c) Reconstruction algorithm
   d) Nothing-it is constant

14) Which of the following is not commonly used as a CT scintillation detector ?
   a) Ceramic rare earth
   b) silver halide
   c) Bismuth germinate
   d) cadmium tungstate

SLR-TC – 465

Seat No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018
MEDICAL IMAGING – II

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) Differentiate between plain CT and spiral CT and explain different types of CT artifacts.

   2) Describe various detectors used in CT scanning.

   3) Draw and explain second and third generations of CT scan.

   4) State clinical applications of MR spectroscopy.

   5) Define CT number and state its significance.

3. Attempt **any two** : **(2×6=12)**

   1) Explain working of chemical shift imaging and water suppression techniques used in MRS.

   2) Describe different types of pulse sequences used in MRS.

   3) List various image reconstruction techniques used in CT imaging and explain Fourier reconstruction techniques with one example.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) Explain the working principle of magnetic resonance imaging.

   2) Define angiography and explain the role of CT in imaging process.

3) Explain clinical applications of MRI imaging.

4) Describe working of Electrical Impedance Tomography in short.

5) Describe various superconducting magnets used in MRI.

5. Attempt **any two** : **(2×6=12)**

1) Explain phase and frequency encoding used in MRI with necessary diagrams.

2) Define hybrid imaging and its applications. Also explain PET/CT hybrid imaging technique in detail.

3) Describe the construction and detectors used in MDCET along with angiography technique.

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SLR-TC – 466

Seat No.	

Set **P**

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) Control panel of diagnostic X-ray equipment operating at _____ KVP.
   a) 225 b) 325 c) 25 d) 125

2) The entrance door of the ICU room should be _____ feet for easy movement of beds.
   a) 4 b) 14 c) 0.4 d) 40

3) Glass electrodes are suitable for measurement in the range of pH
   a) 0 – 110 b) 11 – 100 c) 0 – 11 d) None

4) The following is not a classification of maintenance.
   a) Corrective maintenance b) Timely maintenance
   c) Scheduled maintenance d) Preventive maintenance

5) With increase in preventive maintenance cost, breakdown maintenance cost
   a) Increases b) Decreases
   c) Remain same d) Any of the above

6) pH stand for Power of
   a) H^+ ion concentration b) OH^- ion concentration
   c) He^+ ion concentration d) Power of Hypnotisis

7) On which of the following mass spectrometer separations ?
   a) Mass b) Charge
   c) Molecular weight d) Mass to charge ratio

8) X-ray beam falls are not less than _____ thick brick or equivalent.
   a) 35 cm b) 23 cm c) 20 cm d) 11 cm

9) In ICU, room should be at least _____ with free movable space around the bed.
   a) 120 sq. Feet b) 120 feet
   c) 120 sq. meter d) 20 sq. feet

10) Clear free area inside operation room should be around
   a) 480 – 600 sq. feet b) 480 – 600 feet
   c) 500 – 640 sq. feet d) 500 – 640 sq. feet

11) _____ are routinely used for the measurement of lithium, sodium and potassium in body.
   a) Spectrophotometer b) Colorimeter
   c) Flame photometer d) Centrifuge

12) Equipment failure takes place due to various reason are classified as
   a) Improper choice of components b) Production deficiencies
   c) Careless storage and transport d) All of the above

13) _____ is defined as the ability of an item to perform a required function without failure, under stated condition for a specified period of time.
   a) Reliability b) Maintenance
   c) Trouble shooting d) Servicing

14) Spirometer is used to measure
   a) Lung capacity b) Lung passage
   c) Lung weight d) Air

_____

SLR-TC – 466

Seat No.	

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** the questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

II. Answer **any four** : **(4×4=16)**

1) What are troubleshooting techniques explain with respective
i) Functional area approach ii) Split half method.
2) Explain in detail benefits and scopes of medical equipment's insurance.
3) Explain maintenance policy regarding to biomedical instrumentation.
4) Explain the installation procedure of defibrillator.
5) Enumerate steps for fault finding.

III. Answer **any two** : **(2×6=12)**

1) Give the pre installation techniques of the X – ray machine.
2) Discuss importance and role of biomedical engg. in the hospital.
3) List and explain precautions of equipment's before installation.

SECTION – II

IV. Answer **any four** : **(4×4=16)**

1) Write a short note on ISO, NABH certification.
2) Differentiate between CMC and AMC in detail.
3) Draw fault finding tree of short wave diathermy.
4) Explain in detail performance test and calibration of auto analyzer.
5) Explain the rules of installations that has been applied while installing radiology equipment in radiology department.

V. Answer **any two** : **(2×6=12)**

1) Explain installation and maintenance procedure for
   i) Colorimeter ii) X-ray machine.
2) Explain troubleshooting and fault analytical equipment's.
3) Draw the curve for max. Permissible leakage current through the heart vs frequency and explain it.

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Seat No.	

SLR-TC – 466

Set Q

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) X-ray beam falls are not less than _____ thick brick or equivalent.
   a) 35 cm b) 23 cm c) 20 cm d) 11 cm

2) In ICU, room should be at least _____ with free movable space around the bed.
   a) 120 sq. Feet b) 120 feet
   c) 120 sq. meter d) 20 sq. feet

3) Clear free area inside operation room should be around
   a) 480 – 600 sq. feet b) 480 – 600 feet
   c) 500 – 640 sq. feet d) 500 – 640 sq. feet

4) _____ are routinely used for the measurement of lithium, sodium and potassium in body.
   a) Spectrophotometer b) Colorimeter
   c) Flame photometer d) Centrifuge

5) Equipment failure takes place due to various reason are classified as
   a) Improper choice of components b) Production deficiencies
   c) Careless storage and transport d) All of the above

6) _____ is defined as the ability of an item to perform a required function without failure, under stated condition for a specified period of time.
   a) Reliability b) Maintenance
   c) Trouble shooting d) Servicing

7) Spirometer is used to measure
   a) Lung capacity b) Lung passage
   c) Lung weight d) Air

8) Control panel of diagnostic X-ray equipment operating at _____ KVP.
   a) 225 b) 325 c) 25 d) 125

9) The entrance door of the ICU room should be _____ feet for easy movement of beds.
   a) 4 b) 14 c) 0.4 d) 40

10) Glass electrodes are suitable for measurement in the range of pH
   a) 0 – 110 b) 11 – 100 c) 0 – 11 d) None

11) The following is not a classification of maintenance.
   a) Corrective maintenance b) Timely maintenance
   c) Scheduled maintenance d) Preventive maintenance

12) With increase in preventive maintenance cost, breakdown maintenance cost
   a) Increases b) Decreases
   c) Remain same d) Any of the above

13) pH stand for Power of
   a) H^+ ion concentration b) OH^- ion concentration
   c) He^+ ion concentration d) Power of Hypnotisis

14) On which of the following mass spectrometer separations ?
   a) Mass b) Charge
   c) Molecular weight d) Mass to charge ratio

_____

SLR-TC – 466

Seat No.	

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** the questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

II. Answer **any four** : **(4×4=16)**

1) What are troubleshooting techniques explain with respective
i) Functional area approach ii) Split half method.
2) Explain in detail benefits and scopes of medical equipment's insurance.
3) Explain maintenance policy regarding to biomedical instrumentation.
4) Explain the installation procedure of defibrillator.
5) Enumerate steps for fault finding.

III. Answer **any two** : **(2×6=12)**

1) Give the pre installation techniques of the X – ray machine.
2) Discuss importance and role of biomedical engg. in the hospital.
3) List and explain precautions of equipment's before installation.

SECTION – II

IV. Answer **any four** : **(4×4=16)**

1) Write a short note on ISO, NABH certification.
2) Differentiate between CMC and AMC in detail.
3) Draw fault finding tree of short wave diathermy.
4) Explain in detail performance test and calibration of auto analyzer.
5) Explain the rules of installations that has been applied while installing radiology equipment in radiology department.

Set Q

V. Answer **any two** : **(2×6=12)**

1) Explain installation and maintenance procedure for
   i) Colorimeter ii) X-ray machine.
2) Explain troubleshooting and fault analytical equipment's.
3) Draw the curve for max. Permissible leakage current through the heart vs frequency and explain it.

———————

Seat No.	

SLR-TC – 466

Set R

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) With increase in preventive maintenance cost, breakdown maintenance cost
   a) Increases b) Decreases
   c) Remain same d) Any of the above

2) pH stand for Power of
   a) H^+ ion concentration b) OH^- ion concentration
   c) He^+ ion concentration d) Power of Hypnotisis

3) On which of the following mass spectrometer separations ?
   a) Mass b) Charge
   c) Molecular weight d) Mass to charge ratio

4) X-ray beam falls are not less than _____ thick brick or equivalent.
   a) 35 cm b) 23 cm c) 20 cm d) 11 cm

5) In ICU, room should be at least _____ with free movable space around the bed.
   a) 120 sq. Feet b) 120 feet
   c) 120 sq. meter d) 20 sq. feet

6) Clear free area inside operation room should be around
   a) 480 – 600 sq. feet b) 480 – 600 feet
   c) 500 – 640 sq. feet d) 500 – 640 sq. feet

7) _____ are routinely used for the measurement of lithium, sodium and potassium in body.
   a) Spectrophotometer b) Colorimeter
   c) Flame photometer d) Centrifuge

8) Equipment failure takes place due to various reason are classified as
   a) Improper choice of components b) Production deficiencies
   c) Careless storage and transport d) All of the above

9) _____ is defined as the ability of an item to perform a required function without failure, under stated condition for a specified period of time.
   a) Reliability b) Maintenance
   c) Trouble shooting d) Servicing

10) Spirometer is used to measure
   a) Lung capacity b) Lung passage
   c) Lung weight d) Air

11) Control panel of diagnostic X-ray equipment operating at _____ KVP.
   a) 225 b) 325 c) 25 d) 125

12) The entrance door of the ICU room should be _____ feet for easy movement of beds.
   a) 4 b) 14 c) 0.4 d) 40

13) Glass electrodes are suitable for measurement in the range of pH
   a) 0 – 110 b) 11 – 100 c) 0 – 11 d) None

14) The following is not a classification of maintenance.
   a) Corrective maintenance b) Timely maintenance
   c) Scheduled maintenance d) Preventive maintenance

_____

SLR-TC – 466

Seat No.	

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** the questions are **compulsory**.*
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SECTION – I

II. Answer **any four** : **(4×4=16)**

1) What are troubleshooting techniques explain with respective
i) Functional area approach ii) Split half method.
2) Explain in detail benefits and scopes of medical equipment's insurance.
3) Explain maintenance policy regarding to biomedical instrumentation.
4) Explain the installation procedure of defibrillator.
5) Enumerate steps for fault finding.

III. Answer **any two** : **(2×6=12)**

1) Give the pre installation techniques of the X – ray machine.
2) Discuss importance and role of biomedical engg. in the hospital.
3) List and explain precautions of equipment's before installation.

SECTION – II

IV. Answer **any four** : **(4×4=16)**

1) Write a short note on ISO, NABH certification.
2) Differentiate between CMC and AMC in detail.
3) Draw fault finding tree of short wave diathermy.
4) Explain in detail performance test and calibration of auto analyzer.
5) Explain the rules of installations that has been applied while installing radiology equipment in radiology department.

Set R

V. Answer **any two** : **(2×6=12)**

1) Explain installation and maintenance procedure for
   i) Colorimeter ii) X-ray machine.
2) Explain troubleshooting and fault analytical equipment's.
3) Draw the curve for max. Permissible leakage current through the heart vs frequency and explain it.

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Seat No.	

SLR-TC – 466

Set S

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) Clear free area inside operation room should be around
   a) 480 – 600 sq. feet b) 480 – 600 feet
   c) 500 – 640 sq. feet d) 500 – 640 sq. feet

2) _____ are routinely used for the measurement of lithium, sodium and potassium in body.
   a) Spectrophotometer b) Colorimeter
   c) Flame photometer d) Centrifuge

3) Equipment failure takes place due to various reason are classified as
   a) Improper choice of components b) Production deficiencies
   c) Careless storage and transport d) All of the above

4) _____ is defined as the ability of an item to perform a required function without failure, under stated condition for a specified period of time.
   a) Reliability b) Maintenance
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5) Spirometer is used to measure
   a) Lung capacity b) Lung passage
   c) Lung weight d) Air

6) Control panel of diagnostic X-ray equipment operating at _____ KVP.
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7) The entrance door of the ICU room should be _____ feet for easy movement of beds.
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8) Glass electrodes are suitable for measurement in the range of pH
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   a) 35 cm b) 23 cm c) 20 cm d) 11 cm

14) In ICU, room should be at least _____ with free movable space around the bed.
   a) 120 sq. Feet b) 120 feet
   c) 120 sq. meter d) 20 sq. feet

_____

SLR-TC – 466

Seat No.	

B.E. (Part II) (Biomedical Engineering) (New CGPA) Examination, 2018
INSTALLATION, MAINTENANCE AND SERVICING

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** the questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

II. Answer **any four** : **(4×4=16)**

1) What are troubleshooting techniques explain with respective
i) Functional area approach ii) Split half method.
2) Explain in detail benefits and scopes of medical equipment's insurance.
3) Explain maintenance policy regarding to biomedical instrumentation.
4) Explain the installation procedure of defibrillator.
5) Enumerate steps for fault finding.

III. Answer **any two** : **(2×6=12)**

1) Give the pre installation techniques of the X – ray machine.
2) Discuss importance and role of biomedical engg. in the hospital.
3) List and explain precautions of equipment's before installation.

SECTION – II

IV. Answer **any four** : **(4×4=16)**

1) Write a short note on ISO, NABH certification.
2) Differentiate between CMC and AMC in detail.
3) Draw fault finding tree of short wave diathermy.
4) Explain in detail performance test and calibration of auto analyzer.
5) Explain the rules of installations that has been applied while installing radiology equipment in radiology department.

Set S

V. Answer **any two** : **(2×6=12)**

1) Explain installation and maintenance procedure for
   i) Colorimeter ii) X-ray machine.
2) Explain troubleshooting and fault analytical equipment's.
3) Draw the curve for max. Permissible leakage current through the heart vs frequency and explain it.

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SLR-TC – 467

Seat No.	

Set P

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ technology is used for micro array manufacturing.
   a) photolithography b) inkjetting
   c) contact printing d) all above

2) Microbiosensors are based on _____
   a) ions effect
   b) ion sensitive field effect transistor
   c) pieroelectric effect
   d) magnetic effect

3) Microarrays are also known as _____
   a) bio chips b) DNA chips c) gene chips d) all of them

4) One of the application of Bulk micromachining is _____ sensor.
   a) SAW sensor b) Resonant c) Pressure d) Temperature

5) _____ is a material removal method.
   a) surface micromachining b) LIGA
   c) micro stereo lithography d) none of above

6) Combination of _____ is used to form sharp points.
   a) dry and isotropic wet etching
   b) dry and an isotropic wet etching.
   c) a) and b)
   d) none of above

7) Focused ion beam milling is _____ process.
   a) an isotropic
   b) wet isotropic
   c) electrochemical
   d) X-ray lithography

8) Most microproducts available today are _____
   a) microactuators
   b) microsensors
   c) pumps
   d) microoptics

9) _____ can be measured by MEMS.
   a) relative humidity
   b) Barometric pressure
   c) aviation
   d) all above

10) The advantages of microneedles used in drug delivery is _____
   a) painters
   b) does'nt reach to nerve
   c) eliminates vibration of the hand
   d) both a) and b)

11) MEMS devices are within the range _____
   a) 1 pm – 1nm
   b) 1 nm – 1 μm
   c) 1 μm – 1mm
   d) 1mm – 1 cm

12) X-ray lithography is a process used in electronic industry to selectively remove parts of _____
   a) thick film
   b) thin film
   c) resistive layer
   d) conductive layer

13) Chemical deposition technique include chemical _____ deposition in which stream of source gas reacts on substrate to grow.
   a) reaction
   b) vapour
   c) gas
   d) liquid

14) The most common material for micromachining is _____
   a) silicon
   b) germenium
   c) copper
   d) silicon oxide

_____

SLR-TC – 467

Seat No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Give properties and applications of poly silicon and silicon dioxide.

   2) Define and differentiate between surface and bulk micromachining.

   3) Describe levels of MEMS packaging.

   4) Discuss with a neat diagram RIE technique.

   5) Describe process of micro contact printing in detail.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Define PVD and discuss two types in detail.

   2) Discuss with neat diagrams the process steps of photolithography.

   3) Write a short note on :

      a) LIGA process steps

      b) APCVD.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Classify micropumps and explain any two types in detail.

   2) Describe the concept of drug delivery vehicles.

   3) Discuss various flow techniques used in μ-TAS.

   4) Describe construction and working of Amperometric biosensor.

   5) Explain scaling in fluid mechanics and electricity.

Set P

5. Attempt **any two** questions : **(6×2=12)**

   1) Classify biosensor based on detection techniques. Discuss any one type in detail. Explain immobilization technique is short.

   2) Discuss fabrication of any one type of microneedle in detail.

   3) Write a short note on :

      a) Various microsurgical tools

      b) PCR and genetic screening.

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Seat No.	

SLR-TC – 467

Set Q

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Most microproducts available today are _____
   a) microactuators b) microsensors
   c) pumps d) microoptics

2) _____ can be measured by MEMS.
   a) relative humidity b) Barometric pressure
   c) aviation d) all above

3) The advantages of microneedles used in drug delivery is _____
   a) painters
   b) does'nt reach to nerve
   c) eliminates vibration of the hand
   d) both a) and b)

4) MEMS devices are within the range _____
   a) 1 pm – 1nm b) 1 nm – 1 μm
   c) 1 μm – 1mm d) 1mm – 1 cm

P.T.O.

5) X-ray lithography is a process used in electronic industry to selectively remove parts of _____
   a) thick film b) thin film
   c) resistive layer d) conductive layer

6) Chemical deposition technique include chemical _____ deposition in which stream of source gas reacts on substrate to grow.
   a) reaction b) vapour c) gas d) liquid

7) The most common material for micromachining is _____
   a) silicon b) germenium c) copper d) silicon oxide

8) _____ technology is used for micro array manufacturing.
   a) photolithography b) inkjetting
   c) contact printing d) all above

9) Microbiosensors are based on _____
   a) ions effect
   b) ion sensitive field effect transistor
   c) pieroelectric effect
   d) magnetic effect

10) Microarrays are also known as _____
   a) bio chips b) DNA chips c) gene chips d) all of them

11) One of the application of Bulk micromachining is _____ sensor.
   a) SAW sensor b) Resonant c) Pressure d) Temperature

12) _____ is a material removal method.
   a) surface micromachining b) LIGA
   c) micro stereo lithography d) none of above

13) Combination of _____ is used to form sharp points.
   a) dry and isotropic wet etching b) dry and an isotropic wet etching.
   c) a) and b) d) none of above

14) Focused ion beam milling is _____ process.
   a) an isotropic b) wet isotropic
   c) electrochemical d) X-ray lithography

_____

SLR-TC – 467

Seat No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Give properties and applications of poly silicon and silicon dioxide.

   2) Define and differentiate between surface and bulk micromachining.

   3) Describe levels of MEMS packaging.

   4) Discuss with a neat diagram RIE technique.

   5) Describe process of micro contact printing in detail.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Define PVD and discuss two types in detail.

   2) Discuss with neat diagrams the process steps of photolithography.

   3) Write a short note on :

      a) LIGA process steps

      b) APCVD.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Classify micropumps and explain any two types in detail.

   2) Describe the concept of drug delivery vehicles.

   3) Discuss various flow techniques used in μ-TAS.

   4) Describe construction and working of Amperometric biosensor.

   5) Explain scaling in fluid mechanics and electricity.

Set Q

5. Attempt **any two** questions : **(6×2=12)**

   1) Classify biosensor based on detection techniques. Discuss any one type in detail. Explain immobilization technique is short.

   2) Discuss fabrication of any one type of microneedle in detail.

   3) Write a short note on :

      a) Various microsurgical tools

      b) PCR and genetic screening.

_____

Seat No.	

SLR-TC – 467

Set R

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ is a material removal method.
   a) surface micromachining b) LIGA
   c) micro stereo lithography d) none of above

2) Combination of _____ is used to form sharp points.
   a) dry and isotropic wet etching b) dry and an isotropic wet etching.
   c) a) and b) d) none of above

3) Focused ion beam milling is _____ process.
   a) an isotropic b) wet isotropic
   c) electrochemical d) X-ray lithography

4) Most microproducts available today are _____
   a) microactuators b) microsensors
   c) pumps d) microoptics

5) _____ can be measured by MEMS.
   a) relative humidity b) Barometric pressure
   c) aviation d) all above

6) The advantages of microneedles used in drug delivery is _____
   a) painters
   b) does'nt reach to nerve
   c) eliminates vibration of the hand
   d) both a) and b)

7) MEMS devices are within the range _____
   a) 1 pm – 1nm
   b) 1 nm – 1 μm
   c) 1 μm – 1mm
   d) 1mm – 1 cm

8) X-ray lithography is a process used in electronic industry to selectively remove parts of _____
   a) thick film
   b) thin film
   c) resistive layer
   d) conductive layer

9) Chemical deposition technique include chemical _____ deposition in which stream of source gas reacts on substrate to grow.
   a) reaction
   b) vapour
   c) gas
   d) liquid

10) The most common material for micromachining is _____
   a) silicon
   b) germenium
   c) copper
   d) silicon oxide

11) _____ technology is used for micro array manufacturing.
   a) photolithography
   b) inkjetting
   c) contact printing
   d) all above

12) Microbiosensors are based on _____
   a) ions effect
   b) ion sensitive field effect transistor
   c) pieroelectric effect
   d) magnetic effect

13) Microarrays are also known as _____
   a) bio chips
   b) DNA chips
   c) gene chips
   d) all of them

14) One of the application of Bulk micromachining is _____ sensor.
   a) SAW sensor
   b) Resonant
   c) Pressure
   d) Temperature

_____

SLR-TC – 467

Seat No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Give properties and applications of poly silicon and silicon dioxide.

   2) Define and differentiate between surface and bulk micromachining.

   3) Describe levels of MEMS packaging.

   4) Discuss with a neat diagram RIE technique.

   5) Describe process of micro contact printing in detail.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Define PVD and discuss two types in detail.

   2) Discuss with neat diagrams the process steps of photolithography.

   3) Write a short note on :

      a) LIGA process steps

      b) APCVD.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Classify micropumps and explain any two types in detail.

   2) Describe the concept of drug delivery vehicles.

   3) Discuss various flow techniques used in μ-TAS.

   4) Describe construction and working of Amperometric biosensor.

   5) Explain scaling in fluid mechanics and electricity.

Set R

5. Attempt **any two** questions : **(6×2=12)**

   1) Classify biosensor based on detection techniques. Discuss any one type in detail. Explain immobilization technique is short.

   2) Discuss fabrication of any one type of microneedle in detail.

   3) Write a short note on :

      a) Various microsurgical tools

      b) PCR and genetic screening.

———————

Seat No.	

SLR-TC – 467

Set S

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The advantages of microneedles used in drug delivery is _____
   a) painters
   b) does'nt reach to nerve
   c) eliminates vibration of the hand
   d) both a) and b)

2) MEMS devices are within the range _____
   a) 1 pm – 1nm b) 1 nm – 1 μm
   c) 1 μm – 1mm d) 1mm – 1 cm

3) X-ray lithography is a process used in electronic industry to selectively remove parts of _____
   a) thick film b) thin film
   c) resistive layer d) conductive layer

4) Chemical deposition technique include chemical _____ deposition in which stream of source gas reacts on substrate to grow.
   a) reaction b) vapour c) gas d) liquid

5) The most common material for micromachining is _____
   a) silicon b) germenium c) copper d) silicon oxide

6) _____ technology is used for micro array manufacturing.
   a) photolithography b) inkjetting
   c) contact printing d) all above

7) Microbiosensors are based on _____
   a) ions effect
   b) ion sensitive field effect transistor
   c) pieroelectric effect
   d) magnetic effect

8) Microarrays are also known as _____
   a) bio chips b) DNA chips c) gene chips d) all of them

9) One of the application of Bulk micromachining is _____ sensor.
   a) SAW sensor b) Resonant c) Pressure d) Temperature

10) _____ is a material removal method.
   a) surface micromachining b) LIGA
   c) micro stereo lithography d) none of above

11) Combination of _____ is used to form sharp points.
   a) dry and isotropic wet etching b) dry and an isotropic wet etching.
   c) a) and b) d) none of above

12) Focused ion beam milling is _____ process.
   a) an isotropic b) wet isotropic
   c) electrochemical d) X-ray lithography

13) Most microproducts available today are _____
   a) microactuators b) microsensors
   c) pumps d) microoptics

14) _____ can be measured by MEMS.
   a) relative humidity b) Barometric pressure
   c) aviation d) all above

_____

SLR-TC – 467

Seat No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018
BIOMEDICAL MICROSYSTEM

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**

   1) Give properties and applications of poly silicon and silicon dioxide.

   2) Define and differentiate between surface and bulk micromachining.

   3) Describe levels of MEMS packaging.

   4) Discuss with a neat diagram RIE technique.

   5) Describe process of micro contact printing in detail.

3. Attempt **any 2** questions : **(6×2=12)**

   1) Define PVD and discuss two types in detail.

   2) Discuss with neat diagrams the process steps of photolithography.

   3) Write a short note on :

      a) LIGA process steps

      b) APCVD.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**

   1) Classify micropumps and explain any two types in detail.

   2) Describe the concept of drug delivery vehicles.

   3) Discuss various flow techniques used in μ-TAS.

   4) Describe construction and working of Amperometric biosensor.

   5) Explain scaling in fluid mechanics and electricity.

Set S

5. Attempt **any two** questions : **(6×2=12)**

   1) Classify biosensor based on detection techniques. Discuss any one type in detail. Explain immobilization technique is short.

   2) Discuss fabrication of any one type of microneedle in detail.

   3) Write a short note on :

      a) Various microsurgical tools

      b) PCR and genetic screening.

———————

SLR-TC – 468

Seat No.	

Set P

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018
TISSUE ENGINEERING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Tissue assembled in vitro may have _____ metabolic requirements than their in vitro counterparts.
   a) Equal b) Zero
   c) Different d) None of these

2) Which of the following is a extracellular matrix proteins ?
   a) Vitronection b) Laminin
   c) Collagen d) All above

3) _____ surfaces can be used to control the initial interface between two cell types in co-culture system.
   a) Nanopatterns b) Micropatterns
   c) Bit patterns d) Both a) and b)

4) Shear rate is expressed in
   a) cm/s/cm b) s^{-1}
   c) Both a) and b) d) None

5) Erythropoeitin production is related oxygen delivery to the renal interstinal cell
   a) Directly b) Equally
   c) Zero d) Inversely

6) The _____ was the first organ to be successfully transplanted from a donor individual to an Autologous recipient patient.
   a) Heart b) Brain
   c) Kidney d) None

7) Cartilage tissue engg. include
   a) Only in vivo b) Only in vitro
   c) Both a) and b) d) None

8) In adults stem cells are found in _____ only at very low concentration but the Concentration _____ dramatically after stem cell mobilization.
   a) Cord blood, Decreases b) Cord blood, Increases
   c) Peripheral blood, Increases d) Peripheral blood, Decreases

9) _____ are the responsible for the synthesis of many GAGS and for the deposition and organization of collagen.
   a) Adipocytes b) Stem cells
   c) Fibroblast d) All above

10) Chondrocyte is a
   a) Kidney cell b) Blood cell
   c) Liver cell d) Cartilage cell

11) Nerve is formed through collection of
   a) Neurons b) Nerve fibers
   c) Spinal cord d) Blood vessels

12) Mature cells are continuously produced from
   a) Stem cells b) Stromal cells
   c) Progenitor cells d) None

13) When skeletal muscles shortens in response to stimulation there is
   a) A decrease in the width of the I band
   b) A decrease in the width of the A band
   c) A increase in the width of the H zone
   d) Both b) and c)

14) Normal human kidney form _____ of filtrate every minute.
   a) 200 ml b) 100 ml
   c) 10 ml d) 500 ml

_____

SLR-TC – 468

Seat No.	

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018
TISSUE ENGINEERING

Day and Date : Tuesday, 22-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** : **(4×4=16)**
   1) Explain the reconstruction of connective tissues.
   2) Explain in detail adult stem cell.
   3) Explain metabolic requirement for cell using graphical representation.
   4) Explain gene therapy tissue engg. in vascular biology.
   5) State advantages and disadvantages of in-vitro and in-vivo tissue engineering.

3. Answer **any two** : **(2×6=12)**
   1) Explain different bioreactor design in tissue engineering.
   2) Explain methodologies and devices used for in-vitro experiments for study of shear stress.
   3) Explain tissue composition and types of stromal cells.

SECTION – II

4. Answer **any four** : **(4×4=16)**
   1) Explain function and organization of hematopoietic system.
   2) Explain in-vivo cartilage repair.
   3) Explain tubule reabsorption for kidney function.
   4) Explain the history of cell culture development.
   5) Explain basic background study of liver in tissue engineering.

5. Answer **any two** : **(2×6=12)**
   1) Explain tissue reconstruction of nervous system with neat diagram.
   2) Explain injury and repair of skeletal muscle.
   3) What is bone marrow transplantation ? Explain autologous and allogenic bone marrow transplantation.

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Set P

Set P

SLR-TC – 468

Seat No.	

Set **Q**

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018
TISSUE ENGINEERING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In adults stem cells are found in _____ only at very low concentration but the Concentration _____ dramatically after stem cell mobilization.
   a) Cord blood, Decreases b) Cord blood, Increases
   c) Peripheral blood, Increases d) Peripheral blood, Decreases

2) _____ are the responsible for the synthesis of many GAGS and for the deposition and organization of collagen.
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3) Chondrocyte is a
   a) Kidney cell b) Blood cell
   c) Liver cell d) Cartilage cell

4) Nerve is formed through collection of
   a) Neurons b) Nerve fibers
   c) Spinal cord d) Blood vessels

5) Mature cells are continuously produced from
   a) Stem cells b) Stromal cells
   c) Progenitor cells d) None

6) When skeletal muscles shortens in response to stimulation there is
   a) A decrease in the width of the I band
   b) A decrease in the width of the A band
   c) A increase in the width of the H zone
   d) Both b) and c)

7) Normal human kidney form _____ of filtrate every minute.
   a) 200 ml
   b) 100 ml
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8) Tissue assembled in vitro may have _____ metabolic requirements than their in vitro counterparts.
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   b) Zero
   c) Different
   d) None of these

9) Which of the following is a extracellular matrix proteins ?
   a) Vitronection
   b) Laminin
   c) Collagen
   d) All above

10) _____ surfaces can be used to control the initial interface between two cell types in co-culture system.
   a) Nanopatterns
   b) Micropatterns
   c) Bit patterns
   d) Both a) and b)

11) Shear rate is expressed in
   a) cm/s/cm
   b) s^{-1}
   c) Both a) and b)
   d) None

12) Erythropoeitin production is related oxygen delivery to the renal interstinal cell
   a) Directly
   b) Equally
   c) Zero
   d) Inversely

13) The _____ was the first organ to be successfully transplanted from a donor individual to an Autologous recipient patient.
   a) Heart
   b) Brain
   c) Kidney
   d) None

14) Cartilage tissue engg. include
   a) Only in vivo
   b) Only in vitro
   c) Both a) and b)
   d) None

_____

SLR-TC – 468

Seat No.	

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018
TISSUE ENGINEERING

Day and Date : Tuesday, 22-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** : **(4×4=16)**
   1) Explain the reconstruction of connective tissues.
   2) Explain in detail adult stem cell.
   3) Explain metabolic requirement for cell using graphical representation.
   4) Explain gene therapy tissue engg. in vascular biology.
   5) State advantages and disadvantages of in-vitro and in-vivo tissue engineering.

3. Answer **any two** : **(2×6=12)**
   1) Explain different bioreactor design in tissue engineering.
   2) Explain methodologies and devices used for in-vitro experiments for study of shear stress.
   3) Explain tissue composition and types of stromal cells.

SECTION – II

4. Answer **any four** : **(4×4=16)**
   1) Explain function and organization of hematopoietic system.
   2) Explain in-vivo cartilage repair.
   3) Explain tubule reabsorption for kidney function.
   4) Explain the history of cell culture development.
   5) Explain basic background study of liver in tissue engineering.

5. Answer **any two** : **(2×6=12)**
   1) Explain tissue reconstruction of nervous system with neat diagram.
   2) Explain injury and repair of skeletal muscle.
   3) What is bone marrow transplantation ? Explain autologous and allogenic bone marrow transplantation.

———————

Set Q

Set Q

SLR-TC – 468

Seat No.	

Set R

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018
TISSUE ENGINEERING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Erythropoeitin production is related oxygen delivery to the renal interstinal cell

a) Directly b) Equally

c) Zero d) Inversely

2) The _____ was the first organ to be successfully transplanted from a donor individual to an Autologous recipient patient.

a) Heart b) Brain

c) Kidney d) None

3) Cartilage tissue engg. include

a) Only in vivo b) Only in vitro

c) Both a) and b) d) None

4) In adults stem cells are found in _____ only at very low concentration but the Concentration _____ dramatically after stem cell mobilization.

a) Cord blood, Decreases b) Cord blood, Increases

c) Peripheral blood, Increases d) Peripheral blood, Decreases

P.T.O.

5) _____ are the responsible for the synthesis of many GAGS and for the deposition and organization of collagen.
   a) Adipocytes b) Stem cells
   c) Fibroblast d) All above

6) Chondrocyte is a
   a) Kidney cell b) Blood cell
   c) Liver cell d) Cartilage cell

7) Nerve is formed through collection of
   a) Neurons b) Nerve fibers
   c) Spinal cord d) Blood vessels

8) Mature cells are continuously produced from
   a) Stem cells b) Stromal cells
   c) Progenitor cells d) None

9) When skeletal muscles shortens in response to stimulation there is
   a) A decrease in the width of the I band
   b) A decrease in the width of the A band
   c) A increase in the width of the H zone
   d) Both b) and c)

10) Normal human kidney form _____ of filtrate every minute.
   a) 200 ml b) 100 ml
   c) 10 ml d) 500 ml

11) Tissue assembled in vitro may have _____ metabolic requirements than their in vitro counterparts.
   a) Equal b) Zero
   c) Different d) None of these

12) Which of the following is a extracellular matrix proteins ?
   a) Vitronection b) Laminin
   c) Collagen d) All above

13) _____ surfaces can be used to control the initial interface between two cell types in co-culture system.
   a) Nanopatterns b) Micropatterns
   c) Bit patterns d) Both a) and b)

14) Shear rate is expressed in
   a) cm/s/cm b) s^{-1}
   c) Both a) and b) d) None

_____

SLR-TC – 468

Seat No.	

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018
TISSUE ENGINEERING

Day and Date : Tuesday, 22-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** : **(4×4=16)**
   1) Explain the reconstruction of connective tissues.
   2) Explain in detail adult stem cell.
   3) Explain metabolic requirement for cell using graphical representation.
   4) Explain gene therapy tissue engg. in vascular biology.
   5) State advantages and disadvantages of in-vitro and in-vivo tissue engineering.

3. Answer **any two** : **(2×6=12)**
   1) Explain different bioreactor design in tissue engineering.
   2) Explain methodologies and devices used for in-vitro experiments for study of shear stress.
   3) Explain tissue composition and types of stromal cells.

SECTION – II

4. Answer **any four** : **(4×4=16)**
   1) Explain function and organization of hematopoietic system.
   2) Explain in-vivo cartilage repair.
   3) Explain tubule reabsorption for kidney function.
   4) Explain the history of cell culture development.
   5) Explain basic background study of liver in tissue engineering.

5. Answer **any two** : **(2×6=12)**
   1) Explain tissue reconstruction of nervous system with neat diagram.
   2) Explain injury and repair of skeletal muscle.
   3) What is bone marrow transplantation ? Explain autologous and allogenic bone marrow transplantation.

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Set R

Set R

SLR-TC – 468

Seat No.	

Set **S**

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018
TISSUE ENGINEERING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

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SLR-TC – 468

Seat No.	

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   3) What is bone marrow transplantation ? Explain autologous and allogenic bone marrow transplantation.

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Set S

Set S