Seat No.

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:

 $(14 \times 1 = 14)$

a)
$$\frac{1}{\left(s+1\right)^2}$$

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

c)
$$\frac{s}{(s+1)^2}$$

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) $\frac{e^{\frac{t}{3}}}{3}$ c) $\frac{e^{t}}{3}$
- d) $\frac{e^{-\frac{1}{3}}}{3}$

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) $u_{x} = -v_{y}, u_{y} = v_{x}$

6)	A function $\Phi(x,$	y) having	continuous	partial	derivatives	of the	first	and	second
	order is called h	narmonic fu	unction 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) ·

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 $f(z) = \overline{z}$, 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



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:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e4t sin3t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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.	

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.

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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:

 $(14 \times 1 = 14)$

- 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 πi

- 6) If $f(z) = \overline{z}$, 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)
$$\frac{1}{\left(s+1\right)^2}$$

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

c)
$$\frac{s}{(s+1)^2}$$

- 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) et

- b) $\frac{e^{\frac{t}{3}}}{2}$ c) $\frac{e^{t}}{3}$
- 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) $u_x = v_y$, $u_y = -v_x$ d) $u_x = -v_y$, $u_y = v_x$

c) $u_{x} = -v_{x}$, $u_{y} = v_{y}$

- 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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Instructions: 1) Figures to the **right** indicate **full** marks.

2) Assume suitable data whenever necessary.

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e4t sin3t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ is analytic.
- 5) Find the Laplace transform of $e^{-4t} \int_0^t u \sin 3u du$.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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

Seat	
No.	

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

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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:

 $(14 \times 1 = 14)$

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

a)
$$u_x = v_x$$
, $u_y = -v_y$

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

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_a is equal to

a) 1

b) π

c) 0

d) None



- 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 $W = \frac{1}{2}$ 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, $\int_{c}^{c} \frac{\sin z}{z} dz$, C: |z| = 1 is
 - a) 0

b) πi

c) $-\pi i$

d) $-2\pi i$

- 9) If $f(z) = \overline{z}$, then f'(z)
 - a) equal to 1

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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)
$$\frac{1}{\left(s+1\right)^2}$$

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

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) et

- b) $\frac{e^{\frac{t}{3}}}{3}$ c) $\frac{e^{t}}{3}$
- 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) $\Phi'\left(\frac{s}{a}\right)$



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:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e^{4t} sin³t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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

Seat No.

Set S

Max. Marks: 70

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

Day and Date: Thursday, 3-5-2018

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

1.

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.

in Answer Book Page No. 3. Each question carries one mark.

- 3) Figures to right indicate full marks.
- 4) Assume suitable data whenever necessary.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 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) πi

c) $-\pi i$

d) $-2\pi i$

4) If $f(z) = \overline{z}$, 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

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6) L{t e^{-t}} is

a)
$$\frac{1}{(s+1)^2}$$

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

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) e4t 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) et

- b) $\frac{e^{\frac{t}{3}}}{3}$ c) $\frac{e^{t}}{3}$ d) $\frac{e^{-\frac{t}{3}}}{3}$
- 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)
$$u_x = v_x$$
, $u_y = -v_y$

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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 $f'(z) \neq 0$
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- 13) Fourier expansion of an even function in the range $(-\pi, \pi)$ has
 - a) Only sine terms
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 - 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

b) π

c) 0

d) None



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:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e4t sin3t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ is analytic.
- 5) Find the Laplace transform of $e^{-4t} \int_0^t u \sin 3u du$.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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



Seat No.	Set	Р
NO.		

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

Dur	atio	n : 30 Minutes			Marks: 14
1.	Ch	oose the correc	t answer :		(1×14=14)
	1)		allows air to pas	s into the lungs.	
				c) Pancreas	d) Larynx
	2)	Thoracic and a	bdominal cavities a	re separated by the	
		a) pleura		b) diaphragm	
		c) lumbar		d) spleen	
	3)		$_{_}$ is the structural, fib	rous protein found in	n the dermis.
		a) Collagen	b) Heparin	c) Sebum	d) Melanin
	4)		is the flexible co	nnective tissues that	is attached to bones
		at the joints.			
		a) Adipose	b) Cartilage	c) Muscle	d) Nerve
	5)			ch an impulse is tran	smitted from one
		neuron to anot	her neuron.		
		a) Synapse		b) Terminal plate	
		c) Dendrite		d) Nerve center	
	6)		is the body cavity t	hat contains the pitu	itary gland.
		a) Abdominal		b) Cranial	
		c) Spinal		d) Thoracic	

7)	controls body tempe	rature, sleep and appetite.
	a) Adrenal gland	b) Hypothalamus
	c) Pancreas	d) Thalamus
8)	Saliva contains an enzyme that act nutrients.	ts upon of the following
	a) starches	b) proteins
	c) fats	d) minerals
9)	is the master glan	d 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 (is called	O_2 and nutrients to the cells of the body
	a) diffusion	b) systemic circulation
	c) coagulation	d) pulmonary circulation
12)	The right lung consists oflobes.	_ lobes and left lung has
	a) 3, 2 b) 2, 3	c) 2, 2 d) 3, 1
13)	Afferent peripheral nerves that bring	s information into CNS are called
	a) Motor nerves	b) Sensory nerves
	c) Gray matter	d) White matter
14)	The formed elements of the blood at	re made up of all the following except
	a) RBC's	b) WBC's
	c) Plasma	d) Platelets



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.



Seat No.		Set	Q
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•	dicai) (Part – I) (Ne JMAN ANATOMY <i>I</i>	•	-
Day and Date : Friday, Time : 2.30 p.m. to 5.30			Max. Marks: 70
,	-	ge No. 3. Each quective type quest	
	MCQ/Objective T	ype Questions	
Duration: 30 Minutes			Marks: 14
1. Choose the correct	answer:		(1×14=14)
 Saliva contains nutrients. 	an enzyme that ac	ts upon	of the following
a) starches		b) proteins	
c) fats		d) minerals	
2)	is the master glan	d of endocrine syst	em.
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	
 The circulatory s is called 	system that supplies ($O_{\!\scriptscriptstyle 2}$ and nutrients to t	he cells of the body
a) diffusion		b) systemic circul	ation
-\		al\ .al.aa a.aa a.a. a!a	مراجع المراجع

- 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

6)		neral nerves that bring		
	a) Motor nerve	es	b) Sensory ner	ves
	c) Gray matte	r	d) White matter	r
7)	The formed ele	ements of the blood a	re 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.	
,		b) Aorta		d) Larynx
9)	Thoracic and a	abdominal cavities are	separated by th	e
,	a) pleura		b) diaphragm	
	c) lumbar		d) spleen	
10)	,	_ is the structural, fibro	, .	l in the dermis
10)			-	
		b) Heparin		
11)		ia tha flavibla agar		- 4 ! 44 1 1 4 - 1
· · /			nective tissues tha	at is attached to bones
,	at the joints.			
,	at the joints. a) Adipose	b) Cartilage	c) Muscle	d) Nerve
12)	at the joints. a) Adipose		c) Muscle	d) Nerve
	at the joints. a) Adipose	b) Cartilage is a point at which	c) Muscle	d) Nerve
	at the joints. a) Adipose	b) Cartilage is a point at which	c) Muscle	d) Nerve ansmitted from one
	at the joints. a) Adipose neuron to anot	b) Cartilage is a point at which	c) Muscle an impulse is tra	d) Nerve ansmitted from one ite
	at the joints. a) Adipose neuron to anot a) Synapse c) Dendrite	b) Cartilage is a point at which	c) Muscle an impulse is tra b) Terminal pla d) Nerve cente	d) Nerve ansmitted from one ite r
12)	at the joints. a) Adipose neuron to anot a) Synapse c) Dendrite	b) Cartilage is a point at which ther neuron.	c) Muscle an impulse is tra b) Terminal pla d) Nerve cente	d) Nerve ansmitted from one ite r
12)	at the joints. a) Adipose neuron to anot a) Synapse c) Dendrite	b) Cartilage is a point at which ther neuron.	c) Muscle an impulse is tra b) Terminal pla d) Nerve cente at contains the pi	d) Nerve ansmitted from one ite r
12) 13)	at the joints. a) Adipose neuron to anot a) Synapse c) Dendrite a) Abdominal c) Spinal	b) Cartilage is a point at which ther neuron is the body cavity the	c) Muscle an impulse is tra b) Terminal pla d) Nerve cente at contains the pi b) Cranial d) Thoracic	d) Nerve ansmitted from one ate r ituitary gland.
12)	at the joints. a) Adipose neuron to anot a) Synapse c) Dendrite a) Abdominal c) Spinal	b) Cartilage is a point at which ther neuron is the body cavity that _ controls body tempe	c) Muscle an impulse is tra b) Terminal pla d) Nerve cente at contains the pi b) Cranial d) Thoracic	d) Nerve ansmitted from one ate r ituitary gland.
12) 13)	at the joints. a) Adipose neuron to anot a) Synapse c) Dendrite a) Abdominal c) Spinal	b) Cartilage is a point at which ther neuron is the body cavity that _ controls body tempe	c) Muscle an impulse is tra b) Terminal pla d) Nerve cente at contains the pi b) Cranial d) Thoracic	d) Nerve ansmitted from one ate r ituitary gland.

Set Q



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.



	Y .	,	
Seat		Set	R
No.			- 1

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

Dura	tior	n: 30 Minutes		Marks: 14				
1. (Cho	Choose the correct answer:						
1)		neuron to anot	is a point at which an impulse is transmitted from her neuron.	one				
		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 gla						
		c) Pancreas	d) Thalamus					
		Saliva contains nutrients.	s an enzyme that acts upon of the fol	lowing				
		a) starches	b) proteins					
		c) fats	d) minerals					
	5)		is the master gland of endocrine system.					
		a) Adrenal	b) Pancreas					
		c) Thyroid	d) Pituitary					

6)	Sinu atrial node is locate	d at		
	a) Right atrium	b)	Right ventricle	
	c) Left atrium	d)	Left ventricle	
7)	The circulatory system th is called	at supplies O ₂ a	and nutrients to th	ne cells of the body
	a) diffusion	b)	systemic circula	ation
	c) coagulation	d)	pulmonary circu	ulation
8)	The right lung consists lobes.	of lo	bes and left lun	g has
	a) 3, 2 b) 2,	3 c)	2, 2	d) 3, 1
9)	Afferent peripheral nerve	es that brings in	formation into C	NS are called
	a) Motor nerves	b)	Sensory nerves	3
	c) Gray matter	d)	White matter	
10)	The formed elements of	the blood are n	nade up of all the	e following except
	a) RBC's	b)	WBC's	
	c) Plasma	d)	Platelets	
11)	allows	air to pass into	the lungs.	
	a) Trachea b) Ad			d) Larynx
12)	Thoracic and abdominal	cavities are se	parated by the	
	a) pleura	b)	diaphragm	
	c) lumbar	d)	spleen	
13)	is the str	uctural, fibrous	protein found in	the dermis.
	a) Collagen b) He	eparin c)	Sebum	d) Melanin
14)	is the	flexible connect	ive tissues that is	attached to bones
,	at the joints.			
	a) Adipose b) Ca	artilage c)	Muscle	d) Nerve

Set R



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.



Seat	Set	S
No.		

	•	, ,	w CBCS) Examinated AND PHYSIOLOG	
-	nd Date : Friday, 4-5 2.30 p.m. to 5.30 p			Max. Marks: 70
	ii n 2) A	n Answer Book Pa nark. Answer MCQ/Obje		
		MCQ/Objective T	ype Questions	
Duratio	on: 30 Minutes			Marks: 14
1. Ch	oose the correct ar	nswer:		(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 sys is called	stem that supplies ($O_{\scriptscriptstyle 2}$ and nutrients to th	e cells of the body
	a) diffusion		b) systemic circula	tion
	c) coagulation		d) pulmonary circu	lation
3)	The right lung collobes.	nsists of	_ lobes and left lung	g has
	a) 3, 2	b) 2, 3	c) 2, 2	d) 3, 1
4)	Afferent periphera	l nerves that bring	s information into Cl	NS are called
	a) Motor nerves		b) Sensory nerves	
	c) Gray matter		d) White matter	
5)	The formed eleme	ents of the blood ar	re made up of all the	following except
	a) RBC's		b) WBC's	
	c) Plasma		d) Platelets	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

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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/Objectiv	e Type Questio	าร
Dur	atio	n : 30 Minutes			Marks : 14
1.	Ch	noose the correc	t answer :		(14×1=14)
	1)	Biosensors are	used in		
		a) medical field		b) agricultui	ral field
		c) pollution mo	nitoring	d) all of the	above
	2)	Restorative bior of the	naterials are desig	ned to recover th	e shape and the function
		a) teeth	b) bone	c) tissue	d) none of above
	3)	are pattern to the sp		(3D) networks of	atoms having no regular
		a) Glasses	b) Fiber	c) Metal	d) Polymer
	4)	Polycrystalline of	ceramics have no	compo	nents.
		a) glassy	b) liquid	c) solid	d) crystal
	5)		the ability of a ma pecific application		with an appropriate host
		a) Reduction		b) Biocomp	atibility
		c) Oxidation		d) None of a	above



6)	Elastic deformation in polymers is due to					
	a) Slight adjust of molecular chains					
	b) Slippage of molecular chains					
	c) Straightening of m	olecular chains				
	d) Severe of covalent	t bonds				
7)	One of characteristic	properties of po	lym	ner material		
	a) High temperature	stability	b)	High mechani	ical strength	
	c) High elongation		d)	Low hardness	3	
8)	Polymers are	in nature.				
	a) organic b) inorganic	c)	both a and b	d) none	
9)	polymers ca	nnot be recycle	d.			
	a) Thermoplasts b) Thermosets	c)	Elastomers	d) All polymers	
10)	types of bio	materials are us	ed	as bridges betv	veen human tissues	
	and metals.					
	a) Polymeric b) Ceramic	c)	Metallic	d) All of these	
11)	Which of the following	g statements is t	rue	?		
	a) Ceramic materials	have low melting	ng p	point		
	b) Porcelain is used a	as insulating ma	ter	ial in spark plu	gs	
	c) Graphite is viscoel	astic in nature				
	d) Compacting iron of	xide powder cei	ram	nic tools are pr	epared	
12)	materials	can be used to	ma	nufacture elas	tomers.	
	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 drav	wn into wires				
	c) Both a and b					
4.4\	d) None of the above					
14)	Ductility means a) Metals can be drav	wn into cheete				
	b) Metals undergo ela		n II	nder tensile lo	ads	
	c) Metals undergo pla					
	d) All of the above					



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set P

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

Dur	atio	n : 30 Minutes				Marks: 14
1.	Ch	noose the correct an	iswer:			(14×1=14)
	1)	Polymers are	in nature.			
		a) organic	b) inorganic	c) both a and b	d) none	
	2)	polymers	cannot be recycle	ed.		
		a) Thermoplasts	b) Thermosets	c) Elastomers	d) All polyn	ners
	3)	types of I and metals.	oiomaterials are us	sed as bridges bet	ween human	tissues
		a) Polymeric	b) Ceramic	c) Metallic	d) All of the	ese
	4)	Which of the follow	ing statements is	true?		
		a) Ceramic materia	als have low melti	ng point		
		b) Porcelain is use	ed as insulating ma	aterial in spark plu	ugs	
		c) Graphite is visco	oelastic in nature			
		d) Compacting iron	n oxide powder ce	ramic tools are p	repared	
	5)	materia	als can be used to	manufacture elas	stomers.	
		a) Limestone	b) Petroleum	c) Alcohol	d) All of the	e above

6)	Malleability means a) Metals undergo plastic deformation under compressive stresses b) Metals can be drawn into wires			
	c) Both a and bd) None of the above			
7)	Ductility means a) Metals can be drawn into s b) Metals undergo elastic defo c) Metals undergo plastic defo d) All of the above	ormation unde		
8)	Biosensors are used in			
	a) medical field	b) agr	icultural field	
	c) pollution monitoring	d) all d	of the above	
9)	Restorative biomaterials are de of the	signed to reco	over the shape	and the function
	a) teeth b) bone	c) tiss	ue d)	none of above
10)	are three-dimensio	nal (3D) netwo	orks of atoms h	aving no regular
	pattern to the spacing.			
	a) Glasses b) Fiber	c) Met	tal d)	Polymer
l1)	Polycrystalline ceramics have			
	a) glassy b) liquid	c) soli	d d)	crystal
12)	is the ability of a response in a specific applicat	-	rform with an	appropriate host
	a) Reduction	b) Bio	compatibility	
	c) Oxidation	d) Nor	ne of above	
13)	Elastic deformation in polymer	s is due to		
	a) Slight adjust of molecular c	hains		
	b) Slippage of molecular chair	າຣ		
	c) Straightening of molecular	chains		
	d) Severe of covalent bonds			
14)	One of characteristic propertie	s of polymer n	naterial	
	a) High temperature stability	b) Hig	h mechanical	strength
	c) High elongation	d) Lov	v hardness	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set Q

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

Dura	ation : 30 Minutes	Marks: 14
1.	Choose the correct answer:	(14×1=14)
	1) is the ability of a mater response in a specific application.	rial to perform with an appropriate host
	a) Reduction	b) Biocompatibility
	c) Oxidation	d) None of above
	 2) Elastic deformation in polymers is d a) Slight adjust of molecular chains b) Slippage of molecular chains c) Straightening of molecular chain d) Severe of covalent bonds 	
	3) One of characteristic properties of pa) High temperature stabilityc) High elongation	-
	4) Polymers are in naturea) organicb) inorganic	
	5) polymers cannot be recycle	led.
	a) Thermoplasts b) Thermosets	

6)	types of biomaterials are used as bridges between human tissues and metals.				
	and metals. a) Polymeric	h) Coramic	o) Motallic	d) All of those	
7)		•	•	u) All of these	
7)	Which of the following statements is true?				
	a) Ceramic materi		• .		
	b) Porcelain is use	_	ateriai in spark pil	ugs	
	c) Graphite is visc				
	d) Compacting iro	n oxide powder ce	eramic tools are p	repared	
8)		als can be used to			
	a) Limestone	b) Petroleum	c) Alcohol	d) All of the above	
9)	Malleability means				
	a) Metals undergo	•	on under compres	ssive stresses	
	b) Metals can be o	drawn into wires			
	c) Both a and b	_			
	d) None of the abo	ove			
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				
	-				
44\	d) All of the above				
11)	d) All of the above Biosensors are use		b) agricultural fi	old	
11)	d) All of the above Biosensors are use a) medical field	ed in	b) agricultural fi		
,	d) All of the aboveBiosensors are usea) medical fieldc) pollution monito	ed in oring	d) all of the abo	ve	
,	d) All of the aboveBiosensors are usea) medical fieldc) pollution monito	ed in oring	d) all of the abo		
,	d) All of the aboveBiosensors are usea) medical fieldc) pollution monitoRestorative biomat	ed in oring erials are designed	d) all of the abo	ve	
,	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth	ed in oring erials are designed b) bone	d) all of the abo d to recover the sh c) tissue	ve ape and the function	
12)	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth	ed in oring erials are designed b) bone ee-dimensional (3E	d) all of the abo d to recover the sh c) tissue	ve ape and the function d) none of above	
12)	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth are three	ed in oring erials are designed b) bone ee-dimensional (3E	d) all of the abo d to recover the sh c) tissue	ve ape and the function d) none of above ns having no regular	
12) 13)	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth are thre pattern to the space	ed in oring erials are designed b) bone ee-dimensional (3E sing. b) Fiber	d) all of the about to recover the shot c) tissue D) networks of ator c) Metal	ve ape and the function d) none of above ns having no regular d) Polymer	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set R

Seat	
No.	

Set

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

Dur	atic	n : 30 Minutes			Marks: 14	
1.	Choose the correct answer:					
	1)	types of and metals.	of biomaterials are u	used as bridges b	etween human tissues	
		a) Polymeric	b) Ceramic	c) Metallic	d) All of these	
	2)	a) Ceramic mateb) Porcelain is usec) Graphite is vis	owing statements is erials have low mel- sed as insulating ma scoelastic in nature on oxide powder c	ting point naterial in spark		
	3)		rials can be used t b) Petroleum		lastomers. d) All of the above	
	4)	•	go plastic deformat drawn into wires	ion under compr	ressive stresses	

5)	Ductility means a) Metals can be db) Metals undergoc) Metals undergod) All of the above	elastic deformation		
6)	Biosensors are use	ed in		
	a) medical field		b) agricultural fi	eld
	c) pollution monito	ring	d) all of the abo	ve
7)	Restorative biomate of the	erials are designed	d to recover the sh	ape and the function
	a) teeth	b) bone	c) tissue	d) none of above
8)	are thre pattern to the spaci) networks of ato	ms having no regular
	a) Glasses	b) Fiber	c) Metal	d) Polymer
9)	Polycrystalline cera	ımics have no	componen	ts.
	a) glassy	b) liquid	c) solid	d) crystal
10)	is the response in a spec		al to perform with	an appropriate host
	a) Reduction		b) Biocompatibi	lity
	c) Oxidation		d) None of above	/e
11)	Elastic deformation	in polymers is du	ie to	
	a) Slight adjust of r	molecular chains		
	b) Slippage of mole	ecular chains		
	c) Straightening of			
	d) Severe of covale			
12)	One of characterist			
	a) High temperatur	e stability	_	_
	c) High elongation		d) Low hardnes	S
13)	Polymers are			
	a) organic	,	•	d) none
14)	polymers	-		
	a) Thermoplasts	b) Thermosets	c) Elastomers	d) All polymers



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set S

Seat	
No.	

7) $IC = \beta I_B + ____$

a) I_{CBO}

b) I_C

Set

Р

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: $(1 \times 14 = 14)$ 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. b) 0.7 V a) 0.3 V d) 1.4 V c) 0.9 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 ___ b) low a) high c) very high d) almost zero 5) The value of α of a transistor is a) more than 1 b) less than 1 d) none of the above c) 1 6) The relation between β and α is a) $\beta = 1/(1 - \alpha)$ b) $\beta = (1 - \alpha)/\alpha$ c) $\beta = \alpha/(1 - \alpha)$ d) $\beta = \alpha/(1 + \alpha)$

c) αI_{CEO}

d) $\alpha I_{\rm F}$

b) Width of clock pulsed) RC time constant

14) _____ controls the output pulse width of a one shot.

a) The clock frequency

c) RL time constant

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

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

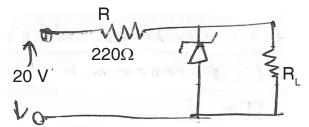
SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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,

$$V_{7} = 20 \text{ V}$$

$$P_{7} = 400 \text{ mw}$$

$$R_L = 400 \Omega$$

- 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:

 $(6 \times 2 = 12)$

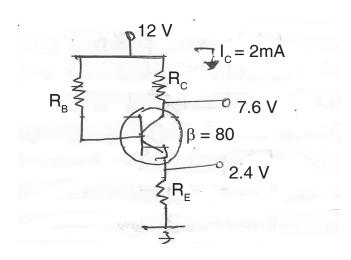
1) Design a zener voltage regulator for following specification.

$$V_{ip} = 20 \pm 2V$$
, $V_{o} = 6V$, $I_{c} = 50$ 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.



3) Determine $\rm R_{\rm C},\, R_{\rm E},\, R_{\rm B},\, V_{\rm CE}$ and $\rm V_{\rm B}$ for given bias circuit.

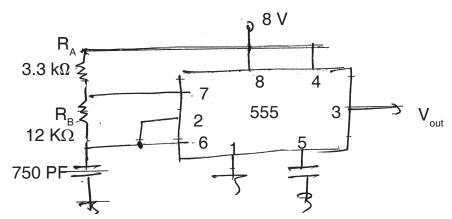


SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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.



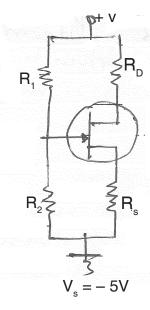


5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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 k Ω , 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.

Seat		
No.	Set	Q

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

Max. Marks: 70 Day and Date: Monday, 7-5-2018 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 $(1 \times 14 = 14)$ 1. Choose the correct answer: 1) A JFET is also called as _____ transistor. a) unipolar b) bipolar d) none of the above c) unijunction 2) _____ has the lowest noise level. a) MOSFET b) Diode c) Zener diode d) JFET 3) A certain p channel E-MOSFET has $V_{\rm GS(th)} = -2V$. If $V_{\rm GS} = 0$ V, then $I_{\rm D}$ is b) I_{D (on)} c) Maximum d) I_{DSS} a) 0mA 4) IGBT is a modern power semiconductor device that combine the characteristic of _____ a) BJT b) BJT and MOSFET

d) SCR

c) MOSFET and SCR

5)	semicondu	ıctor device acts li	ke	a diode and 2 tr	ans	sistors.
	a) UJT	b) Diac	c)	Triac	d)	SCR
6)	The	is defined as the ti	me	output is active	divi	ided by the total
	period of the outpu	t signal.				
	a) on timec) duty cycle		,	off time active ratio		
7)	a) The clock frequency RL time constant			vidth of a one sh Width of clock RC time consta		se
8)	Shunting the ac cor a) transformer					of a rectifier
9)	With a 12 V supply voltage will be drop a) 0.3 V		ode	Э.		series, 1.4 V
0)	The base of a trans a) heavily c) lightly	sistor is (b)	ed. moderately none of the abo	ove	
1)	The input impedan a) high	ce of a transistor i b) low		very high	d)	almost zero
12)	The value of α of a a) more than 1 c) 1	a transistor is	,	less than 1 none of the abo	ove	
Í	The relation betwe a) $\beta = 1/(1 - \alpha)$ c) $\beta = \alpha/(1 - \alpha)$	·	b)	$\beta = (1 - \alpha)/\alpha$ $\beta = \alpha/(1 + \alpha)$		
14)	$IC = \beta I_B + \underline{\hspace{1cm}}$ a) I_{CBO}	b) I _c	c)	αI_{CEO}	d)	αI_{E}



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

ay and Date Monday, 7-5-2016

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

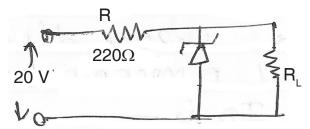
SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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,

$$V_z = 20 \text{ V}$$

$$P_z = 400 \text{ mw}$$

$$R_1 = 400 \Omega$$

- 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:

 $(6 \times 2 = 12)$

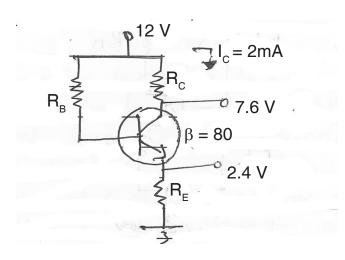
1) Design a zener voltage regulator for following specification.

$$V_{in} = 20 \pm 2V$$
, $V_{o} = 6V$, $I_{c} = 50$ 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.



3) Determine $\rm R_{\rm C},\, R_{\rm E},\, R_{\rm B},\, V_{\rm CE}$ and $\rm V_{\rm B}$ for given bias circuit.

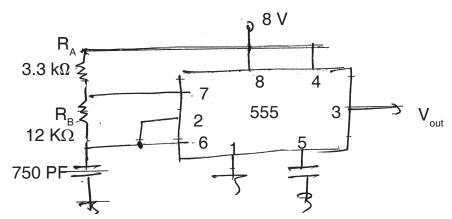


SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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.

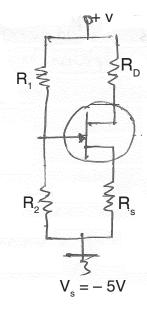


5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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 k Ω , 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.



c) Zener diode

SLR-TC - 432

Seat		
No.	Set	K

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

ELECTRONIC CIRCUITS A	NALYSIS AND DESIGN – I
Day and Date : Monday, 7-5-2018 Time : 2.30 p.m. to 5.30 p.m.	Max. Marks: 70
30 minutes in Ar carries one mark. 2) Answer MCQ/Ob	pulsory. It should be solved in first aswer Book Page No. 3. Each question ijective type questions on Page No. 3 to mention, Q.P. Set (P/Q/R/S) on Top
MCQ/Objective	Type Questions
Duration: 30 Minutes	Marks: 14
1. Choose the correct answer:	(1×14=14)
 The value of α of a transistor is a) more than 1 t a t t a t t a t t a t a t t<td>b) less than 1 d) none of the above</td>	b) less than 1 d) none of the above
a) $\beta = 1/(1 - \alpha)$ c) $\beta = \alpha/(1 - \alpha)$	b) $\beta = (1 - \alpha)/\alpha$ 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 asa) unipolarc) unijunction	transistor. b) bipolar d) none of the above
5) has the lowest noise level a) MOSFET	l. b) Diode

6) A certain p channel E-MOSFET has $V_{\rm GS(th)} = -$ 2V. If $V_{\rm GS} = 0$ V, then $I_{\rm D}$ is

d) JFET

a) 0 mA	b) I _{D (on)}	c) Maximum	d) I _{DSS}

7)	IGBT is a modern power semiconductor device that combine the characteristic of			ne characteristic		
	a) BJT c) MOSFET and S			BJT and MOSF SCR	ET	
8)	semicondu	uctor device acts li	ke	a diode and 2 tr	ans	sistors.
	a) UJT	b) Diac	c)	Triac	d)	SCR
9)	The period of the output		me	output is active	divi	ded by the total
	a) on time		b)	off time		
	c) duty cycle		d)	active ratio		
10)	contro	ols the output puls	e v	vidth of a one sh	ot.	
	a) The clock frequ	ency	b)	Width of clock	puls	se
	c) RL time consta	nt	d)	RC time consta	ınt	
11)	Shunting the ac co					
	a) transformer	b) filter	c)	regulator	d)	rectifier
12)	With a 12 V supply	, a silicon diode a	nd	a 370 Ω resisto	r in	series,
	voltage will be drop	•				
	a) 0.3 V	b) 0.7 V	c)	0.9 V	d)	1.4 V
13)	The base of a tran-	sistor is	dop	ed.		
	a) heavily		b)	moderately		
	c) lightly		d)	none of the abo	ove	
14)	The input impedan	ice of a transistor i	is _			
	a) high	b) low	c)	very high	d)	almost zero



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

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

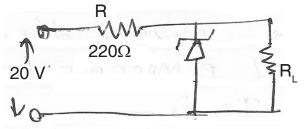
Marks: 56

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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_1 , I_1 , I_2 and I_B for network below:



Given,

 $V_z = 20 \text{ V}$

 $P_z = 400 \text{ mw}$

 $R_1 = 400 \Omega$.

- 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:

 $(6 \times 2 = 12)$

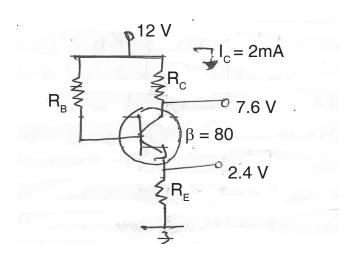
1) Design a zener voltage regulator for following specification.

$$V_{in} = 20 \pm 2V$$
, $V_{o} = 6V$, $I_{c} = 50$ 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.



3) Determine $\rm R_{\rm C},\, R_{\rm E},\, R_{\rm B},\, V_{\rm CE}$ and $\rm V_{\rm B}$ for given bias circuit.

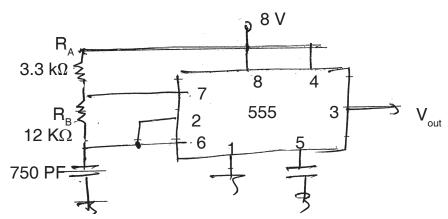


SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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.

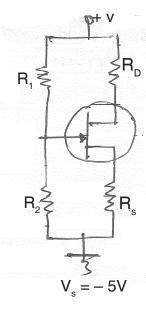


5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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 k Ω , 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.

Seat		
No.	Set	5

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

	ELECTRO	ONIC CIRCUI	rs analysis and de	SIGN – I
	nd Date : Monday 2.30 p.m. to 5.30			Max. Marks: 70
		30 minutes ocarries one m Answer MCC	compulsory. It should in Answer Book Page No eark. D'Objective type question orget to mention, Q.P. S	o. 3. Each question ons on Page No. 3
		MCQ/Objec	tive Type Questions	
Duratio	on: 30 Minutes			Marks: 14
	oose the correct A certain p cha		T has $V_{GS(th)} = -2V$. If $V_{GS(th)}$	$(1 \times 14 = 14)$ _{GS} = 0 V, then I_D is
2)	a) 0 mA IGBT is a moder of a) BJT c) MOSFET an	n power semico	c) Maximum nductor device that combin b) BJT and MOSF d) SCR	e the characteristic
3)	a) UJT		acts like a diode and 2 tra	ansistors. d) SCR
4)	The period of the out a) on time c) duty cycle		b) off time d) active ratio	divided by the total
5)	a) The clock free c) RL time cons	equency	ut pulse width of a one sh b) Width of clock p d) RC time consta	oulse
6)	Shunting the ac a) transformer	-	ay from the load is the ta c) regulator	sk of a d) rectifier

7)	With a 12 V supply, a silicon diode a		or in series,
	voltage will be dropped across the a 0.3 V b) 0.7 V	c) 0.9 V	d) 1.4 V
8)	The base of a transistor is	•	
	a) heavilyc) lightly	b) moderatelyd) none of the ab	oove
9)	The input impedance of a transistor		
	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 ab	ove
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)	$IC = \beta I_B + \underline{\hspace{1cm}}$		
	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 ab	ove
14)	has the lowest noise level		
,	a) MOSFET	b) Diode	
	c) Zener diode	d) JFET	



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

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

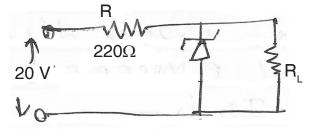
SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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,

$$V_{7} = 20 \text{ V}$$

$$P_{7} = 400 \text{ mw}$$

$$R_1 = 400 \Omega$$
.

- 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 :

 $(6 \times 2 = 12)$

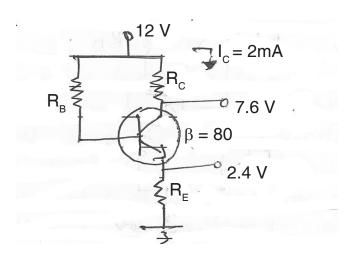
1) Design a zener voltage regulator for following specification.

$$V_{in} = 20 \pm 2V$$
, $V_{o} = 6V$, $I_{c} = 50$ 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.



3) Determine $\rm R_{\rm C},\, R_{\rm E},\, R_{\rm B},\, V_{\rm CE}$ and $\rm V_{\rm B}$ for given bias circuit.

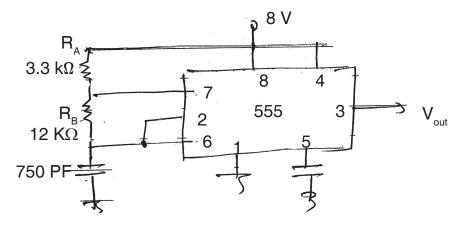


SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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.

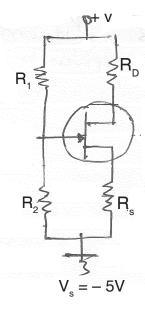


5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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 k Ω , 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.

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

Dur	atio	n : 30 Minutes					Marks: 14
1.	Ch	noose the correct ar	nswer:				(1×14=14)
	1)	i	s not a bilate	eral.			
		a) Resistor	b) Diode	c)	Capacitor	d) Inductor	
	2)	In active filter,		element i	s absent.		
		a) Inductor		b)	Capacitor		
		c) Both a) and b)		d)	Resistor		
	3)	Reactive power dra	awn by a pu	re resistor	is		
		a) 0		b)	Minimum		
		c) Maximum		d) .	Average		
	4)	Under resonance of	condition, the	e power fa	ctor of a syste	em is	
		a) Unity	b) Lagging	g c)	Leading	d) Any of a	bove
	5) In an AC circuit containing pure inductance, the voltage applied in 120V, 50Hz, while the current is 10A. The value of inductance with the current is 10A.						be
		a) 35 mH	b) 34 mH	c)	30 mH	d) 38 mH	
	6)	In 2 port network, 2	$Z_{12} = Z_{21}$ indic	cates	p	roperty.	
		a) Unilateral	b) Bilatera	al c)	Linear	d) Non-line	ar

7)	Advantage of active	e filter is				
	a) Do not offer aga	in	b) Easy to tune			
	c) Both a) and b)		d) Derive high in	mpedance load		
8)	Number of an ideal especially for casca		•	•		
	a) Zero	b) Unity	c) Infinity	d) Unpredictable		
9)			•	e $V_s = 100V$ in series with 5Ω and edance 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 circu	uit, power factor c	an be defined as			
	a) R/Z	b) P/S	c) V _r /V	d) All above		
11)	Superposition theor	em is not applica	ble for			
	a) Current calculati	on	b) Voltage calcu	ulation		
	c) Power calculation	n	d) Energy calcu	lation		
12)	A circuit with a resist for Hz. If all the compared frequency is	oonents values are	e now doubled, th	ne new resonant		
	a) 2f ₀	b) f _o	c) f ₀ /4	d) $f_0/2$		
	In a series R-L-C ci frequency is					
	a) 2×10^4 Hz A network contains	b) $\frac{1}{\pi} \times 10^4 \text{Hz}$	c) 10 ⁴ Hz	d) $2\pi \times 10^4 \text{ Hz}$		
14)	A network contains the values of all res	only an independ istors are doubled	lent current sourd d. The value of th	e and resistors. If e node voltages will		
	a) Becomes half		b) Remain unch	anged		
	c) Becomes double	9	d) None of the a	above		



Seat	
No.	

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

Day and Date: Tuesday, 8-5-2018

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

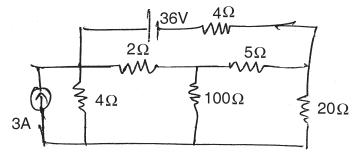
SECTION - I

2. Attempt any 4 questions:

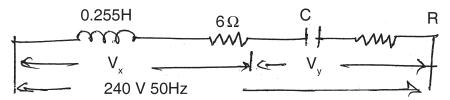
 $(4 \times 4 = 16)$

Marks: 56

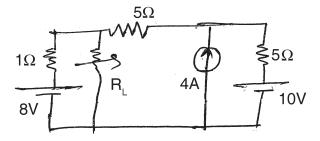
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

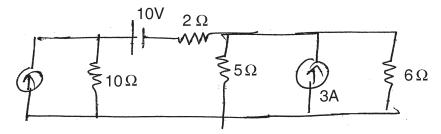




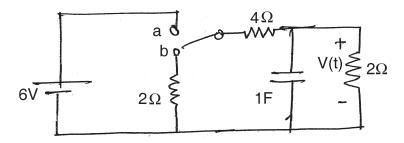
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



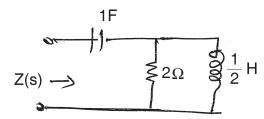
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

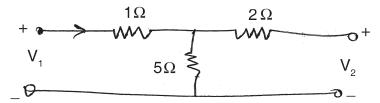
- 1) With the help of neat diagram, explain working of band pass and band reject filter.
- 2) Find poles and zeros of the impedance of the following network and plot them on S-plane.



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



4) Find the transmission parameter for the network shown.



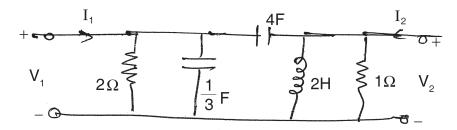
5) Explain how 2 port network can be represented by an equivalent T network.

-5-

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

	 _	
Seat No.	Set	Q
	l L	

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

Dur	atio	n : 30 Minutes				Marks: 14
1.	Ch	noose the correct an	swer:			(1×14=14)
	1)	Number of an ideal especially for casca		•	ncies in pass _	band
		a) Zero	b) Unity	c) Infinity	d) Unpredic	ctable
	2)	A 2 port network is terminated in a 25Ω		3		
		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 circu	uit, power factor c	an be defined as		
		a) R/Z	b) P/S	c) V _r /V	d) All above	е
	4)	Superposition theor	rem is not applica	ble for		
		a) Current calculati	ion	b) Voltage calcu	ılation	
		c) Power calculation	on	d) Energy calcu	lation	
	5)	A circuit with a resist for Hz. If all the compared frequency is	onents values ar	•		
		a) 2f ₀	b) f _o	c) f ₀ /4	d) $f_0/2$	

6)	In a series R-L-C cir frequency is					
	a) 2 × 10 ⁴ Hz	b) $\frac{1}{\pi} \times 10^4 \text{Hz}$	c) 1	10⁴Hz	d)	$2\pi \times 10^4 \text{ Hz}$
7)	A network contains the values of all resi	only an independ	dent d	current sour	ce ar	nd resistors. If
	a) Becomes half		b) F	Remain uncl	nang	jed
	c) Becomes double		d) 1	None of the	abov	/e
8)	is	not a bilateral.				
	a) Resistor		c) (Capacitor	d)	Inductor
9)	In active filter,	eleme	ent is	s absent.		
	a) Inductor		b) (Capacitor		
	c) Both a) and b)		d) F	Resistor		
10)) Reactive power drawn by a pure resistor is					
	a) 0		b) N	Minimum		
	c) Maximum		d) A	Average		
11)	Under resonance co	ondition, the powe	er fac	ctor of a syst	tem	is
	a) Unity	b) Lagging	c) L	_eading	d)	Any of above
12)	In an AC circuit cont 120V, 50Hz, while the	• .				•
	a) 35 mH	b) 34 mH	c) 3	30 mH	d)	38 mH
13)	In 2 port network, Z	$_{12} = Z_{21}$ indicates _			prop	erty.
	a) Unilateral	b) Bilateral		∟inear		Non-linear
14)	Advantage of active	filter is				
	a) Do not offer agai	n	b) E	Easy to tune		
	c) Both a) and b)		d) [Derive high i	mpe	dance load



Seat	
No.	

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

Day and Date: Tuesday, 8-5-2018

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

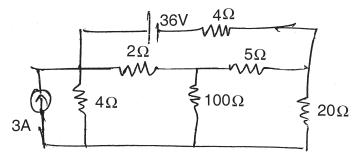
Marks: 56

SECTION - I

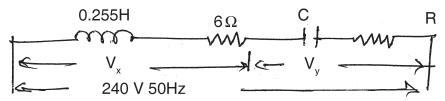
2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

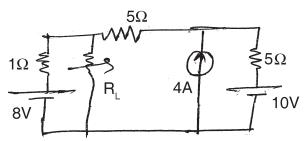
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

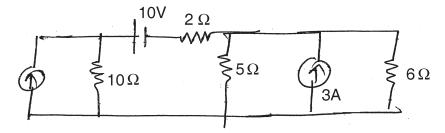




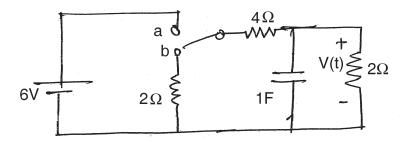
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



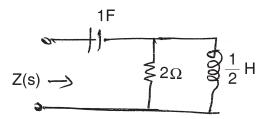
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 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.

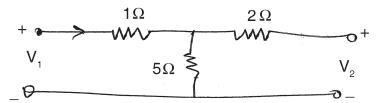


3) Derive condition for reciprocity for open circuit impedance parameter.

-5-



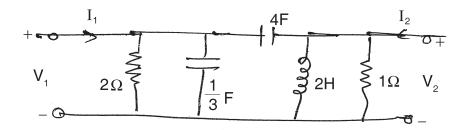
4) Find the transmission parameter for the network shown.



- 5) Explain how 2 port network can be represented by an equivalent T network.
- 5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

Seat	
No.	

Set F

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

			•	71		
Dur	atio	n : 30 Minutes			Marks: 14	
1.	Ch	noose the correct ar	nswer:		(1×14=14)	
	1)	1) In an AC circuit containing pure inductance, the voltage applied is 120V, 50Hz, while the current is 10A. The value of inductance will				
		a) 35 mH	b) 34 mH	c) 30 mH	d) 38 mH	
	2)	In 2 port network,	$Z_{12} = Z_{21}$ indicates	S	property.	
		a) Unilateral				
	3)	Advantage of activ	e filter is			
		a) Do not offer ag	ain	b) Easy to tune		
		c) Both a) and b)		d) Derive hig	h impedance load	
	4)	Number of an idea especially for case			uencies in pass band	
		a) Zero	b) Unity	c) Infinity	d) Unpredictable	
	5)			· ·	series with 5Ω and neters 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) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$	



6)	In series R – L circu	uit, power factor c	an	be defined as	
	a) R/Z	b) P/S	c)	V_r/V	d) All above
7)	Superposition theor	rem is not applica	ble	for	
	a) Current calculati	on	b)	Voltage calcu	lation
	c) Power calculation	n	d)	Energy calcu	lation
8)	A circuit with a resist for Hz. If all the compared frequency is	oonents values ar 	e n	ow doubled, th	e new resonant
	a) 2f ₀	b) f _o	c)	f ₀ /4	d) $f_0/2$
9)	In a series R-L-C ci frequency is		. = 1	H, $C = 1/400 \mu$	uf. The resonant
	a) 2 × 10 ⁴ Hz	b) $\frac{1}{2} \times 10^4 \text{Hz}$	c)	10⁴Hz	d) $2\pi \times 10^4 \text{ Hz}$
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	e	b)	Remain unch	anged
	c) Becomes double	e	d)	None of the a	bove
11)	is	s not a bilateral.			
	a) Resistor	b) Diode	c)	Capacitor	d) Inductor
12)	In active filter,	elem	ent	is absent.	
	a) Inductor		b)	Capacitor	
	c) Both a) and b)		d)	Resistor	
13)	Reactive power dra	wn by a pure resi	isto	r is	
	a) 0		b)	Minimum	
	c) Maximum		d)	Average	
14)	Under resonance co	ondition, the pow	er f	actor of a syste	em is
	a) Unity	b) Lagging	c)	Leading	d) Any of above



Seat	
No.	

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

Day and Date: Tuesday, 8-5-2018

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

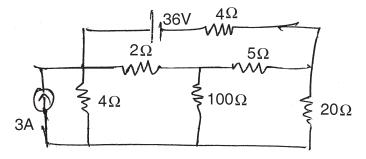
SECTION - I

2. Attempt any 4 questions:

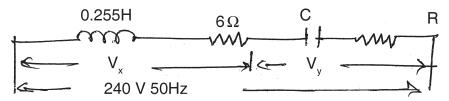
 $(4 \times 4 = 16)$

Marks: 56

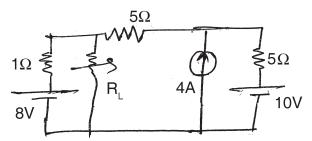
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

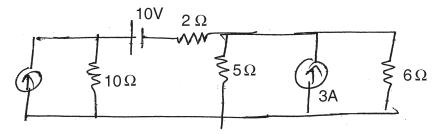




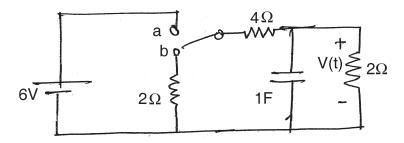
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



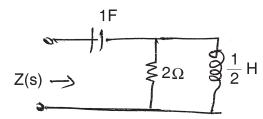
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt any 4 questions:

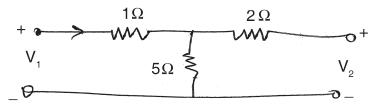
 $(4 \times 4 = 16)$

- 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.



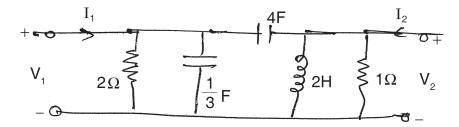
5) Explain how 2 port network can be represented by an equivalent T network.

-5-

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

Seat	
No.	

c) Becomes double

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

_					
•	nd Date : Tueso 2.30 p.m. to 5.	•		Total Marks : 70	
		carries one mark. 2) Answer MCQ/Ob	swer Book Page iective type que	d be solved in first e No. 3. Each question estions on Page No. 3 Q.P. Set (P/Q/R/S) on	
		MCQ/Objective	Type Question	ns	
Duration	on : 30 Minutes			Marks: 14	
 Choose the correct answer : (1×14=1 In series R – L circuit, power factor can be defined as 				(1×14=14)	
	a) R/Z	b) P/S	c) V _r /V	d) All above	
2	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 _o	c) f ₀ /4	d) $f_0/2$	
4)	4) In a series R-L-C circuit, R = $2k\Omega$, L = 1H, C = $1/400~\mu f$. The resonant frequency is				
	a) $2 \times 10^4 \text{ Hz}$	b) $\frac{1}{7} \times 10^4 \text{Hz}$	c) 10 ⁴ Hz	d) $2\pi \times 10^4 \text{ Hz}$	
5)				ource and resistors. If of the node voltages will	
	a) Becomes h	— nalf	b) Remain u	ınchanged	

d) None of the above

6)	is	not a bilateral.		
	a) Resistor	b) Diode	c) Capacitor	d) Inductor
7)	In active filter,	eleme	ent is absent.	
	a) Inductor		b) Capacitor	
	c) Both a) and b)		d) Resistor	
8)	Reactive power dra	wn by a pure resi	stor is	
	a) 0		b) Minimum	
	c) Maximum		d) Average	
9)	Under resonance co	ondition, the powe	er factor of a syste	em is
	a) Unity	b) Lagging	c) Leading	d) Any of above
10)	In an AC circuit con 120V, 50Hz, while t	• .	•	• •
	a) 35 mH	b) 34 mH	c) 30 mH	d) 38 mH
11)	In 2 port network, Z	$_{12} = Z_{21}$ indicates _		property.
	a) Unilateral	b) Bilateral	c) Linear	d) Non-linear
12)	Advantage of active	filter is		
	a) Do not offer again	in	b) Easy to tune	
	c) Both a) and b)		d) Derive high in	npedance load
13)	Number of an ideal especially for casca		•	ncies in pass band _
	a) Zero	b) Unity	c) Infinity	d) Unpredictable
14)	A 2 port network is terminated in a 25Ω			
	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) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$



Seat	
No.	

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

Day and Date: Tuesday, 8-5-2018

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

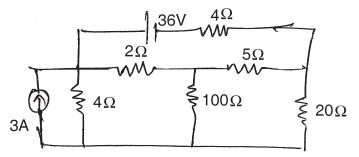
SECTION - I

2. Attempt any 4 questions:

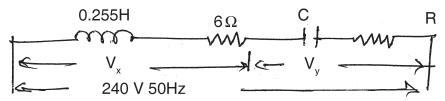
 $(4 \times 4 = 16)$

Marks: 56

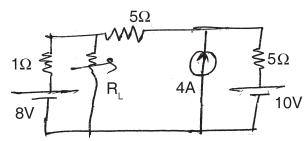
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

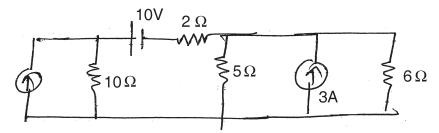




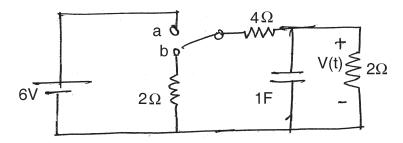
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



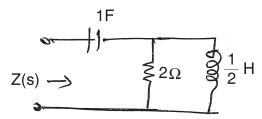
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt **any 4** questions:

 $(4 \times 4 = 16)$

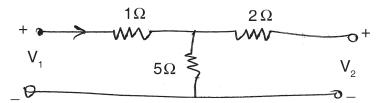
- 1) With the help of neat diagram, explain working of band pass and band reject filter.
- 2) Find poles and zeros of the impedance of the following network and plot them on S-plane.



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



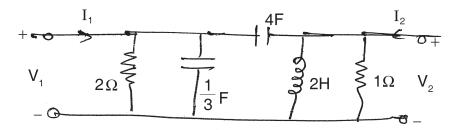
4) Find the transmission parameter for the network shown.



- 5) Explain how 2 port network can be represented by an equivalent T network.
- 5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

Seat No.

Max. Marks: 70

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

Day and Date: Thursday, 3-5-2018

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:

 $(14 \times 1 = 14)$

a)
$$\frac{1}{(s+1)^2}$$

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

c)
$$\frac{s}{(s+1)^2}$$

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

- 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) $\frac{e^{\frac{t}{3}}}{3}$ c) $\frac{e^{t}}{3}$
- d) $\frac{e^{-\frac{1}{3}}}{3}$

- 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) $u_{x} = -v_{y}, u_{y} = v_{x}$

- 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) π i

c) $-\pi i$

 $d) - 2\pi i$

- 13) If $f(z) = \overline{z}$, 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



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:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e4t sin3t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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

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Seat	
No.	

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:

 $(14 \times 1 = 14)$

- 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 πi

- 6) If $f(z) = \overline{z}$, 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)
$$\frac{1}{(s+1)^2}$$

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

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) et

- b) $\frac{e^{\frac{t}{3}}}{2}$ c) $\frac{e^{t}}{3}$
- 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) $u_x = v_y$, $u_y = -v_x$ d) $u_x = -v_y$, $u_y = v_x$

c) $u_{x} = -v_{x}$, $u_{y} = v_{y}$

- 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



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:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e^{4t} sin³t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ is analytic.
- 5) Find the Laplace transform of $e^{-4t} \int_0^t u \sin 3u du$.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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

Seat	
No.	

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:

 $(14 \times 1 = 14)$

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

a)
$$u_x = v_x$$
, $u_y = -v_y$

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

c)
$$u_{x}^{x} = -v_{x}^{x}, u_{y}^{y} = v_{y}^{y}$$

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_a is equal to

a) 1

b) π

c) 0

d) None



- 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 $W = \frac{1}{2}$ 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, $\int_{c}^{c} \frac{\sin z}{z} dz$, C: |z| = 1 is
 - a) 0

b) πi

c) $-\pi i$

d) $-2\pi i$

- 9) If $f(z) = \overline{z}$, 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)
$$\frac{1}{(s+1)^2}$$

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

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) et

- b) $\frac{e^{\frac{t}{3}}}{3}$ c) $\frac{e^{t}}{3}$
- 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) $\Phi'\left(\frac{s}{a}\right)$



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:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e^{4t} sin³t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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

Seat	
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Set S

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

Day and Date: Thursday, 3-5-2018

y, 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:

 $(14 \times 1 = 14)$

- 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) πi

c) $-\pi i$

d) $-2\pi i$

- 4) If $f(z) = \overline{z}$, 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

-2-



6) L{t e^{-t}} is

a)
$$\frac{1}{(s+1)^2}$$

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

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) e4t 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) et

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

b) π

c) 0

d) None



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:

 $(4 \times 4 = 16)$

- 1) Find the Laplace transform of e4t sin3t.
- 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 $\frac{1}{2}log(x^2 + y^2) + itan^{-1}\frac{kx}{y}$ 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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

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

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

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S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018 HUMAN ANATOMY AND PHYSIOLOGY

	` HUI	MAN ANATOMY	AND PHYSIOLO	OGY	
-	nd Date : Friday, 4 2.30 p.m. to 5.30			Max. Ma	arks : 70
	2) 3) 4)	Assume suitable Q. No. 1 is cor 30 minutes in A carries one mark Answer MCQ/O	tht indicate full man e data wherever red mpulsory. It shou nswer Book Page : bjective type ques et to mention, Q.P.	quired. uld be solved ir No. 3. Each qu stions on Page	nestion No. 3
Duratio	on : 30 Minutes	MCQ/Objective	Type Questions	Ma	arks : 14
1. Ch	oose the correct a	answer:		(14	4×1=14)
1)	The anatomical ra) Sternum	name for the thigh b) Femur	n bone is c) Clavicle	d) Pelvis	
2)	Number of thoraca) 6	cic vertebrae in th b) 8	ne human body are c) 16	d) 12	
3)	a) Pons c) Medulla	ture of nervous s	ystem detects char b) Thermorecep d) Pituitary Gla	otors	ıre.
4)	a) Dophamine c) Acetylcholine	cample of a neuro	otransmitter. b) Norepinephr d) All of the abo		
5)	The dendrites not a) axon c) cell body	rmally conduct in	npulses towards the b) pituitary glan d) synapse		
6)	Veins are a) Thin	walls that carry b) Thick	y deoxygenated blo c) Rigid		

7) The bone that protects the _____ is called the cranium.

c) Clavicle

a) Sternum b) Brain

d) Pelvis

8)	The thoracic cage is a structural unifunctions?	t important for whi	ch of the following
	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 sr	mall intestine.	
	a) Ascending colon	b) Cecum	
	c) Ileum	d) Sigmoid colon	
11)	hormone does the pancrea	tic alpha cell secre	te.
	a) Insulin	b) Somatostatin	
	c) Glucagon	d) Somatotropin	
12)	The serves as the source of	of the flagellum in s	perm.
	a) Nucleus	b) Cilia	
	c) Cell membrane	d) Centriole	
13)	contains an enzyme that ac	cts upon starches o	f the nutrients.
	a) saliva b) proteins	c) fats	d) minerals
14)	Brain has ventricles.		
,	a) 2 b) 3	c) 4	d) 5
		-	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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.

Set P

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Seat	0-4	
No.	Set	Q

,	I) (Old CGPA) Examination, 2018 'AND PHYSIOLOGY
Day and Date : Friday, 4-5-2018 Time : 2.30 p.m. to 5.30 p.m.	Max. Marks: 70
3) Q. No. 1 is con 30 minutes in Al carries one mark. 4) Answer MCQ/O b	data wherever required. npulsory. It should be solved in first nswer Book Page No. 3 . Each question
MCQ/Objective Duration: 30 Minutes	Type Questions Marks: 14
Duration : 30 ivillutes	Marks . 14
Choose the correct answer:	(14×1=14)
,	unit important for which of the following
functions ? a) Alimentation	b) Menstruation
c) Mentation	d) Respiration
2) allows gas exchange in tl	he lungs.
a) Alveoli b) Bronchi	c) Bronchioles d) Capillaries
3) structures are part of the	
a) Ascending colon	b) Cecumd) Sigmoid colon
c) Ileum4) hormone does the pancre	,
a) Insulin	
c) Glucagon	d) Somatotropin
5) The serves as the source	e of the flagellum in sperm.
a) Nucleus	b) Cilia
c) Cell membrane	d) Centriole
6) contains an enzyme that	

c) 4

7) Brain has _____ ventricles.

a) 2

b) 3

d) 5

8)	The anatomical na	me for the thigh be	one is	
	a) Sternum	b) Femur	c) Clavicle	d) Pelvis
9)	Number of thoracio	vertebrae in the l	numan body are	
	a) 6	b) 8	c) 16	d) 12
10)	structu	re of nervous syst	em detects change	es in temperature.
	a) Pons		b) Thermorecepto	ors
	c) Medulla		d) Pituitary Gland	
11)	is an exa	mple of a neurotra	ınsmitter.	
	a) Dophamine		b) Norepinephrine	9
	c) Acetylcholine		d) All of the above	Э
12)	The dendrites norn	nally conduct impu	ulses towards the	
	a) axon		b) pituitary gland	
	c) cell body		d) synapse	
13)	Veins are	walls that carry d	eoxygenated blood	d towards heart.
	a) Thin	b) Thick	c) Rigid	d) Transparent
14)	The bone that prote	ects the is	called the cranium	n.
	a) Sternum	b) Brain	c) Clavicle	d) Pelvis



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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.

Set Q

Seat	Cod	
No.	Set	K

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 4-5-2018	Max. Marks: 70
T: 0.00 L E.00	

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	
Duratio	on: 30 Minutes	-		Marks: 14
1. Ch	oose the correct ar	nswer:		(14×1=14)
1)	The dendrites nor a) axon c) cell body	mally conduct imp	pulses towards the b) pituitary glar d) synapse	
2)	Veins are a) Thin c) Rigid	_ walls that carry	deoxygenated blo b) Thick d) Transparent	
3)	The bone that pro a) Sternum			
4)	The thoracic cage functions? a) Alimentation c) Mentation	e is a structural u	nit important for v b) Menstruation d) Respiration	which of the following
5)	a) Alveoli c) Bronchioles	as exchange in th	ne lungs. b) Bronchi d) Capillaries	
6)	a) Ascending cold c) Ileum		small intestine. b) Cecum d) Sigmoid cold	on

b) Norepinephrine

d) All of the above

a) Dophamine

c) Acetylcholine



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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.

Set R

Seat	
No.	

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	
Duratio	n : 30 Minutes			Marks: 14
1. Ch	oose the correct a	nswer :		(14×1=14)
1)	a) Ascending cold c) Ileum	•		on
2)	a) Insulin c) Glucagon	e does the pancr	•	n
3)	The serval a) Nucleus c) Cell membrane		e of the flagellum in b) Cilia d) Centriole	n sperm.
4)	a) saliva	-	acts upon starche c) fats	
5)	Brain hasa) 2	ventricles. b) 3	c) 4	d) 5
6)	The anatomical na	ame for the thigh		d) Pelvis
7)	Number of thoraci	c vertebrae in th b) 8	•	d) 12

c) Bronchioles d) Capillaries

14) _____ allows gas exchange in the lungs.

a) Alveoli b) Bronchi



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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.

Set S

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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/Objectiv	e Type Questio	าร
Dur	atio	n : 30 Minutes			Marks : 14
1.	Ch	noose the correc	t answer :		(14×1=14)
	1)	Biosensors are	used in		
		a) medical field		b) agricultui	ral field
		c) pollution mo	nitoring	d) all of the	above
	2)	Restorative bior of the	naterials are desig	ned to recover th	e shape and the function
		a) teeth	b) bone	c) tissue	d) none of above
	3)	are pattern to the sp		(3D) networks of	atoms having no regular
		a) Glasses	b) Fiber	c) Metal	d) Polymer
	4)	Polycrystalline of	ceramics have no	compo	nents.
		a) glassy	b) liquid	c) solid	d) crystal
	5)		the ability of a ma pecific application		with an appropriate host
		a) Reduction		b) Biocomp	atibility
		c) Oxidation		d) None of a	above



6)	Elastic deformation in	n polymers is du	e to)	
	a) Slight adjust of molecular chains				
	b) Slippage of molecular chains				
	c) Straightening of m	nolecular chains			
	d) Severe of covaler	nt bonds			
7)	One of characteristic	properties of po	lyn	ner material	
	a) High temperature	stability	b)	High mechani	ical strength
	c) High elongation		d)	Low hardness	3
8)	Polymers are	in nature.			
	a) organic	b) inorganic	c)	both a and b	d) none
9)	polymers ca	annot be recycle	d.		
	a) Thermoplasts	b) Thermosets	c)	Elastomers	d) All polymers
10)	types of bid	omaterials are us	ed	as bridges betv	veen human tissues
	and metals.				
	a) Polymeric I	b) Ceramic	c)	Metallic	d) All of these
11)	Which of the followin	g statements is t	true	?	
	a) Ceramic materials	s have low meltir	ng p	point	
	b) Porcelain is used	as insulating ma	ater	ial in spark plu	gs
	c) Graphite is viscoe	lastic in nature			
	d) Compacting iron of	oxide powder ce	ram	nic tools are pr	epared
12)	materials	s can be used to	ma	nufacture elas	tomers.
	a) Limestone	b) Petroleum	c)	Alcohol	d) All of the above
13)	Malleability means				
	a) Metals undergo p		n u	nder compres	sive stresses
	b) Metals can be dra	wn into wires			
	c) Both a and b	2			
4.4\	d) None of the above	J			
14)	Ductility means a) Metals can be dra	wn into sheets			
	b) Metals undergo e		n II	nder tensile lo	ads
	c) Metals undergo p				
	d) All of the above		,		



Seat	
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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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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
SLR-1C - 430

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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

Dur	atio	n : 30 Minutes			Marks: 14
1.	Ch	noose the correct ar	iswer:		(14×1=14)
	1)	Polymers are	in nature.		
		a) organic	b) inorganic	c) both a and b	d) none
	2)	polymers	cannot be recycle	ed.	
		a) Thermoplasts	b) Thermosets	c) Elastomers	d) All polymers
	3)	types of and metals.	biomaterials are us	sed as bridges bet	ween human tissues
		a) Polymeric	b) Ceramic	c) Metallic	d) All of these
	4)	Which of the follow	ring statements is	true ?	
		a) Ceramic materia	als have low melti	ng point	
		b) Porcelain is use	ed as insulating ma	aterial in spark plu	ugs
		c) Graphite is visc	oelastic in nature		
		d) Compacting iron	n oxide powder ce	eramic tools are p	repared
	5)	materia	als can be used to	manufacture ela	stomers.
		a) Limestone	b) Petroleum	c) Alcohol	d) All of the above

6)	Malleability meansa) Metals undergo plastic deformab) Metals can be drawn into wiresc) Both a and bd) None of the above		nder compre	essive	e stresses
7)	Ductility means a) Metals can be drawn into sheet b) Metals undergo elastic deformation c) Metals undergo plastic deformation d) All of the above 	ation u			
8)	Biosensors are used in				
	a) medical field	b)	agricultural	field	
	c) pollution monitoring	d)	all of the ab	ove	
9)	Restorative biomaterials are design of the	ned to	recover the s	hape	and the function
	a) teeth b) bone	c)	tissue	d)	none of above
10)	are three-dimensional (a pattern to the spacing.	(3D) ne	etworks of ato	oms h	naving no regular
	a) Glasses b) Fiber	c)	Metal	d)	Polymer
11)	Polycrystalline ceramics have no _		componer	nts.	
	a) glassy b) liquid	c)	solid	d)	crystal
12)	is the ability of a mater response in a specific application.	erial to	perform with	n an	appropriate host
	a) Reduction	b)	Biocompatib	oility	
	c) Oxidation	d)	None of abo	ve	
13)	Elastic deformation in polymers is)		
	a) Slight adjust of molecular chain	IS			
	b) Slippage of molecular chains				
	c) Straightening of molecular chair	ns			
	d) Severe of covalent bonds				
14)	One of characteristic properties of				
	a) High temperature stability	-	High mecha		strength
	c) High elongation	d)	Low hardne	SS	



Seat	
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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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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.

	LR-TC - 43
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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

Dur	atio	n : 30 Minutes						Marks : 14
1.	Ch	noose the correct an	swer:					(14×1=14)
	1)	is the response in a spec		al to	perform with	an	appropriat	te host
		a) Reduction		b)	Biocompatibil	ity		
		c) Oxidation		d)	None of abov	е		
	 2) Elastic deformation in polymers is dual a) Slight adjust of molecular chains b) Slippage of molecular chains c) Straightening of molecular chains d) Severe of covalent bonds)			
	3)	One of characterist a) High temperatur c) High elongation	re stability	b)			strength	
	4)	Polymers are	in nature.	·				
		a) organic	b) inorganic	c)	both a and b	d)	none	
	5)	polymers	cannot be recycle	d.				
		a) Thermoplasts	b) Thermosets	c)	Elastomers	d)	All polym	ers

6)	types of biomaterials are used as bridges between human tissues and metals.							
	and metals. a) Polymeric	h) Coramic	o) Motallic	d) All of those				
7)		•	•	u) 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 visc							
	d) Compacting iro	n oxide powder ce	eramic tools are p	repared				
8)		als can be used to						
	a) Limestone	b) Petroleum	c) Alcohol	d) All of the above				
9)	Malleability means							
	a) Metals undergo	•	on under compres	ssive stresses				
	b) Metals can be o	drawn into wires						
	c) Both a and b	_						
	d) None of the abo	ove						
10)	Ductility means							
	a) Metals can be o							
	b) Metals undergo							
	c) Metals undergo plastic deformation under tensile loads							
	-							
44\	d) All of the above							
11)	d) All of the above Biosensors are use		b) agricultural fi	old				
11)	d) All of the above Biosensors are use a) medical field	ed in	b) agricultural fi					
,	d) All of the aboveBiosensors are usea) medical fieldc) pollution monito	ed in oring	d) all of the abo	ve				
,	d) All of the aboveBiosensors are usea) medical fieldc) pollution monito	ed in oring	d) all of the abo					
,	d) All of the aboveBiosensors are usea) medical fieldc) pollution monitoRestorative biomat	ed in oring erials are designed	d) all of the abo	ve				
,	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth	ed in oring erials are designed b) bone	d) all of the abo d to recover the sh c) tissue	ve ape and the function				
12)	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth	ed in oring erials are designed b) bone ee-dimensional (3E	d) all of the abo d to recover the sh c) tissue	ve ape and the function d) none of above				
12)	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth are three	ed in oring erials are designed b) bone ee-dimensional (3E	d) all of the abo d to recover the sh c) tissue	ve ape and the function d) none of above ns having no regular				
12)	d) All of the above Biosensors are use a) medical field c) pollution monito Restorative biomat of the a) teeth are thre pattern to the space	ed in oring erials are designed b) bone ee-dimensional (3E sing. b) Fiber	d) all of the about to recover the shot c) tissue D) networks of ator c) Metal	ve ape and the function d) none of above ns having no regular d) Polymer				



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 1) Explain which material is suited as bone cement? Mention its specifications.
- 2) Explain materials can be protected from corrosion.

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- 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:

 $(6 \times 2 = 12)$

- 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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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

Dur	atio	n : 30 Minutes				Marks: 14
1.	Ch	(14×1=14)				
	1)	types of and metals.	of biomaterial	s are used as b	ridges betweer	n human tissues
		a) Polymeric	b) Ceran	nic c) Met	tallic d) A	All of these
	2)	Which of the folloa) Ceramic mate b) Porcelain is us c) Graphite is vis d) Compacting ir	rials have lo sed as insula scoelastic in	w melting point iting material ir nature	spark plugs	red
	3)	mate a) Limestone				
	4)	stresses				

5)	Ductility means a) Metals can be db) Metals undergoc) Metals undergod) All of the above	elastic deformatic			
6)	Biosensors are use	d in			
	a) medical field		b)	agricultural fie	eld
	c) pollution monito	ring	d)	all of the above	ve
7)	Restorative biomate of the	erials are designed	d to	recover the sha	ape and the function
	a) teeth	b) bone	c)	tissue	d) none of above
8)	are thre pattern to the spaci	· · · · · · · · · · · · · · · · · · ·)) ne	etworks of aton	ns having no regular
	a) Glasses	b) Fiber	c)	Metal	d) Polymer
9)	Polycrystalline cera	mics have no		component	S.
	a) glassy	b) liquid	c)	solid	d) crystal
10)	is the	ability of a materia	al to	perform with	an appropriate host
	response in a spec	fic application.			
	a) Reduction		b)	Biocompatibil	ity
	c) Oxidation		d)	None of abov	е
l1)	Elastic deformation	in polymers is du	e to)	
	a) Slight adjust of r				
	b) Slippage of mole				
	c) Straightening of				
	d) Severe of covale				
12)	One of characterist		-		
	a) High temperatur	e stability	-		_
. 0/	c) High elongation		•	Low hardness	3
13)	Polymers are			le alle a caral le	.D
	a) organic	_	-	both a and b	a) none
14)	polymers	_			15 A II
	a) Thermoplasts	b) Thermosets	c)	Elastomers	d) All polymers



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (Old CGPA) Examination, 2018 BIOMATERIALS

Day and Date: Saturday, 5-5-2018

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:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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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No.	Set	P
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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

Dur	atio	n : 30 Minutes			Marks: 14
1.	1. Choose the correct answer:				
	1)	type to a rectifier.	of transformer is	required to cr	eate 180 degree input
		a) Center tap second	ondary	b) Step dow	n secondary
		c) Stepped up sec	condary	d) Split wind	ding primary
	2)	In a power supply	diagram	block in	dicates a smooth dc output.
		a) transformer	b) filter	c) rectifier	d) regulator
	3)	A current ratio of I	/I _E is usually less	than one and	is called
		a) beta	b) alpha	c) omega	d) theta
	4)	In a transistor colle	ector current is co	ntrolled by	
		a) base current		b) collector	voltage
		c) collector resista	ince	d) all	
	5)	What is the current $I_E = 4.2 \text{ mA}$ and I_C	guration where		
		a) 16.80	b) 1.05	c) 0.20	d) 0.95

6)	If a transistor opera current gain will mo				e, a (decrease in	the
	a) no where	b) up	c)	down	d)	off the load	line
7)	In series regulator r controlling element.	_		compo	oner	nt works as	a
	a) load resistor	b) zener diode	c)	transistor	d)	none of abo	ove
8)	type of	regulator offers in	her	ent short circu	ıit pı	rotection.	
	a) shunt	b) series c) t	hre	e terminal	d)	switching	
9)	Determine the value $I_{DSS} = 9mA$, $V_{P} = -2$		anc	e for N-channe	el JF	ET with	
	a) 7.5 ms	b) 6.5 ms	c)	4.5 ms	d)	5.5 ms	
10)	Maximum power los	ss in power device	es c	occurs during _		ti	me.
	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 o	r holes	d)	both electron	and	l holes	
12)	is a tw	o terminal three la	aye	r device.			
	a) BJT	b) power diode	c)	MOSFET	d)	none	
13)	is not a p	ower transistor.					
	a) IGBT	b) COLMOS	c)	TRIAC	d)	DIAC	
14)	mode 2 external resistor a				555	timer chip h	nas
	a) Monostable		b)	Pulse stretchi	ng		
	c) Schmidt trigger		d)	Astable			



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:

 $(4 \times 4 = 16)$

- 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 $V_{CF} = 6V$, $I_{C} = 3mA$, $V_{BF} = 0.7V$.
- 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:

 $(6 \times 2 = 12)$

- 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:

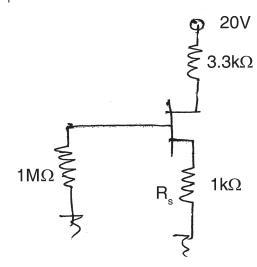
 $(4 \times 4 = 16)$

- 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:

$$I_{DSS} = 8mA$$

$$V_P = -6V$$



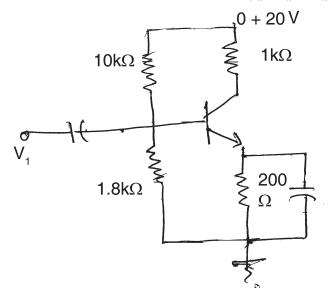
- a) V_{GS}
- b) I_D
- c) V_{DS}
- d) V_s .
- 4) Explain construction and working of DIAC power device.
- 5) Explain working of a stable multivibrator using IC555. Draw necessary waveform.



5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) For the circuit shown determine : $I_{\text{CQ}},\,I_{\text{BQ}},\,V_{\text{EQ}}$ and stability factor β = 80.



- 2) Explain construction and working of power transistors and trial.
- 3) Draw and explain various configuration of MOSFET in short.

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

Dur	atic	on : 30 Minutes				Marks: 14
1.	Ch	noose the correct an	swer:			(14×1=14)
	1)	type of	regulator offers in	herent short circ	uit protection	
		a) shunt	b) series c) t	hree terminal	d) switching	g
	2)	Determine the value $I_{DSS} = 9mA$, $V_{P} = -2$		ance for N-chann	el JFET with	
		a) 7.5 ms	b) 6.5 ms	c) 4.5 ms	d) 5.5 ms	
	3)	Maximum power los	ss in power devic	es occurs during		_ time.
		a) delay	b) rise	c) spread	d) all	
	4)	Anode current in ar	SCR consists of			
		a) holes only		b) electrons onl	у	
		c) either electron o	r holes	d) both electron	and holes	
	5)	is a tw	o terminal three I	ayer device.		
		a) BJT	b) power diode	c) MOSFET	d) none	
	6)	is not a p	oower transistor.			
		a) IGBT	b) COLMOS	c) TRIAC	d) DIAC	

7)				555 timer chip has
	2 external resistor a	nd an external ca	apacitor.	
	a) Monostable		b) Pulse stretch	ing
	c) Schmidt trigger		d) Astable	
8)	to a rectifier.	of transformer is I	required to create	180 degree input
	a) Center tap secon	ndary	b) Step down se	econdary
	c) Stepped up seco	ondary	d) Split winding	primary
9)	In a power supply dia	agram	block indicates	a smooth dc output.
	a) transformer	b) filter	c) rectifier	d) regulator
10)	A current ratio of I _c /	I _E is usually less t	than one and is ca	alled
	a) beta	b) alpha	c) omega	d) theta
11)	In a transistor collect	ctor current is con	itrolled by	
	a) base current		b) collector volta	age
	c) collector resistar	nce	d) all	
12)	What is the current $I_E = 4.2 \text{ mA}$ and $I_C =$	•	on base configura	tion where
	a) 16.80	b) 1.05	c) 0.20	d) 0.95
13)	If a transistor opera current gain will mo			e, a decrease in the
	a) no where	b) up	c) down	d) off the load line
14)	In series regulator r controlling element.	_	comp	onent works as a
	a) load resistor	b) zener diode	c) transistor	d) none of above



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:

 $(4 \times 4 = 16)$

- 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 $V_{CF} = 6V$, $I_{C} = 3mA$, $V_{BF} = 0.7V$.
- 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:

 $(6 \times 2 = 12)$

- 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:

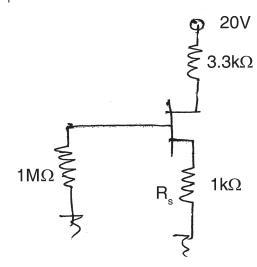
 $(4 \times 4 = 16)$

- 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:

$$I_{DSS} = 8mA$$

$$V_P = -6V$$



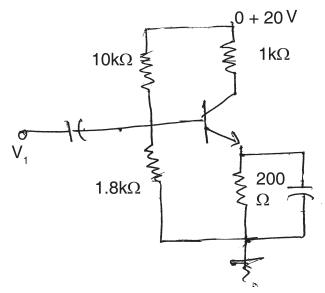
- a) V_{GS}
- b) I_D
- c) V_{DS}
- d) V_s .
- 4) Explain construction and working of DIAC power device.
- 5) Explain working of a stable multivibrator using IC555. Draw necessary waveform.



5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) For the circuit shown determine : $I_{\text{CQ}},\,I_{\text{BQ}},\,V_{\text{EQ}}$ and stability factor β = 80.



- 2) Explain construction and working of power transistors and trial.
- 3) Draw and explain various configuration of MOSFET in short.

Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (Old – CGPA) Examination, 2018 **ELECTRONIC CIRCUIT ANALYSIS AND DESIGN - I**

Total Marks: 70 Day and Date: Monday, 7-5-2018

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.

MOO/Objective Type Overtions

			wcQ/Objecti	ve i	ype Questions		
Dura	tio	n : 30 Minutes					Marks: 14
1.	Ch	noose the correct a	nswer:				(14×1=14)
	1)	What is the curren $I_F = 4.2 \text{ mA}$ and I_C	•	mm	on base configu	ration where	
		a) 16.80	b) 1.05		c) 0.20	d) 0.95	
	2)	If a transistor oper current gain will m					e in the
		a) no where	b) up		c) down	d) off the le	oad line
	3)	In series regulator controlling elemen	•	uit _	com	ponent works	as a
		a) load resistor	b) zener die	ode	c) transistor	d) none of	above
	4)	type o	f regulator offe	ers i	nherent short cir	cuit protection	١.
		a) shunt	b) series	c)	three terminal	d) switchin	ıg
	5)	Determine the value $I_{DSS} = 9mA, V_{P} = -$			tance for N-chan	nel JFET with	1
		a) 7.5 ms	b) 6.5 ms		c) 4.5 ms	d) 5.5 ms	
	6)	Maximum power lo	oss in power o	levio	ces occurs during	9	time.
		a) delav	b) rise		c) spread	d) all	

7)	Anode current in an	SCR consists of			
	a) holes only		b)	electrons only	y
	c) either electron or	r holes	d)	both electron	and holes
8)	is a tw				
	a) BJT	b) power diode	c)	MOSFET	d) none
9)	is not a p	ower transistor.			
	a) IGBT	b) COLMOS	c)	TRIAC	d) DIAC
10)	mode = 2 external resistor a	=	_		555 timer chip has
	a) Monostable		b)	Pulse stretch	ing
	c) Schmidt trigger		d)	Astable	
11)	to a rectifier.	of transformer is r	equ	uired to create	180 degree input
	a) Center tap secon	ndary	b)	Step down se	econdary
	c) Stepped up seco	ondary	d)	Split winding	primary
12)	In a power supply dia	agram		block indicates	a smooth dc output.
	a) transformer	b) filter	c)	rectifier	d) regulator
13)	A current ratio of $I_{\rm c}$	l _e is usually less t	har	n one and is ca	alled
	a) beta	b) alpha	c)	omega	d) theta
14)	In a transistor collect	ctor current is con	trol	led by	
	a) base current		b)	collector volta	age
	c) collector resistar	nce	d)	all	



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:

 $(4 \times 4 = 16)$

- 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 $V_{CF} = 6V$, $I_{C} = 3mA$, $V_{BF} = 0.7V$.
- 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:

 $(6 \times 2 = 12)$

- 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:

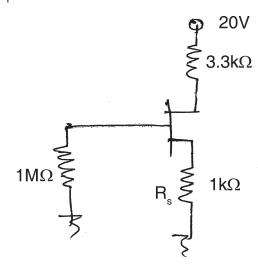
 $(4 \times 4 = 16)$

- 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:

$$I_{DSS} = 8mA$$

$$V_P = -6V$$



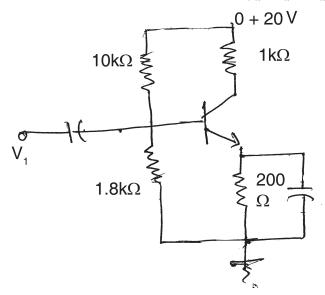
- a) V_{GS}
- b) I_D
- c) V_{DS}
- d) V_s .
- 4) Explain construction and working of DIAC power device.
- 5) Explain working of a stable multivibrator using IC555. Draw necessary waveform.



5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) For the circuit shown determine : $I_{\text{CQ}},\,I_{\text{BQ}},\,V_{\text{EQ}}$ and stability factor β = 80.



- 2) Explain construction and working of power transistors and trial.
- 3) Draw and explain various configuration of MOSFET in short.

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

Dur	atio	n : 30 Minut	tes						Marks: 14
1.	Ch	noose the co	orrect answ	er:					(14×1=14)
	1)	Maximum p	oower loss	in power devic	es (occurs during	J		_ time.
		a) delay	b) rise	c)	spread	d)	all	
	2)	Anode curr	ent in an S	CR consists of					
		a) holes or	nly						
		b) electron	s only						
		c) either el	lectron or h	oles					
		d) both ele	ectron and h	noles					
	3)		_ is a two t	erminal three I	aye	r device.			
		a) BJT	b) power diode	c)	MOSFET	d)	none	
	4)		is not a pov	ver transistor.					
		a) IGBT	b) COLMOS	c)	TRIAC	d)	DIAC	
	5)			operation is be l an external ca	_		a 555	timer ch	nip has
		a) Monosta	able		b)	Pulse stretc	hing		
		c) Schmid	t trigger		d)	Astable			

6)	type of transformer is required to create 180 degree input				
	to a rectifier.				
	a) Center tap secon	ndary	b) Step down se	econdary	
	c) Stepped up seco	ondary	d) Split winding	primary	
7)	In a power supply dia	agram	block indicates	a smooth dc output.	
	a) transformer	b) filter	c) rectifier	d) regulator	
8)	A current ratio of $I_{\rm c}$	l _e is usually less t	han one and is ca	alled	
	a) beta	b) alpha	c) omega	d) theta	
9)	In a transistor collect	ctor current is con	trolled by		
	a) base current		b) collector volta	age	
	c) collector resistar	nce	d) all		
10)	What is the current	•	n base configura	tion where	
	$I_E = 4.2 \text{ mA} \text{ and } I_C =$	4.0 mA ?			
	a) 16.80	b) 1.05	c) 0.20	d) 0.95	
11)	If a transistor opera current gain will mo			e, a decrease in the	
	a) no where	b) up	c) down	d) off the load line	
12)	In series regulator r controlling element.		comp	onent works as a	
	a) load resistor	b) zener diode	c) transistor	d) none of above	
13)	type of	regulator offers in	herent short circu	uit protection.	
	a) shunt	b) series c) t	hree terminal	d) switching	
14)	Determine the value		ance for N-chann	el JFET with	
	$I_{DSS} = 9mA, V_{P} = -2$	^{2}V , $V_{GS} = -1V$.			
	a) 7.5 ms	b) 6.5 ms	c) 4.5 ms	d) 5.5 ms	



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:

 $(4 \times 4 = 16)$

- 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 $V_{CF} = 6V$, $I_{C} = 3mA$, $V_{BF} = 0.7V$.
- 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:

 $(6 \times 2 = 12)$

- 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:

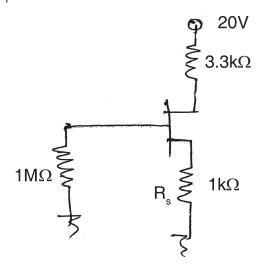
 $(4 \times 4 = 16)$

- 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 a stable multivibrator using IC555. Draw necessary waveform.

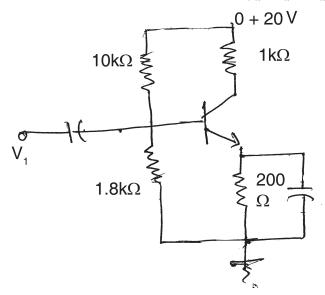




5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) For the circuit shown determine : $I_{\text{CQ}},\,I_{\text{BQ}},\,V_{\text{EQ}}$ and stability factor β = 80.



- 2) Explain construction and working of power transistors and trial.
- 3) Draw and explain various configuration of MOSFET in short.

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

Dur	atio	n : 30 Minutes				Marks: 14
1.	Ch	noose the correct and	swer:			(1×14=14)
	1)	is	s not a bilateral.			
		a) Resistor	b) Diode	c) Capacitor	d) Inductor	
	2)	In active filter,	elem	ent is absent.		
		a) Inductor		b) Capacitor		
		c) Both a) and b)		d) Resistor		
	3)	Reactive power dra	wn by a pure resi	stor 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 a	bove
	5)	In an AC circuit con 120V, 50Hz, while t	• .		•	be
		a) 35 mH	b) 34 mH	c) 30 mH	d) 38 mH	
	6)	In 2 port network, Z	$I_{12} = Z_{21}$ indicates		property.	
		a) Unilateral	b) Bilateral	c) Linear	d) Non-line	ar

7)	Advantage of active	filter is			
	a) Do not offer again		b) Easy to tune		
	c) Both a) and b)		d) Derive high in	mpedance load	
8)	Number of an ideal especially for casca		•	•	
	a) Zero	b) Unity	c) Infinity	d) Unpredictable	
9)			e $V_s = 100V$ in series with 5Ω and pedance 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 circu	uit, power factor ca	an be defined as		
	a) R/Z	b) P/S	c) V/V	d) All above	
11)	Superposition theor	em is not applica	ble for		
	a) Current calculati	on	b) Voltage calcu	ulation	
	c) Power calculatio	n	d) Energy calcu	lation	
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) $f_0/2$	
	In a series R-L-C ci				
	a) 2×10^4 Hz A network contains	b) $\frac{1}{\pi} \times 10^4 \text{Hz}$	c) 10 ⁴ Hz	d) $2\pi \times 10^4 \text{ Hz}$	
14)	A network contains the values of all res	only an independ istors are doubled	lent current sourd d. The value of th	ce and resistors. If e node voltages will	
	a) Becomes half		b) Remain unch	nanged	
	c) Becomes double	•	d) None of the a	above	



Seat	
No.	

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

Day and Date: Tuesday, 8-5-2018

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

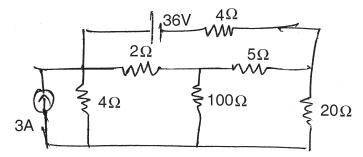
SECTION - I

2. Attempt any 4 questions:

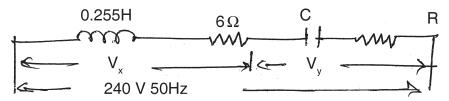
 $(4 \times 4 = 16)$

Marks: 56

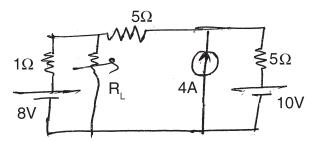
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

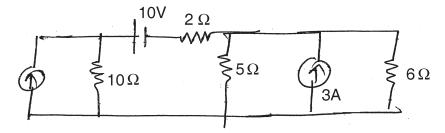




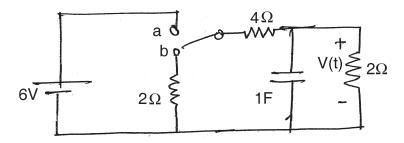
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



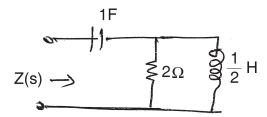
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt **any 4** questions:

 $(4 \times 4 = 16)$

- 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.

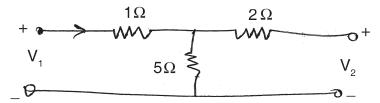


3) Derive condition for reciprocity for open circuit impedance parameter.

-5-



4) Find the transmission parameter for the network shown.

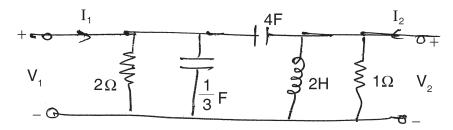


5) Explain how 2 port network can be represented by an equivalent T network.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

Seat	
No.	

frequency is _____

a) 2f₀

b) f₀

Set



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 guestion 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: $(1 \times 14 = 14)$ 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 25 Ω resistor. The impedance parameters are ____ b) $\begin{bmatrix} 20 & 40 \\ 2 & 10 \end{bmatrix}$ c) $\begin{bmatrix} 10 & 40 \\ 10 & 20 \end{bmatrix}$ d) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$ In series R – L circuit, power factor can be defined as _____ b) P/S c) V/V d) All above a) R/Z 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_o Hz. If all the components values are now doubled, the new resonant

c) f₀/4

d) $f_0/2$

6) In a series R-L-C circuit, R = $2k\Omega$, L = 1H, C = $1/400 \mu f$. The resoftequency is				
	a) $2 \times 10^4 \text{ Hz}$ b) $\frac{1}{\pi} \times 10^4 \text{Hz}$	c) 10 ⁴ Hz	d) $2\pi \times 10^4 \text{ Hz}$	
7)	A network contains only an independent the values of all resistors are double	ident current sou	rce and resistors. If	
	a) Becomes half	b) Remain un	changed	
	c) Becomes double	d) None of the	e above	
8)	is not a bilateral.			
	a) Resistor b) Diode	c) Capacitor	d) Inductor	
9)	In active filter, elen	nent is absent.		
	a) Inductor	b) Capacitor		
	c) Both a) and b)	d) Resistor		
10)	Reactive power drawn by a pure res			
	a) 0	b) Minimum		
	c) Maximum	d) Average		
11)	Under resonance condition, the pov	ver factor of a sy	stem is	
	a) Unity b) Lagging	c) Leading	d) Any of above	
12)	In an AC circuit containing pure indu 120V, 50Hz, while the current is 10		•	
	a) 35 mH b) 34 mH	c) 30 mH	d) 38 mH	
13)	In 2 port network, $Z_{12} = Z_{21}$ indicates	S	_ property.	
	a) Unilateral b) Bilateral		d) Non-linear	
14)	Advantage of active filter is			
	a) Do not offer again	b) Easy to tun	е	
	c) Both a) and b)	d) Derive high	impedance load	



Seat	
No.	

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

Day and Date: Tuesday, 8-5-2018

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

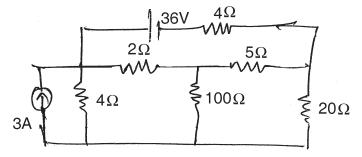
SECTION - I

2. Attempt any 4 questions:

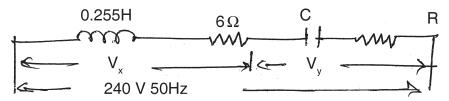
 $(4 \times 4 = 16)$

Marks: 56

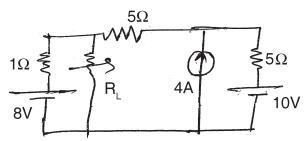
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

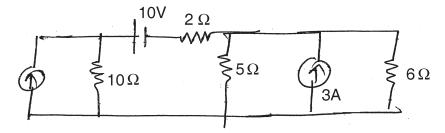




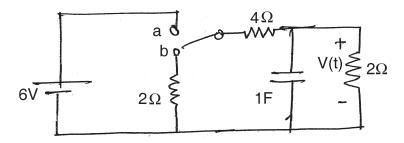
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



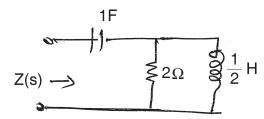
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt **any 4** questions:

 $(4 \times 4 = 16)$

- 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.

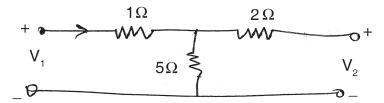


3) Derive condition for reciprocity for open circuit impedance parameter.

-5-



4) Find the transmission parameter for the network shown.

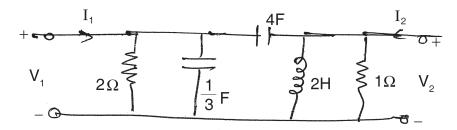


5) Explain how 2 port network can be represented by an equivalent T network.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

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

Total Marks: 70 Day and Date: Tuesday, 8-5-2018

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

Dur	atio	n : 30 Minutes			Marks: 14
1.	Ch	noose the correct a	ınswer :		(1×14=14)
 In an AC circuit containing pure inducta 120V, 50Hz, while the current is 10A. T 			• .		•
		a) 35 mH	b) 34 mH	c) 30 mH	d) 38 mH
	2)	In 2 port network,	$Z_{12} = Z_{21}$ indicates	S	property.
					d) Non-linear
3) Advantage of active filter is					
		a) Do not offer ag	gain	b) Easy to tu	ne
		c) Both a) and b)		d) Derive hig	h impedance load
	4)	Number of an ide especially for cas	al value of attenua	ation for the freq	uencies in pass band
		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) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$

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 theor	em is not applica	ble	for	
	a) Current calculati	on	b)	Voltage calcu	lation
	c) Power calculation	n	d)	Energy calcul	ation
8)	A circuit with a resistor, inductor and f ₀ Hz. If all the components values are frequency is		e n	ow doubled, th	e new resonant
	a) 2f ₀	b) f _o	c)	f ₀ /4	d) $f_0/2$
9)	In a series R-L-C ci frequency is		= 1	H, $C = 1/400 \mu$	ւf. The resonant
	a) 2 × 10 ⁴ Hz	b) $\frac{1}{2} \times 10^4 \text{Hz}$	c)	10⁴Hz	d) $2\pi \times 10^4 \text{ Hz}$
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 unch	anged
	c) Becomes double)	d)	None of the a	bove
11)	is	not a bilateral.			
	a) Resistor	b) Diode	c)	Capacitor	d) Inductor
12)	In active filter,	elem	ent	is absent.	
	a) Inductor		b)	Capacitor	
	c) Both a) and b)		d)	Resistor	
13)	Reactive power dra	wn by a pure res	isto	r is	
	a) 0		b)	Minimum	
	c) Maximum		d)	Average	
14)	Under resonance co	ondition, the pow	er fa	actor of a syste	em is
	a) Unity	b) Lagging	c)	Leading	d) Any of above



Seat	
No.	

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

Day and Date: Tuesday, 8-5-2018

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

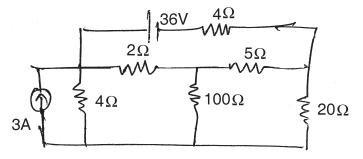
SECTION - I

2. Attempt any 4 questions:

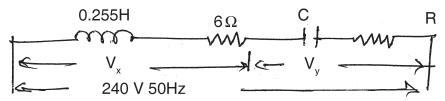
 $(4 \times 4 = 16)$

Marks: 56

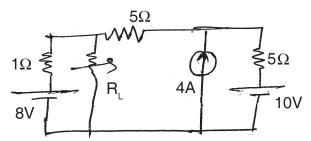
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

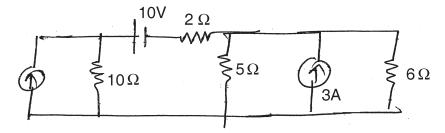




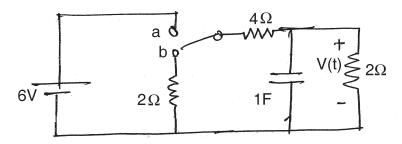
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



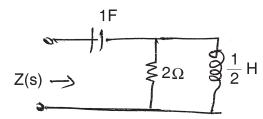
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt **any 4** questions:

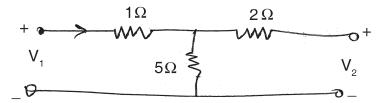
 $(4 \times 4 = 16)$

- 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.

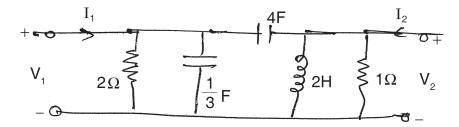
4) Find the transmission parameter for the network shown.



- 5) Explain how 2 port network can be represented by an equivalent T network.
- 5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

Seat	
No.	

c) Becomes double

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

Day and Date: Tuesday, 8-5-2018 Time: 2.30 p.m. to 5.30 p.m.				Total Marks	: 70	
	1	2)	carries one mark. Answer MCQ/Obj e	swer Book Page ective type que	the solved in first No. 3. Each question estions on Page No. 3 D.P. Set (P/Q/R/S) on	
			MCQ/Objective	Type Question	S	
Dura	atio	n : 30 Minutes			Marks	: 14
1.		noose the correct In series R – L ci	answer : rcuit, power factor	can be defined	(1×14=	=14)
		a) R/Z	b) P/S	c) V _/ /V	d) All above	
	2)	Superposition the	eorem is not applic	able for		
		a) Current calcu	lation	b) Voltage calculation		
		c) Power calcula	ation	d) Energy calculation		
	3)	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 _o	c) $f_0/4$	d) f ₀ /2	
	4) In a series R-L-C circuit, R = $2k\Omega$, L = 1H, C = $1/400~\mu f$. The resonant frequency is					
		a) $2 \times 10^4 \text{ Hz}$		c) 10 ⁴ Hz	d) $2\pi \times 10^4 \text{ Hz}$	
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 were supported to the contains of the contains and the contains are doubled.						
		a) Becomes half	:	b) Remain u	nchanged	

d) None of the above

6)	is	s not a bilateral.		
	a) Resistor	b) Diode	c) Capacitor	d) Inductor
7)	In active filter,	elem	ent is absent.	
	a) Inductor		b) Capacitor	
	c) Both a) and b)		d) Resistor	
8)	Reactive power dra	wn by a pure resi	stor is	
	a) 0		b) Minimum	
	c) Maximum		d) Average	
9)	Under resonance c	ondition, the powe	er factor of a syst	em is
	a) Unity	b) Lagging	c) Leading	d) Any of above
10)	In an AC circuit cor 120V, 50Hz, while t	• .		• • •
	a) 35 mH	b) 34 mH	c) 30 mH	d) 38 mH
11)	In 2 port network, Z	$Z_{12} = Z_{21}$ indicates	I	oroperty.
	a) Unilateral			
12)	Advantage of active	e filter is		
	a) Do not offer aga	in	b) Easy to tune	
	c) Both a) and b)		d) Derive high in	mpedance load
13)	Number of an ideal especially for casca		•	ncies in pass band _
	a) Zero	b) Unity	c) Infinity	d) Unpredictable
14)	A 2 port network is terminated in a 25Ω			
	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) $\begin{bmatrix} 20 & 2 \\ 10 & 40 \end{bmatrix}$



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

Day and Date: Tuesday, 8-5-2018

esday, 8-5-2018 Marks : 56

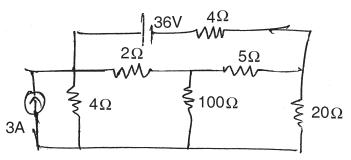
Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

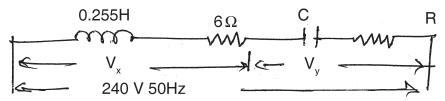
2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

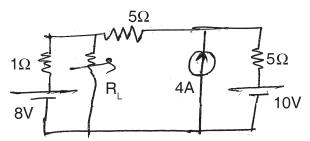
1) Determine the current through the 5Ω resistor using nodal analysis.



- 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 $R_{\rm L}$ for maximum power and calculate maximum power.

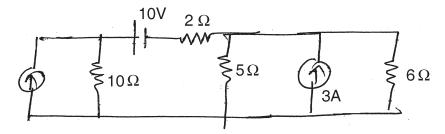




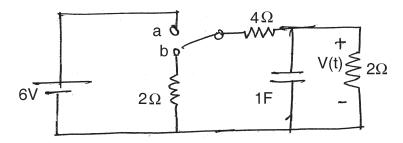
3. Attempt any two questions:

 $(6 \times 2 = 12)$

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).



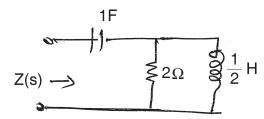
- 3) Write a short note on:
 - a) Mesh and Nodal analysis.
 - b) Current and voltage source transformation.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

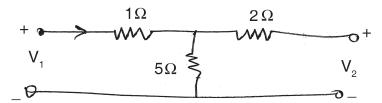
- 1) With the help of neat diagram, explain working of band pass and band reject filter.
- 2) Find poles and zeros of the impedance of the following network and plot them on S-plane.



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



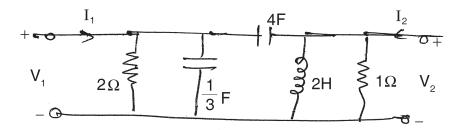
4) Find the transmission parameter for the network shown.



- 5) Explain how 2 port network can be represented by an equivalent T network.
- 5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

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.

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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 T	vpe Questions	
Duratio	n : 30 Minutes	•		Marks : 20
1. Fill	in the blanks:			(1×20=20)
1)	flow of electric cur	rent through it.	substance due to w c) Inductance	which it opposes the d) Impedance
2)	is the p	property of a coil the	•	ange in the amount
3)	An element which as ele	is a source of election	, .	al energy is termed
4)	Ais any	closed part of th	e circuit.	
	a) Mesh	b) Node	c) Branch	d) Loop
5)	A is a connected together a) Node	er.	o or more circuit electors or more circuit ele	
6)	source	e with a parallel re	sistance.	ed into an equivalent
	a) voltage	b) power	c) current	d) watt
7)	Nodal analysis is to a) Kirchoff's		current law. c) Star delta	d) Faradav

8)	phasors.			be represented by
	a) voltages	b) power	c) energy	d) watts
9)	A graph drawn on a intersect.			
				d) none of the above
10)	Sub graph is a sub a) Nodes			
11)	is 0 + order	_	·	te incidence matrix
	a) n + b	b) n/b	c) n×b	d) n – b
12)	If excitation and resis known as the	=		he network function
	a) Transfer	b) Fourier	c) Laplace	d) Driving
13)	When a unit impuls supplied by the sou	urce is		
	a) ∞	b) 1J	c) ½J	d) 0
14)	The transfer funct ports.	ion is used to de	escribe networks v	which have atleast
	a) 3	b) 4	c) 1	d) 2
15)	As the poles of a n a) remains consta c) more oscillating		from the X-axis, the b) becomes less d) variable	
16)	The transfer function			
	a) (RCs) (1+ RCs)	b) $\frac{1}{1+RCs}$	c) $\frac{RCs}{1+RCs}$	d) $\frac{s}{1+RCs}$
17)	For a 2 port symmorparameter C will be		twork, if A = 3 and	B = 1, the value of
	a) 4	b) 6	c) 8	d) 16
18)	For a two port netw a) $z_{11} = z_{22}$	vork to be reciprod b) $y_{12} = y_{21}$		d) AD = BC
19)	The number of roots	of $s^3 + 5s^2 + 7s + 3 =$	= 0 in the left half of s	s-plane is
	a) zero	b) one	c) two	d) three
20)	The nodal method			
	a) KVL and Ohm's	aw	b) KCL and Ohm	
	c) KCL and KVL		d) KCL, KVL and	Ohm's low



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S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date: Saturday, 12-5-2018 Marks: 80

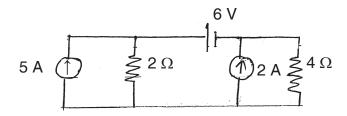
Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

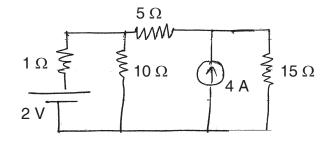
2. Attempt any four:

 $(4 \times 5 = 20)$

- 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.

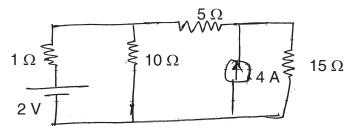


- 4) Define and differentiate between nodal and mesh analysis.
- 5) State and explain superposition theorem.

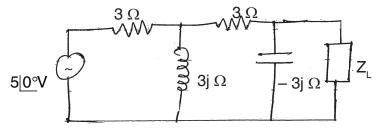
3. Attempt any two:

 $(10 \times 2 = 20)$

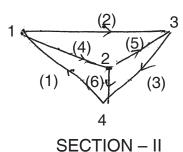
1) State Norton's theorem and find current through 10 Ω resistor using it.



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.



4. Attempt any four:

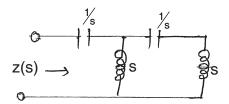
 $(4 \times 5 = 20)$

- 1) Define following:
 - a) Current transfer function
 - b) Transfer impedance function.

-5-



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.

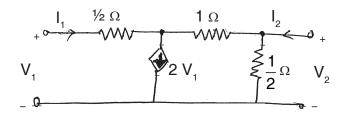
a)
$$s^4 + 4s^3 + 3s + 2$$

b)
$$s^6 + 5s^5 + 4s^4 + 3s^3 + 2s^2 + s + 3$$
.

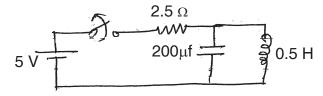
- 5) Mention any 4 properties of positive real function and its necessary and sufficient condition.
- 5. Attempt any two:

 $(10 \times 2 = 20)$

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



Seat	0-4	_
No.	Set	Q

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date : Saturday, 12-5-2018 Time : 2.30 p.m. to 5.30 p.m.				Total Marks: 100
	ŕ	minutes in Answerone mark. Answer MCQ/O	er Book Page No. 3 bjective type que	the solved in first 30 B. Each question carries stions on Page No. 3 B. Set (P/Q/R/S) on Top
		MCQ/Objective	Type Questions	
Duratio	on: 30 Minutes			Marks : 20
1. Fil	l in the blanks :			(1×20=20)
1)	The transfer fund	ction of a low pass	RC network is	
	a) (RCs) (1+ RC	(cs) b) $\frac{1}{1+RCs}$	s RC network is c) $\frac{RCs}{1+RCs}$	d) $\frac{s}{1+RCs}$
2)	For a 2 port symparameter C will		network, if A = 3 ar	and $B = 1$, the value of
	a) 4	b) 6	c) 8	d) 16
3)	For a two port ne	etwork to be recip	rocal	
4.5			c) $h_{21} = -h_{12}$	
4)	The number of roo a) zero		3 = 0 in the left half of c) two	of s-plane is d) three
5)	The nodal metho	od of circuit analys	sis is based on b) KCL and Oh	
	c) KCL and KVL	-	d) KCL, KVL ar	nd Ohm's low
6)		s the property of a urrent through it.	a substance due to	which it opposes the
	a) Capacitance	b) Resistance	c) Inductance	d) Impedance
7)	of current flowing	• •	that opposes any o	change in the amount
	a) Inductance	h) Resistance	c) Canacitance	d) Impedance

8			trical signal of signa	al energy is termed
	as eler a) Passive		c) Series	d) Parallel
9)	A is any	•	•	a) I alalio
٥)	a) Mesh			d) Loop
10)	A is a j	junction where two	o or more circuit ele	ements are
	connected togethe			
	a) Node	b) Mesh	c) Branch	d) Loop
11)	A voltage source wi			ed into an equivalent
	a) voltage			d) watt
40\	_	· ·	•	u) watt
12)	Nodal analysis is based a) Kirchoff's			d) Faraday
40\				
13)	A sinusoidal alterr	nating current and	d can	be represented by
	a) voltages	b) power	c) energy	d) watts
14)				vo branches do not
	a) 1-dimension	b) 3-dimentional	c) 2-dimentional	d) none of the above
15)	Sub graph is a sub	set of branches a	nd of	a graph.
	a) Nodes	b) Planers	c) Meshes	d) Loop
16)	is 0 + order	_	•	te incidence matrix
	a) n + b	b) n/b	c) $n \times b$	d) n – b
17)	If excitation and resis known as the			ne network function
	a) Transfer	b) Fourier	c) Laplace	d) Driving
18)	When a unit impuls supplied by the so			of 1H, the energy
	a) ∞	b) 1J	c) ½J	d) 0
19)	The transfer funct ports.	tion is used to de	escribe networks v	vhich have atleast
	a) 3	b) 4	c) 1	d) 2
20)	As the poles of a na) remains consta c) more oscillating	nt	from the X-axis, the b) becomes less d) variable	



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

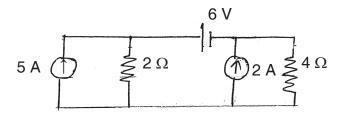
Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

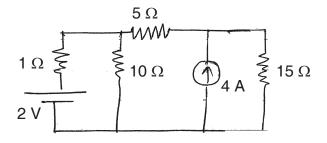
2. Attempt any four:

 $(4 \times 5 = 20)$

- 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.



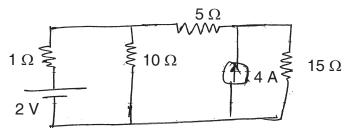
- 4) Define and differentiate between nodal and mesh analysis.
- 5) State and explain superposition theorem.



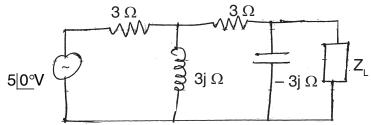
3. Attempt any two:

 $(10 \times 2 = 20)$

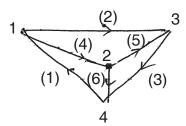
1) State Norton's theorem and find current through 10 Ω resistor using it.



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

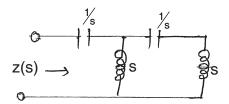
4. Attempt any four:

 $(4 \times 5 = 20)$

- 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.

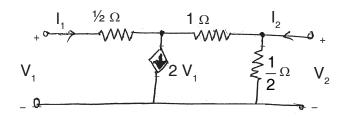
a)
$$s^4 + 4s^3 + 3s + 2$$

b)
$$s^6 + 5s^5 + 4s^4 + 3s^3 + 2s^2 + s + 3$$
.

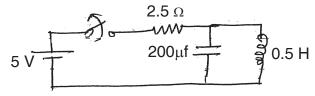
- 5) Mention any 4 properties of positive real function and its necessary and sufficient condition.
- 5. Attempt any two:

 $(10 \times 2 = 20)$

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.

$$z(s) = \frac{(s^2 + 1)(s^2 + 3)}{s(s^2 + 2)(s^2 + 4)}$$

		SLR-TC -	439
Seat No.		Set	R
•	ngineering) (Part – I) (Old) Ex NETWORK ANALYSIS AND S	•	3
Day and Date: Saturday, 12 Time: 2.30 p.m. to 5.30 p.m.		Total Marks	: 100
mii ond 2) An onl	No. 1 is compulsory. It should nutes in Answer Book Page No. 3. e mark. swer MCQ/Objective type questly. Don't forget to mention, Q.P. Page.	Each question cal	rries o. 3
Duration : 30 Minutes	CQ/Objective Type Questions	Mark	ks : 20
is 0 + order	nodes and 'b' branches, the comple	ete incidence matr	20=20) rix

2)	If excitation and resis known as thea) Transfer	point funct	ion.		ne network function d) Driving
3)	When a unit impuls supplied by the so	•	ed	to an inductor of	of 1H, the energy
	a) ∞	b) 1J	c)	½J	d) 0
4)	The transfer funct ports.	ion is used to de	esci	ribe networks v	vhich have atleast
	a) 3	b) 4	c)	1	d) 2
5)	As the poles of a na) remains constact) more oscillating	nt	b)	m the X-axis, th becomes less of variable	•
6)	The transfer function	on of a low pass F	RC i	network is	
	a) (RCs) (1+ RCs)	b) $\frac{1}{1 + RCs}$	c)	RCs 1+RCs	d) $\frac{s}{1+RCs}$
7)	For a 2 port symm	etrical bilateral ne	two	ork, if $A = 3$ and	B = 1, the value of

c) 8

parameter C will be _____

a) 4

b) 6

d) 16

8)	For a two port netv	vork to be reciprod	cal	
	a) $z_{11} = z_{22}$	b) $y_{12} = y_{21}$	c) $h_{21} = -h_{12}$	d) $AD = BC$
9)	The number of roots	of $s^3 + 5s^2 + 7s + 3 =$	= 0 in the left half of s	s-plane is
	a) zero	b) one	c) two	d) three
10)	The nodal method	_		
	a) KVL and Ohm's	alaw	b) KCL and Ohm	's law
	c) KCL and KVL		d) KCL, KVL and	Ohm's low
11)			ubstance due to w	hich it opposes the
	flow of electric curr a) Capacitance	_	c) Inductance	d) Impedance
10\				
12)	of current flowing t		at opposes any cha	ange in the amount
	a) Inductance	=	c) Capacitance	d) Impedance
13)	•	•		al energy is termed
.0,	as eler		aroar orginal or orgin	ar onergy to termou
	a) Passive		c) Series	d) Parallel
14)	A is any	closed part of the	e circuit.	
	a) Mesh	b) Node	c) Branch	d) Loop
15)	A is a j	unction where two	o or more circuit ele	ements are
	connected togethe			
	a) Node	b) Mesh	c) Branch	d) Loop
16)	A voltage source wi			ed into an equivalent
	a) voltage			d) watt
17)	Nodal analysis is b	ased on	current law.	
	a) Kirchoff's			d) Faraday
18)	A sinusoidal alterr phasors.	nating current and	d can	be represented by
	a) voltages	b) power	c) energy	d) watts
19)	A graph drawn on a intersect.	a plane is sa	aid to be planer if tv	wo branches do not
	a) 1-dimension	b) 3-dimentional	c) 2-dimentional	d) none of the above
20)	Sub graph is a sub			
	a) Nodes			



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

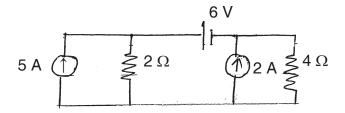
Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

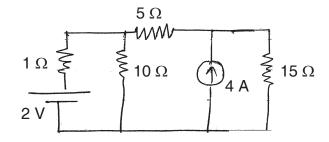
2. Attempt any four:

 $(4 \times 5 = 20)$

- 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.



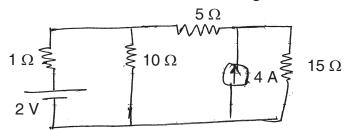
- 4) Define and differentiate between nodal and mesh analysis.
- 5) State and explain superposition theorem.



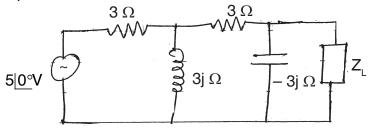
3. Attempt any two:

 $(10 \times 2 = 20)$

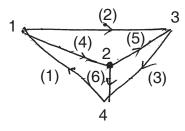
1) State Norton's theorem and find current through 10 Ω resistor using it.



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

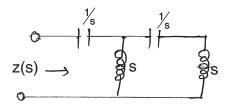
4. Attempt any four:

 $(4 \times 5 = 20)$

- 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.

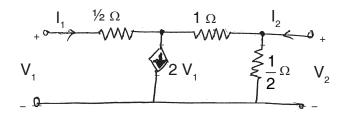
a)
$$s^4 + 4s^3 + 3s + 2$$

b)
$$s^6 + 5s^5 + 4s^4 + 3s^3 + 2s^2 + s + 3$$
.

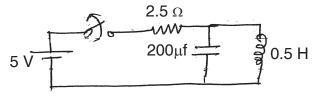
- 5) Mention any 4 properties of positive real function and its necessary and sufficient condition.
- 5. Attempt any two:

 $(10 \times 2 = 20)$

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.

$$z(s) = \frac{(s^2 + 1)(s^2 + 3)}{s(s^2 + 2)(s^2 + 4)}$$

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Seat	Cot	
No.	Set	5

S.E. (Biomedical Engineering) (Part – I) (Old) Examination, 2018 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

•	d Date : Saturday, 2.30 p.m. to 5.30 p			Total Marks	: 100
	2) A	ninutes in Answe one mark. Answer MCQ/Ob ,	r Book Page No. 3.	be solved in first Each question can stions on Page N Set (P/Q/R/S) on	rries o. 3
Duratio	on : 30 Minutes	MCQ/Objective	Type Questions	Mark	ks : 20
1. Fill	in the blanks:			(1×2	0=20)
1)	•	rith a series resista e with a parallel re		ted into an equivale	nt
	a) voltage		c) current	d) watt	
2)	Nodal analysis is a) Kirchoff's		_ current law. c) Star delta	d) Faraday	
3)	A sinusoidal alter phasors.	nating current ar	nd car	n be represented b	ру
	a) voltages	b) power	c) energy	d) watts	
4)	A graph drawn on intersect.	a plane is	said to be planer if	two branches do n	ot
	a) 1-dimension	b) 3-dimentiona	al c) 2-dimentiona	l d) none of the a	oove
5)	Sub graph is a su a) Nodes		and c c) Meshes		
6)	For a graph with 'r is 0 + order		ranches, the comp	lete incidence matr	ix
	a) n + b	b) n/b	c) $n \times b$	d) n – b	
7)	If excitation and re is known as the _	•	•	the network function	n
	a) Transfer	b) Fourier	c) Laplace	d) Driving	

SLR-TC - 439 -2-				
8)	When a unit impul supplied by the so		ed to an inductor	of 1H, the energy
	a) ∞	b) 1J	c) ½J	d) 0
9)	The transfer function ports.	tion is used to de	escribe networks	which have atleast
	a) 3	b) 4	c) 1	d) 2
10)	As the poles of a rank a) remains constant c) more oscillating	nt	from the X-axis, the b) becomes less d) variable	ne response oscillating
11)	The transfer functi			
	a) (RCs) (1+ RCs) b) $\frac{1}{1 + RCs}$	c) RCs 1+RCs	d) $\frac{s}{1+RCs}$
12)	For a 2 port symmometer C will be a) 4	e	twork, if A = 3 and c) 8	B = 1 ,the value of d) 16
13)	For a two port net	,	•	- /
,	a) $z_{11} = z_{22}$	•		d) $AD = BC$
14)	The number of roots	:		s-plane is
,	a) zero		c) two	d) three
15)	The nodal method	of circuit analysis		
	a) KVL and Ohm'	s law	b) KCL and Ohm	
	c) KCL and KVL		d) KCL, KVL and	l Ohm's low
16)	flow of electric cur		substance due to w	hich it opposes the
	a) Capacitance	b) Resistance	c) Inductance	d) Impedance
17)	of current flowing	through it.		ange in the amount
	a) Inductance	b) Resistance	c) Capacitance	d) Impedance
18)				, .
.0)	as ele	ment.		nal energy is termed
.0)	as ele	ment.	trical signal of sign	nal energy is termed
	as ele a) Passive A is any	ment. b) Active closed part of th	c) Series e circuit.	nal energy is termed d) Parallel
19)	as ele a) Passive A is any a) Mesh	ment. b) Active closed part of th b) Node	c) Series e circuit. c) Branch	d) Parallel d) Loop
19)	as ele a) Passive A is any	ment. b) Active closed part of th b) Node junction where two	c) Series e circuit. c) Branch	d) Parallel d) Loop



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

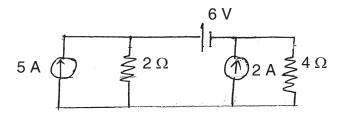
Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

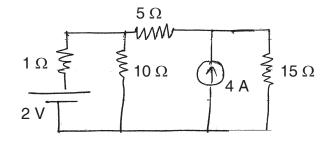
2. Attempt any four:

 $(4 \times 5 = 20)$

- 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.



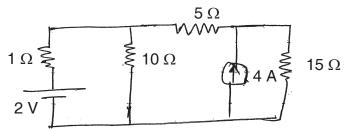
- 4) Define and differentiate between nodal and mesh analysis.
- 5) State and explain superposition theorem.



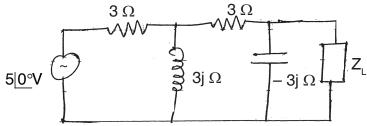
3. Attempt any two:

 $(10 \times 2 = 20)$

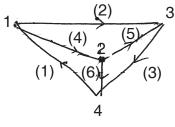
1) State Norton's theorem and find current through 10 Ω resistor using it.



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

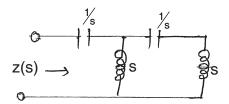
4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Define following:
 - a) Current transfer function
 - b) Transfer impedance function.



2) Determine the driving point impedance of given network.



-5-

- 3) Derive and explain condition for symmetry for z parameter.
- 4) State whether the following polynomial is Hurwitz or not.

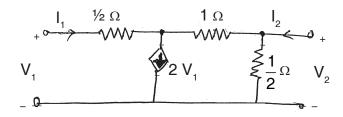
a)
$$s^4 + 4s^3 + 3s + 2$$

b)
$$s^6 + 5s^5 + 4s^4 + 3s^3 + 2s^2 + s + 3$$
.

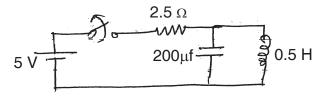
- 5) Mention any 4 properties of positive real function and its necessary and sufficient condition.
- 5. Attempt any two:

 $(10 \times 2 = 20)$

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.

$$z(s) = \frac{(s^2 + 1)(s^2 + 3)}{s(s^2 + 2)(s^2 + 4)}$$

Seat	_	
No.	Set	Р
		_

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

		MCQ/Objective i	ype Questions	
Duratio	on: 30 Minutes	-		Marks : 14
1. Ch	oose the correct ar	iswer:		(14×1=14)
1)	the measuring sys	tem does not resp	•	ut quantity to which d) Error
2)	they measure an o	bject without med		transducers as d) Inductive
3)		, the surfa allic electrodes.		ge accumulates are
4)	Standard electrode a) Voltage			rement of d) Deposited ion
5)	redox reaction. a) Amperometric			ns produced during d) Optical
6)	a) LED		tical sensor. c) Transistor	d) All of above
7)		placement	e in bourdon tubes. b) Pressure to vo d) Pressure to fo	oltage

a) Systematic b) Gross c) Random d) Kinetic

14) _____error is caused by careless handling.



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

 $(4 \times 4 = 16)$

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.



5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 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.	Se

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	Туре	e Questions	
Duratio	n : 30 Minutes	-			Marks: 14
1. Ch	oose the correct ar	nswer:			(14×1=14)
1)	a) Displacement c) Moisture	intities cannot be	b)	asured by capacitive transo Speed None of above	ducers.
2)	des different metals. a) Peltier effect c) Seebeck effect		b)	tween two junctions forme Thomson effect None of above	d by two
3)	strain applied.		b)	e developed is Inversely proportional Independent	to
4)	cell	-		ght, the resistance of pho Remains same d) Separa	
5)	a) Strain gauge c) LVDT	resents active tra	b)	ucer. Thermister Thermo couple	
6)	Capacitive transdoman Static measures c) Transient measures	ment	•	Dynamic measurement Both a) and b)	P.T.O.

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) lons 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. b) Photo diode c) Transistor a) LED 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



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.



5. Attempt any two questions:

- 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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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

Dui	ratio	on : 30 Minutes		Marks: 14	
1.	Ch	oose the correct answer :		(14×1=14)	
	1)	biosensors use	the movement of electrons produced	during	
		redox reaction.			
		a) Amperometric b) Potenti	ometric c) Piezoelectric d) Optical		
	2)	acts as detecto			
		a) LED b) Photo of	diode c) Transistor d) All of all	bove	
	3)	conversion take	e place in bourdon tubes.		
		a) Pressure to displacement	b) Pressure to voltage		
		c) Pressure to strain	d) Pressure to force		
	4)	quantities cann	ot be measured by capacitive transd	ucers.	
			b) Speed		
		c) Moisture	d) None of above		
	5)	describes curre	ent 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			
		strain applied.			
		• •	b) Inversely proportional		
		c) Equal			

7)	With the increase cell	-				•
	a) Increases	b) Decreases	c)	Remains same	d)	Separates
8)	repr					
	a) Strain gauge		b)	Thermister		
	c) LVDT		d)	Thermo couple		
9)	Capacitive transdu					
	a) Static measurer	ment	b)	Dynamic meas	ure	ment
	c) Transient meas	urement	d)	Both a) and b)		
10)	error					
	a) Systematic	b) Gross	c)	Random	d)	Kinetic
11)	is defir	ned as the largest	cha	arge in the inpu	t qı	uantity to which
	the measuring syst	•				
	a) Drift	b) Resolution	c)	Dead band	d)	Error
12)	Capacitive transdu	icers are also cal	lled	as		transducers as
	they measure an o	•		. •		
	a) Proximity	b) Invasive	c)	Loading	d)	Inductive
13)	Quartz is an		ices	on which charg	je a	ccumulates are
	provided with meta					
	a) Conductor		b)	Insulator		
	c) Capacitor		d)	None of above		
14)	Standard electrode					
	a) Voltage	b) Ions apart	c)	Radii of ions	d)	Deposited ion



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.



5. Attempt any two questions:

- 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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S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018 TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

•	d Date : Tuesday, 10.00 a.m. to 1.00			Max. Marks: 70
1	2)	30 minutes in And carries one mark. Answer MCQ/Ob		
		MCQ/Objective	Type Questions	
Duratio	n : 30 Minutes	•	,	Marks: 14
1. Ch	oose the correct a	nswer :		(14×1=14)
1)	In piezoelectric si strain applied.	train transducer vo	oltage developed is	to
	a) Directly propoc) Equal	rtional	b) Inversely proportiond) Independent	ortional
2)	With the increase cell	e in the intensity	of light, the resistar	nce of photovoltaic
	a) Increases	b) Decreases	c) Remains same	d) Separates
3)	a) Strain gauge c) LVDT	presents active tra	nsducer. b) Thermister d) Thermo couple	
4)	a) Static measur		b) Dynamic meas d) Both a) and b)	urement
5)	erro	or is caused by ca	reless handling.	
	a) Systematic	b) Gross	c) Random	d) Kinetic
6)		_	st charge in the inpu	t quantity to which
	a) Drift	stem does not res b) Resolution	c) Dead band	d) Error

7)	Capacitive transducers are also cal they measure an object without med	led as transducers as
	a) Proximity b) Invasive	. •
8)	Quartz is an, the surfator provided with metallic electrodes. a) Conductor c) Capacitor	ces on which charge accumulates are b) Insulator d) None of above
9)	Standard electrode potential for any	
	a) Voltage b) Ions apart	c) Radii of ions d) Deposited ion
10)	biosensors use the mo	ovement of electrons produced during
	redox reaction.	
	a) Amperometric b) Potentiometric	cc) Piezoelectric d) Optical
11)	acts as detector in opt	tical 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 n	neasured 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



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.



5. Attempt any two questions:

- 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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Set P

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018 BIOMEDICAL PROSTHETIC AND ORTHOTICS

DIGINI25107(21110011	
Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks: 70
minutes in Answ carries one mark. 2) Answer MCQ/OL	pulsory. It should be solved in first 30 per Book on Page No. 3. Each question pjective type questions on Page No. get to mention, Q.P. Set (P/Q/R/S) on
MCQ/Objective	Type Questions
Duration: 30 Minutes	Marks: 14
1. Choose the correct answer:	(14×1=14)
1) of the following is not sta	nce 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 know	vn 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 the effort.	is positioned between the fulcrum and
a) first class b) second clas	s c) third class d) fourth class P.T.O.

6)	joints are c		to side and bode a	and forth movement
	a) Hinge	b) Gliding	c) Pivot	d) Condyloid
7)	Following are basis	c types of stress e	xcept	
	a) tensile stress	b) compressive	c) shear	d) volumetric
8)	movem movement of a boo		goniometry is the ι	ipward or backward
	a) Planter flexion	b) Adduction	c) Abduction	d) Dorsiflexion
9)	The degree to which	ch ajoint is able to	move is referred a	S
	a) posture		b) range of motion	n
	c) gait		d) muscle strengt	h
10)	Unit of strain is			
	a) Newton	b) Kg	c) Nm	d) Unit less
11)	A clot formation in	blood vessels is a	lso called	
	a) Diffusion		b) Drift	
	c) Coagulation		d) Hydrolysis	
12)	During gait muscle	es use e	nergy.	
	a) minimum	b) maximum	c) stored	d) kinetic
13)	A cord or strap of o	dense tissue that o	connects a muscle	to bone is called a
	a) tendon	b) ligament	c) bursa	d) arthritis
14)	Protective layer that	at covers dermis is	s known as	
	a) epidermis	b) epithelial	c) muscle	d) nerve



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 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.

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018

	STHETIC AND ORTHOTICS
Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks: 70
minutes in An carries one ma 2) Answer MCQ	ompulsory. It should be solved in first 30 aswer Book on Page No. 3. Each question ark. NObjective type questions on Page No. forget to mention, Q.P. Set (P/Q/R/S) on
MCQ/Objecti Duration: 30 Minutes	ive Type Questions Marks: 14
Choose the correct answer :	(14×1=14)
movement is measur movement of a body part.	red by goniometry is the upward or backward
a) Planter flexion b) Adduction	on c) Abduction d) Dorsiflexion
2) The degree to which ajoint is ab	ole 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 vessel	ls 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 o	dense tissue that o	con	nects a muscle	to b	one is called a
	a) tendon	b) ligament	c)	bursa	d)	arthritis
7)	Protective layer that	at covers dermis is	s kr	nown as		
	a) epidermis	b) epithelial	c)	muscle	d)	nerve
8)	of the foll	owing is not stand	e p	hase of gait.		
	a) Preswing		b)	Midswing		
	c) Loading respon	ise	d)	Post swing		
9)	Cadence is					
	a) Steps per gait of	cycle	b)	Steps per minu	ıte	
	c) Walking time		d)	Stepping time		
11)	The ratio of stress	of strain is known	as			
	a) Modulus of elas	sticity	b)	Young's modul	us	
	c) Both a and b		d)	Hook's modulu	S	
11)	The shoulder and	hip joints are of		type.		
	a) ball and socket		b)	pivot		
	c) saddle		d)	gliding		
12)	In a lever the effort.	r, the resistance is	ро	sitioned betwee	n th	ne fulcrum and
	a) first class	b) second class	c)	third class	d)	fourth class
13)	joints are c		e to	side and bode a	nd '	forth movement
	a) Hinge	b) Gliding	c)	Pivot	d)	Condyloid
14)	Following are basi	c types of stress e	XCE	ept		
	a) tensile stress	b) compressive	c)	shear	d)	volumetric



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 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.

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 s	hould 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 T	ype Questions		
Duratio	n : 30 Minutes				Marks: 14
1. Ch	oose the correct an	swer:			(14×1=14)
1)	In a lever the effort.	r, the resistance is	positioned between	en the fulcrun	n and
	a) first class	b) second class	c) third class	d) fourth cla	ass
2)	joints are o	•	e to side and bode a	and forth mov	ement
	a) Hinge	b) Gliding	c) Pivot	d) Condylo	id
3)	Following are basi	c types of stress e	except		
	a) tensile stress	b) compressive	c) shear	d) volumetr	ric
4)	movem	•	y goniometry is the ι	upward or bac	kward
	a) Planter flexion	b) Adduction	c) Abduction	d) Dorsiflex	rion
5)	The degree to which	ch ajoint is able to	move is referred a	as	
	a) posture		b) range of motio	n	
	c) gait		d) muscle strengt	th	

6)	Unit of strain is					
	a) Newton	b) Kg	c)	Nm	d)	Unit less
7)	A clot formation in	blood vessels is a	lso	called		
	a) Diffusion		b)	Drift		
	c) Coagulation		d)	Hydrolysis		
8)	During gait muscle	es use e	ne	rgy.		
	a) minimum	b) maximum	c)	stored	d)	kinetic
9)	A cord or strap of o	dense tissue that o	on	nects a muscle	to b	one is called a
	a) tendon	b) ligament	c)	bursa	d)	arthritis
10)	Protective layer that	at covers dermis is	s kr	nown as		
	a) epidermis	b) epithelial	c)	muscle	d)	nerve
11)	of the foll	owing is not stand	e p	hase of gait.		
	a) Preswing		b)	Midswing		
	c) Loading respon	ise	d)	Post swing		
12)	Cadence is					
	a) Steps per gait of	cycle	b)	Steps per minu	ıte	
	c) Walking time		d)	Stepping time		
13)	The ratio of stress	of strain is known	as			
	a) Modulus of elas	sticity	b)	Young's modul	us	
	c) Both a and b		d)	Hook's modulu	S	
14)	The shoulder and	hip joints are of		type.		
	a) ball and socket		b)	pivot		
	c) saddle		d)	gliding		



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 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.

Set S

S.E. (Biomedical Engineering) (Part – II) (New CBCS) Examination, 2018 BIOMEDICAL PROSTHETIC AND ORTHOTICS

	BIOWEL	JICAL PROSTINE	THE AND ORTH	01103
-	nd Date : Thursday 10.00 a.m. to 1.00			Max. Marks: 70
	2) A	ninutes in Answei carries one mark. Answer MCQ/Obj	r Book on Page No ective type quest	e solved in first 30 o. 3. Each question rions on Page No. P. Set (P/Q/R/S) on
5	00.14:	MCQ/Objective T	Type Questions	
Duratio	on : 30 Minutes			Marks: 14
1. Ch	oose the correct a	nswer:		(14×1=14)
1)	Unit of strain is			
	a) Newton	b) Kg	c) Nm	d) Unit less
2)	A clot formation in	n blood vessels is a	also called	
	a) Diffusion		b) Drift	
	c) Coagulation		d) Hydrolysis	
3)	During gait muscl	es 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 th	nat covers dermis i	is known as	
	a) epidermis	b) epithelial	c) muscle	d) nerve
6)	of the fo	llowing is not stand	ce phase of gait.	
	a) Preswing		b) Midswing	
	c) Loading respo	nse	d) Post swing	

7)	Cadence is					
	a) Steps per gait of	cycle	b)	Steps per minu	ıte	
	c) Walking time		d)	Stepping time		
8)	The ratio of stress	of strain is known	as			
	a) Modulus of elas	sticity	b)	Young's modul	lus	
	c) Both a and b		d)	Hook's modulu	IS	
9)	The shoulder and	hip joints are of		type.		
	a) ball and socket		b)	pivot		
	c) saddle		d)	gliding		
10)	In a lever the effort.	r, the resistance is	ро	sitioned betwee	n th	ne fulcrum and
	a) first class	b) second class	c)	third class	d)	fourth class
11)	joints are c	•	e to	side and bode a	ınd	forth movement
	a) Hinge	b) Gliding	c)	Pivot	d)	Condyloid
12)	Following are basic	c types of stress e	XCE	ept		
	a) tensile stress	b) compressive	c)	shear	d)	volumetric
13)	movem movement of a boo		/ gc	niometry is the u	ıpw	ard or backward
	a) Planter flexion	b) Adduction	c)	Abduction	d)	Dorsiflexion
14)	The degree to which	ch ajoint is able to	mo	ove is referred a	.S	
	a) posture		b)	range of motion	n	
	c) gait		d)	muscle strengt	h	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 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.

Seat	
No.	

Set P

P.T.O.

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.

	N	ICQ/Objective	Type Questions	3	
Dur	ation : 30 Minutes				Marks: 14
1.	Choose the correct an	swer:			(14×1=14)
	1) The sensitivity of a	multimeter is giv	ven in		
	a) Ω	b) Amperes	c) K Ω/V	d) Joules	
	2) Dynamic errors are	caused by			
	a) Instrument not r	esponding fast			
	b) Human error				
	c) Environmental e	error			
	d) Observational e	rror			
	3) A time base selector	or is used to sele	ect		
	a) Frequency		b) Time		
	c) Amplitude		d) Voltage		
	4) A frequency meter	is used to meas	ure		
	a) Frequency		b) Ratio		
	c) Time interval		d) Phase		DTO

5)	The distance between 2 peaks measured on the X-axis is 2 cm, at 1 cr div. The frequency of the signal is				s is 2 cm, at 1 cm/	
	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 t	he	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 ge	eneration	
	c) Amplification		d)	Alignment		
9)	In a function generation wave.	tor, the resistanc	e d	iode network i	s used to produce	
	a) Square	b) Sine	c)	Triangular	d) Pulse	
0)	A null type recorder	uses				
	a) Amplifier	b) Inductor	c)	Capacitor	d) Potentiometer	
11)	Measurement by du	ıal slope DVM is _l	per	formed during	slope.	
	a) Rising		b)	Falling		
	c) Rising and falling	9	d)	None of the a	lbove	
12)	A distortion is define	ed as				
	a) Unwanted freque	ency	b)	Unwanted an	nplitude	
	c) Change in shape of waveform		d)) Unwanted signal		
13)	Q factor is defined a	as				
	a) Reactance/resist	tance	b)	Resistance/re	eactance	
	c) Resistance/impe	dance	d)	Impedance/re	esistance	
14)	Accuracy is express	sed as				
	a) Relative accurac	;y	b)	% accuracy		
	c) Error		d)	% error		



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:

 $(4 \times 4 = 16)$

- 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 μ A, 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.

|--|

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

Dur	atio	n : 30 Minutes					Marks: 14
1.	Ch	noose the correct ar	iswer:				(14×1=14)
	1)	A sweep generatora) Fault findingc) Amplification	is used to	b)	Frequency g	eneration	
	2)	In a function gener wave.	ator, the resistand	ce d	iode network	is used to pr	oduce
		a) Square	b) Sine	c)	Triangular	d) Pulse	
	3)	A null type recorde	r uses				
		a) Amplifier	b) Inductor	c)	Capacitor	d) Potentio	ometer
	4)	Measurement by d	ual slope DVM is	per	formed during	j s	slope.
		a) Rising		b)	Falling		
		c) Rising and falling	g	d)	None of the	above	
	5)	A distortion is defin	ed as				
		a) Unwanted frequ	iency	b)	Unwanted ar	mplitude	
		c) Change in shap	e of waveform	d)	Unwanted si	gnal	

6)	Q factor is defined a	as			
	a) Reactance/resist	tance	b)	Resistance/re	eactance
	c) Resistance/impe	dance	d)	Impedance/re	esistance
7)	Accuracy is express	sed as			
	a) Relative accurac	ey .	b)	% accuracy	
	c) Error		d)	% error	
8)	The sensitivity of a	multimeter is give	n ir	າ	
	a) Ω	b) Amperes	c)	K Ω/V	d) Joules
9)	Dynamic errors are	caused by			
	a) Instrument not re	esponding fast			
	b) Human error				
	c) Environmental e	rror			
	d) Observational er	ror			
10)	A time base selecto	r is used to selec	t		-
	a) Frequency		b)	Time	
	c) Amplitude		d)	Voltage	
11)	A frequency meter i	s used to measur	e _		
	a) Frequency		b)	Ratio	
	c) Time interval		d)	Phase	
12)	The distance betwee div. The frequency of				s is 2 cm, at 1 cm/
	a) 50 Hz	b) 5 Hz	c)	1 KHz	d) 500 Hz
13)	A sampling CRO is	used for			
			۵)	\/HE	ط/ ۱ E
	a) HF	b) VLF	C)	VIII	d) LF
14)	a) HFFrequency dividers				•
14)	,	are obtained by t	he	use of	



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:

 $(4 \times 4 = 16)$

- 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 μ A, 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.



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

			,,,	
Dur	ation: 30 Minutes			Marks: 14
1.	Choose the correct a	answer:		(14×1=14)
	The distance between div. The frequence	ween 2 peaks mea by of the signal is _		xis is 2 cm, at 1 cm/
	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 divide	rs are obtained by	the use of	
	a) LC network	b) AND gate	c) Flip flop	d) RC n/W
	4) A sweep generat	or is used to		
	a) Fault finding		b) Frequency	generation
	c) Amplification		d) Alignment	
	5) In a function generation wave.	erator, the resistan	ice diode network	is used to produce
	a) Square	b) Sine	c) Triangular	d) Pulse

6)	A null type recorder uses				
	a) Amplifier b) Inductor	c)	Capacitor	d) Potentio	meter
7)	Measurement by dual slope DVI	M is perf	ormed during	S	lope.
	a) Rising	b)	Falling		
	c) Rising and falling	d)	None of the a	above	
8)	A distortion is defined as				
	a) Unwanted frequency	b)	Unwanted an	nplitude	
	c) Change in shape of waveform	m d)	Unwanted sig	gnal	
9)	Q factor is defined as				
	a) Reactance/resistance	b)	Resistance/re	eactance	
	c) Resistance/impedance	d)	Impedance/re	esistance	
10)	Accuracy is expressed as		_		
	a) Relative accuracy	b)	% accuracy		
	c) Error	d)	% error		
11)	The sensitivity of a multimeter is	given ir	l		
	a) Ω b) Amperes	s c)	K Ω/V	d) Joules	
12)	Dynamic errors are caused by _				
	a) Instrument not responding fa	st			
	b) Human error				
	c) Environmental error				
	d) Observational error				
13)	A time base selector is used to s	select		_	
	a) Frequency	b)	Time		
	c) Amplitude	d)	Voltage		
14)	A frequency meter is used to me	easure _		-	
	a) Frequency	b)	Ratio		
	c) Time interval	d)	Phase		



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:

 $(4 \times 4 = 16)$

- 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 μ A, 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.

 	 	 	 	 •••

SLR-TC - 442

Set S

Seat No.

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

Dur	ation : 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 i	s 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

The sensitivity of a	multimeter is give	n ir	າ		
a) Ω	b) Amperes	c)	Κ Ω/V	d)	Joules
Dynamic errors are	caused by				
a) Instrument not re	esponding fast				
b) Human error					
c) Environmental e	rror				
d) Observational er	ror				
A time base selecto	r is used to select	t		-	
a) Frequency		b)	Time		
c) Amplitude		d)	Voltage		
A frequency meter i	s used to measur	e _			
a) Frequency		b)	Ratio		
c) Time interval		d)	Phase		
				s is	2 cm, at 1 cm/
a) 50 Hz	b) 5 Hz	c)	1 KHz	d)	500 Hz
A sampling CRO is	used for				
a) HF	b) VLF	c)	VHF	d)	LF
Frequency dividers	are obtained by tl	he ı	use of		
a) LC network	b) AND gate	c)	Flip flop	d)	RC n/W
A sweep generator	is used to		_		
a) Fault finding		b)	Frequency ge	ene	ration
c) Amplification		d)	Alignment		
In a function generation wave.	ator, the resistance	e di	iode network is	s us	sed to produce
a) Square	b) Sine	c)	Triangular	d)	Pulse
	 a) Ω Dynamic errors are a) Instrument not re b) Human error c) Environmental e d) Observational er A time base selector a) Frequency c) Amplitude A frequency meter i a) Frequency c) Time interval The distance betweediv. The frequency of a) 50 Hz A sampling CRO is a) HF Frequency dividers a) LC network A sweep generator a) Fault finding c) Amplification In a function generator wave. 	a) Ω b) Amperes Dynamic errors are caused by a) Instrument not responding fast b) Human error c) Environmental error d) Observational error A time base selector is used to select a) Frequency c) Amplitude A frequency meter is used to measur a) Frequency c) Time interval The distance between 2 peaks measur div. The frequency of the signal is a) 50 Hz b) 5 Hz A sampling CRO is used for a) HF b) VLF Frequency dividers are obtained by t a) LC network b) AND gate A sweep generator is used to a) Fault finding c) Amplification In a function generator, the resistanc wave.	a) Ω b) Amperes c) Dynamic errors are caused by	a) Ω b) Amperes c) K Ω/V Dynamic errors are caused by	Dynamic errors are caused by



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:

 $(4 \times 4 = 16)$

- 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 μ A, 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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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Seat	
No.	

Set P

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018 DIGITAL DESIGN

Day and Date : Tuesday, 22-5-20	18 Max. Marks :	70
30 minu carries o 2) Answer	MCQ/Objective type questions on Page No. n't forget to mention, Q.P. Set (P/Q/R/S) on To	
MCQ/O Duration: 30 Minutes	bjective Type Questions Marks:	. 14
1. Choose the correct answer :	(1×14=	14)
1) variables wil a) 8 c) 4	be represented by four minterm. b) 2 d) 3	
2) Extremely possible achieved in CMOS IC's . a) Low c) Moderate	by b	
3) In excitation ofa) Tc) J-K	flip flop next state is equal to D state. b) D d) R-S	

4) _____ adder circuits, the carry look ripple delay is eliminated.

a) Multiplication

a) Half

b) Addition

b) Fulld) Parallel

c) Approximation

c) Carry look ahead

d) Integration

6)	The time required time.	d for a gate or in	verter to change	its state is called
	a) Rise	b) Decay	c) Propagation	d) Changing
7)	Odd parity of word a) OR		ntly tested by c) NOR	
8)	The ga a) EX-NOR			d) NOR
9)	Applying Demorga	n's theorem to exp	pression	
	$\overline{\overline{X+Y}}_{+}\overline{\overline{Z}}$, 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 expressingle gate.			
	a) NAND	•	•	•
11)	For the SOP expre	ession AB+ $\overline{\mathtt{B}}\mathtt{C}$,_	zero's	are in truth tables
	output column.	h) One	a) Faux	d) Five
40)	a) Zero			
12)	a) Combinational c) Latches	Circuits		
13)	A ripple counter's sa) Each flip flopc) The flip flops or		the propagation d b) All flip flops an d) Only circuit ga	d gates
14)	Internal propagat	•	nchronous count	er is removed by
	a) Ripple		c) Modulus	d) Synchronous



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 :

 $(4 \times 4 = 16)$

- 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:

- 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.

 $(4 \times 4 = 16)$

- 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.

- 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.



SLR-TC - 443

Seat	
No.	

Set Q

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018 DIGITAL DESIGN

-	d Date : Tuesday, 10.00 a.m. to 1.00			Max.	Marks: 70
1	2) A	0 minutes in Ans arries one mark. Answer MCQ/Obj e	wisory. It should wer Book Page No ective type quest to mention, Q.P. S	o. 3. Each qu i ons on Pa g	uestion ge No. 3
. .:	00.14	MCQ/Objective T	ype Questions		
Duratio	n : 30 Minutes				Marks: 14
1. Ch	oose the correct ar	nswer:			(1×14=14)
1)	The gas a) EX-NOR		XOR gate. c) NAND	d) NOR	
2)	Applying Demorga	an's theorem to ex	pression		
	$\overline{\overline{X+Y}+\overline{Z}}$, we get				
	a) $(X + Y)Z$		b) $(\overline{X} + \overline{Y})Z$		
	c) $(X+Y)\overline{Z}$		$d) \ \left(\overline{X} + \overline{Y}\right)\overline{Z}$		
3)	The Boolean expr	ession $X = \overline{A} + \overline{B} + \overline{C}$	is logically equiva	alent to	
	single gate. a) NAND	b) NOR	c) AND	d) OR	
4)	For the SOP expi	ression AB+BC,_	zero's	are in truth	tables
	output column. a) Zero	b) One	c) Four	d) Five	
5)	a) Combinational c) Latches		aster among the fo b) Sequential circ d) Flip flop	•	

6)	A ripple counter's speed is limited by a) Each flip flop c) The flip flops only with gates	b) All flip flops and gates		
7)	Internal propagation delay of asy counter.	nchronous counter is removed by		
	a) Ripple b) Ring	c) Modulus d) Synchronous		
8)	a) 8 c) 4	ented by four minterm. b) 2 d) 3		
9)	Extremely power dissip achieved in CMOS IC's . a) Low	ation and low cost per gate can be b) High		
	c) Moderate	d) Negligible		
10)	In excitation of flip flop a) T c) J-K	next state is equal to D state. b) D d) R-S		
11)	a) Half c) Carry look ahead	ook ripple delay is eliminated. b) Full d) Parallel		
12)	Conversion of fractional numbers fro accomplished using a successive a) Multiplication c) Approximation	algorithm.		
13)	The time required for a gate or in time.	verter to change its state is called		
	a) Rise b) Decay	c) Propagation d) Changing		
14)	Odd parity of word can be convenient a) OR b) AND	c) NOR d) XOR		



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 :

 $(4 \times 4 = 16)$

- 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:

- 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.

 $(4 \times 4 = 16)$

- 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.

 $(6 \times 2 = 12)$

- 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.

Set Q



SLR-TC - 443

Seat	
No.	

Set R

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018 DIGITAL DESIGN

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: $(1 \times 14 = 14)$ 1) Conversion of fractional numbers from one radix to another is accomplished using a successive ______ algorithm. b) Addition a) Multiplication d) Integration c) Approximation 2) The time required for a gate or inverter to change its state is called __ time. b) Decay a) Rise c) Propagation d) Changing 3) Odd parity of word can be conveniently tested by _____ ____ gate. d) XOR a) OR b) AND c) NOR 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 $\overline{X+Y+7}$, we get b) $(\overline{X} + \overline{Y})Z$ a) (X + Y)Zd) $(\overline{X} + \overline{Y})\overline{Z}$ c) $(X+Y)\overline{Z}$

6)	The Boolean expresingle gate.	ession $X = \overline{A} + \overline{B} + \overline{C}$	Ō is	logically equi	valent to
	a) NAND	b) NOR	c)	AND	d) OR
7)	For the SOP expre	ession AB+BC,_		zero	's are in truth tables
	output column.				
	a) Zero	b) One	c)	Four	d) Five
8)	oper				
	a) Combinational (c) Latches	Circuits		Sequential ci Flip flop	rcuits
9)	A ripple counter's s a) Each flip flop c) The flip flops or		b)	All flip flops a	and gates
10)	Internal propagat		/ncl	nronous cour	nter is removed by
	a) Ripple	b) Ring	c)	Modulus	d) Synchronous
11)	variab	oles will be repres	ent	ed by four mir	nterm.
	a) 8		b)		
	c) 4		d)		
12)	Extremelyachieved in CMOS		atio	on and low co	ost per gate can be
	a) Low		,	High	
	c) Moderate		,	Negligible	
13)	In excitation of	flip flop		•	al to D state.
	a) T c) J-K		b)	R-S	
14)	adder	circuits the carry	,		is eliminated
' '/	a) Half	ondatio, the darry		Full	o diffination.
	c) Carry look ahea	nd	d)	Parallel	



Soot	
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 :

 $(4 \times 4 = 16)$

- 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:

- 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.

 $(4 \times 4 = 16)$

- 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.

- 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.

	SLR-TC – 443
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Seat	2-4	
No.	Set	S

S.E. (Part – II) (Biomedical Engg.) (New CBCS) Examination, 2018 DIGITAL DESIGN

Day and Date: Tuesday, 22-5-2018 Time: 10.00 a.m. to 1.00 p.m.					k. Marks : 70
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.					
Duratio	on : 30 Minutes	MCQ/Objective	Type Questio	ons	Marks: 14
Duratio	iii . 50 Miiiutes				Marks . 14
1. Ch	oose the correct	answer:			(1×14=14)
1)	single gate.	expression $X = \overline{A} + \overline{B} + \overline{B}$		·	
2)	For the SOP ex	xpression $AB + \overline{B}C$,		zero's are in trut	h tables
	output column. a) Zero	b) One	c) Four	d) Five	
3)		pperations are more nal Circuits			
4)	a) Each flip flor	r's speed is limited I o s only with gates	b) All flip flo	ps and gates	
5)		gation delay of as ounter.	synchronous	counter is remo	oved by
	a) Ripple	b) Ring	c) Modulus	d) Synch	ronous
6) variables will be represented by four minterm.					
	a) 8	b) 2	c) 4	d) 3	

7)	Extremely power dissipation and low cost per gate can be achieved in CMOS IC's .			
	a) Lowc) Moderate		b) Highd) Negligible	
8)	In excitation of a) T c) J-K	flip flop (next state is equal b) D d) R-S	to D state.
9)	a) Half c) Carry look ahea		b) Full	eliminated.
10)	Conversion of fract accomplished usin a) Multiplication c) Approximation	g a successive		
11)	The time required time.	I for a gate or in	verter to change	its state is called
	a) Rise	b) Decay	c) Propagation	d) Changing
12)	Odd parity of word a) OR		tly tested by c) NOR	
13)	The ga a) EX-NOR	-	_	d) NOR
14)	Applying Demorga	n's theorem to exp	oression	
	$\overline{\overline{X+Y}}_{+}\overline{\overline{Z}}$, we get			
	a) (X + Y)Z	b) $(\overline{X} + \overline{Y})Z$	c) $(X+Y)\overline{Z}$	d) $(\overline{X} + \overline{Y})\overline{Z}$



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:

 $(4 \times 4 = 16)$

- 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:

- 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.

 $(4 \times 4 = 16)$

- 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.

 $(6 \times 2 = 12)$

- 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.

Set S

CLD TC

				SLN-	16 – 444
Seat No.					Set P
S	, , ,	_	g.) (CBCS) (New ANALYSIS ANI	,	•
-	nd Date : Thursda : 10.00 a.m. to 1.0	•		Tot	al Marks : 70
	,	30 minutes in carries one man Answer MCQ/0	ompulsory. It shad Answer Book Pagerk. Objective type quade get to mention, Q	ge No. 3. Eac u estions on P	h question Page No. 3
Durati	on : 30 Minutes	MCQ/Objectiv	e Type Question	s	Marks : 14
1. C	hoose the correct	answer:			(1×14=14)
1) The current gair a) β_1 .(β_2 /2)		on connection is _ c) β_1/β_2		
2) configura a) Fixed bias c) Emitter follov		vest output impeda b) Voltage di d) Emitter-co	vider	
3) Typical value of a) > 1 c) undefined	current gain of	a CB configuration b) between 1 d) between 1	and 50	_
4) Amplifier gain fo should be minim a) 43		oscillations to obe — c) 10	ey Barkhausen' d) 29	's criteria

5) _____ component is used in Hartley oscillator feedback system.

6) The _____ configuration is frequently used for impedance matching.

7) _____ type of power amplifier is biased for operation at less than 180°

b) Capacitor

a) Class A c) Class C

of the cycle.

a) Inductor

a) fixed bias

c) emitter follower

b) Class B or AB

b) voltage divider bias

d) collector feedback

c) Transistor

d) Resistor

8)	In class B operation active the maximum a) 0.5		d by the output	transis	stor?
9)	In an unbiased em model.	itter bias configura	ation h _{ie} replaces	S	in the ${ m V_{_e}}$
	a) V_e	b) β	c) βV_e	d)	I _b
10)	Op-amps used as configuration.	a high and low	pass filter circui	its em	ploy
	a) non-inverting		b) comparator		
	c) open loop		d) inverting		
11)	ampli	fier is used as fred	quency multiplie	r.	
	a) Class A	b) Class B	c) Class C	d)	Class AB
12)	amon	g the following am	plifier circuit exh	nibit the	e output voltage
	in the form of phas	e inversion.			
	a) Adder		b) Subtractor		
	c) Integrator		d) Differentiato	r	
13)	A circuit whose out signals is considered				ween the input
	a) common mode		b) darlington		
	c) differential		d) operational		
14)	The efficiency of a 15V and an output		-	nplifier	for a supply of
	a) 25%	· · · · · · · · · · · · · · · · · · ·		d)	78.5%



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

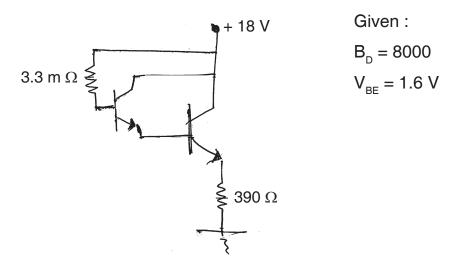
Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions :

 $(4 \times 4 = 16)$

- 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.



- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.

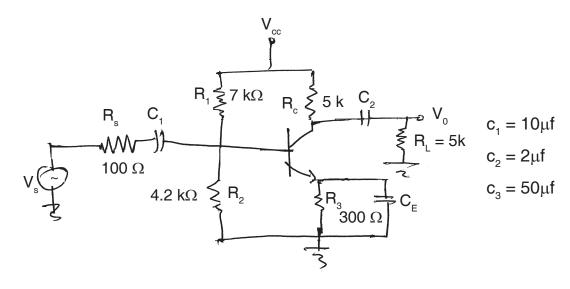


3. Attempt any two questions:

 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 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

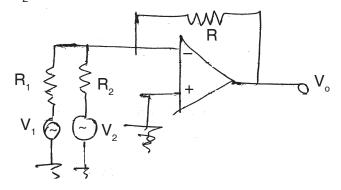
4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions:

- 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.

SLR-TC - 444

Seat	Cot	Q
No.	Set	u

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

-	nd Date : Thursda 10.00 a.m. to 1.0	-		Total Marks:	70
	,	30 minutes in carries one ma Answer MCQ/	Answer Book Page rk. Objective type que	ould be solved in firste e No. 3. Each question estions on Page No. 3 P. Set (P/Q/R/S) on Top) }
		MCQ/Objective	ve Type Questions		
Duration	on : 30 Minutes			Marks:	14
1. Cł	noose the correct	answer:		(1×14=1	4)
1)		mum power dissi	tion of V _{cc} should th pated by the output c) 0.707	ne level of V _L (P) be to transistor?	,
2)	model.			s in the V _e	
3)	· ·	as a high and	 c) βV_e low pass filter circus b) comparator d) inverting 	iits employ	
4)) an	nplifier is used as	s frequency multiplie	er.	
5)	,	nong the following	c) Class Cg amplifier circuit extb) Subtractord) Differentiato	nibit the output voltage	
6)		dered to be			

7)	The efficiency of a 15V and an output		•	ifier for a supply of
	a) 25%	b) 33.3%	c) 50%	d) 78.5%
8)	The current gain for	r the Darlington co	onnection is	I) 0 /0
	a) $\beta_1 \cdot (\beta_2/2)$	b) $\beta_1.\beta_2$	c) β_1/β_2	a) β_2/β_1
9)	configuratioa) Fixed biasc) Emitter follower		output impedanceb) Voltage dividerd) Emitter-collecte	r
10)	Typical value of cu a) > 1 c) undefined	rrent gain of a Cl	B configuration is _ b) between 1 and d) between 100 a	150
11)	Amplifier gain for F should be minimum	=	illations to obey Ba	arkhausen's criteria
	a) 43	b) 4	c) 10	d) 29
12)	componen	t is used in Hartley	y oscillator feedbac	ck system.
	a) Inductor	b) Capacitor	c) Transistor	d) Resistor
13)	The co a) fixed bias c) emitter follower		uently used for imp b) voltage divider d) collector feedb	bias
14)	type of	power amplifier is	biased for operation	on at less than 180°
	of the cycle.			
	a) Class A		b) Class B or AB	
	c) Class C		d) Class D	



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

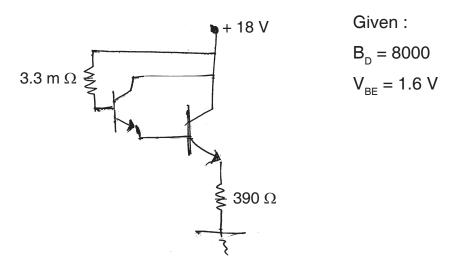
Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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.



- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.

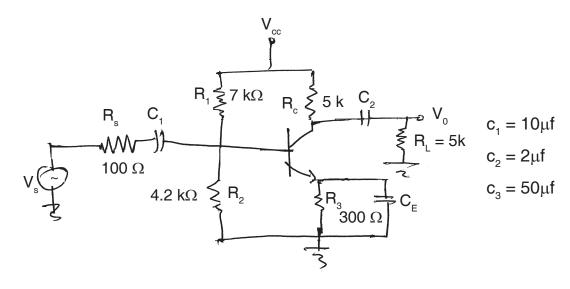


3. Attempt any two questions:

 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 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

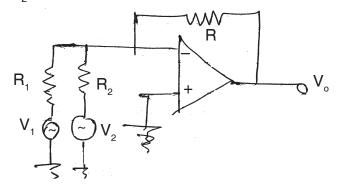
4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions:

- 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.

|--|--|

			SLR-1C - 444	4
Seat No.			Set R	
S.	` , `		ngg.) (CBCS) (New) Examination, 2018 IS ANALYSIS AND DESIGN – II	
-	nd Date : Thursday 10.00 a.m. to 1.00		Total Marks : 7	'0
	2)	30 minutes i carries one m Answer MCC	compulsory. It should be solved in first in Answer Book Page No. 3. Each question park. 2/Objective type questions on Page No. 3 orget to mention, Q.P. Set (P/Q/R/S) on Top	
Duratio	on : 30 Minutes	MCQ/Objec	tive Type Questions Marks: 1	4
1. Ch	oose the correct a	answer:	(1×14=14	4)
	a) Inductor	b) Capacito	Hartley oscillator feedback system. or c) Transistor d) Resistor s frequently used for impedance matching.	
	a) fixed biasc) emitter follow	er	b) voltage divider biasd) collector feedback	
3)	of the cycle. a) Class A c) Class C	of power ampl	ifier is biased for operation at less than 180° b) Class B or AB d) Class D	
4)	In class B opera		iction of V _{CC} should the level of V _L (P) be to sipated by the output transistor? c) 0.707 d) 1	
5)	In an unbiased e model. a) V _e	mitter bias cor β	nfiguration h_{ie} replaces in the V_{e} c) βV_{e} d) I_{b}	
6)	-	as a high and	b) comparator d) inverting	

7)	ampli	fier is used as fred	que	ncy multiplier.		
	a) Class A				d)	Class AB
8)	amon	g the following am	plif	ier circuit exhibit	the	e output voltage
	in the form of phas	e inversion.				
	a) Adder		,	Subtractor		
	c) Integrator		,	Differentiator		
9)	A circuit whose our signals is consider					veen the input
	a) common mode			darlington		
	c) differential		d)	operational		
10)	The efficiency of a 15V and an output	of $V/(D) = 10 V/i$	0			
	a) 25%	b) 33.3%	c)	50%	d)	78.5%
11)	The current gain for a) β_1 .(β_2 /2)	or the Darlington c	onr	ection is		
	a) $\beta_1 \cdot (\beta_2/2)$	b) $\beta_1.\beta_2$	c)	β_1/β_2	d)	β_2/β_1
12)	configuratio	ns has the lowest	ou	put impedance.		
	a) Fixed bias		b)	Voltage divider	•	
	c) Emitter follower	•	d)	Emitter-collecte	er	
13)	Typical value of cu	rrent gain of a C		_		
	a) > 1c) undefined		,	between 1 and between 100 a		
4.4\	•	00 mln n n n n n 1 n 1 n n n	,			
14)	Amplifier gain for F should be minimur		ılla	lions to obey Ba	rkn	ausen s criteria
	a) 43	b) 4	c)	10	d)	29



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

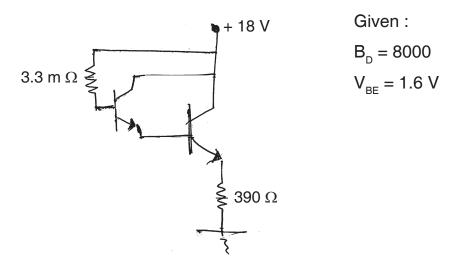
Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions:

- 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.



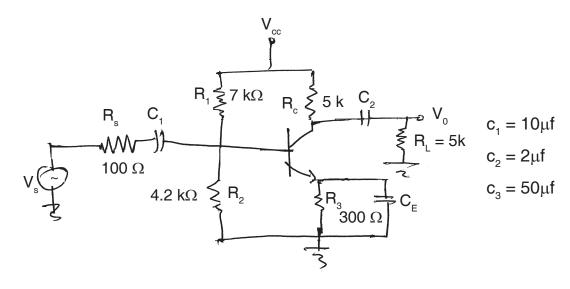
- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.



 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 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.

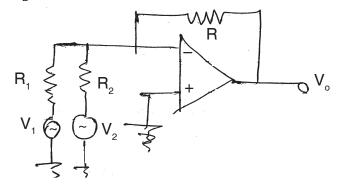
SECTION - II

4. Attempt any four questions:

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions:

- 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.



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

-	nd Date : Thursday 10.00 a.m. to 1.00			Tota	al Marks : 70
	2)	30 minutes in Ar carries one mark. Answer MCQ/Ob	pulsory. It shounswer Book Page jective type ques t to mention, Q.P.	No. 3. Each stions on Pa	n question age No. 3
		MCQ/Objective	Type Questions		
Duratio	on: 30 Minutes	•			Marks: 14
1. Ch	oose the correct a	answer:			(1×14=14)
·	configuration. a) non-inverting c) open loop	·	pass filter circuitsb) comparatord) invertingequency multiplier.	. ,	
۷_			c) Class C		AB
3)	in the form of pha a) Adder c) Integrator		mplifier circuit exhib b) Subtractor d) Differentiator		voltage
4)		ered to be	ial to the difference type of amplification d) operational		e input
5)	•	a transformer co ut of V(P) = 10 V b) 33.3%	upled class A amp	olifier for a s	
6)	_	_	connection is c) β_1/β_2		

7)	,		t output impedance. b) Voltage divider d) Emitter-collecter				
8)	Typical value of cu a) > 1 c) undefined	rrent gain of a Cl	b)	onfiguration is _ between 1 and between 100 a	50		
9)	Amplifier gain for R should be minimum a) 43			tions to obey Ba	ırkha d)		criteria
10)	component	t is used in Hartley	, (0	scillator feedbac	ck sy	ystem.	
11)	The co a) fixed bias c) emitter follower	nfiguration is frequ	b)	ntly used for imp voltage divider collector feedb	bias		ching.
12)	type of of the cycle. a) Class A c) Class C	power amplifier is	b)	sed for operation Class B or AB Class D	n at	less tha	n 180°
13)	In class B operatio active the maximur a) 0.5	n power dissipate	d b	00		tor?¯	be to
14)	In an unbiased emi model. a) V _e	tter bias configurable) β		n h _{ie} replaces βV _e	d)		the $V_{\rm e}$



Seat	
No.	

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

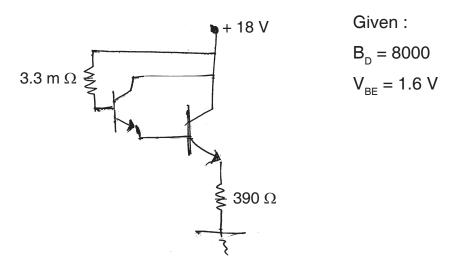
Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions :

- 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.



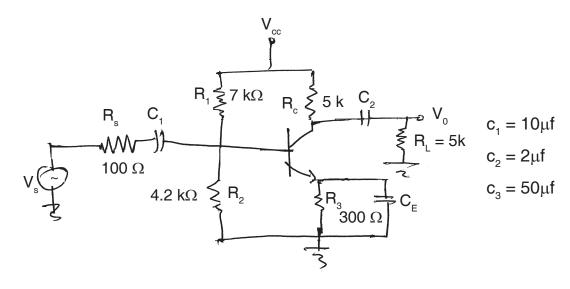
- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.



 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 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.

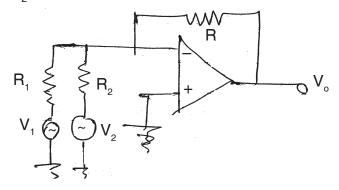
SECTION - II

4. Attempt any four questions :

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions:

- 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.

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No.	Set	Р
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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 1	Type Questions	
Duratio	on: 30 Minutes	•		Marks : 14
1. Ch	noose the correct ar	nswer:		(14×1=14)
1)	the measuring sys	tem does not resp	•	ut quantity to which d) Error
2)	they measure an o	object without med	ulled as chanical coupling. c) Loading	
3)	Quartz is an provided with meta	, the surfa	aces on which char	ge accumulates are
4)	Standard electrode a) Voltage			rement of d) Deposited ion
5)	redox reaction.		ovement of electro	ns produced during d) Optical
6)	a) LED	-	otical sensor. c) Transistor	d) All of above
7)	a) Pressure to dis	placement	e in bourdon tubes. b) Pressure to vo d) Pressure to fo	oltage

a) Systematic b) Gross c) Random d) Kinetic

b) Dynamic measurement

d) Both a) and b)

a) Static measurement

c) Transient measurement

14) _____error is caused by careless handling.



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.

Set P



- 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.

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	Тур	e Questions	
Duratio	n : 30 Minutes	•			Marks: 14
1. Ch	oose the correct ar	nswer:			(14×1=14)
1)	a) Displacement c) Moisture	ntities cannot be	b)	asured by capacitive transo Speed None of above	lucers.
2)	des different metals. a) Peltier effect c) Seebeck effect		b)	tween two junctions formed Thomson effect None of above	d by two
3)	strain applied.	tional	b)	e developed is Inversely proportional Independent	to
4)	cell	,		ght, the resistance of phot Remains samed) Separa	
5)	a) Strain gauge c) LVDT	resents active tra	b)	ucer. Thermister Thermo couple	
6)	Capacitive transdu a) Static measure c) Transient meas	ment	,	Dynamic measurement Both a) and b)	DIO

7)	erro	r is caused by care	eless handling.	
	a) Systematic	b) Gross	c) Random	d) Kinetic
8)	is defi	ned as the largest	charge in the inpu	ut quantity to which
	the measuring sys	stem does not resp	ond.	
	a) Drift	b) Resolution	c) Dead band	d) Error
9)	Capacitive transde	ucers are also cal	lled as	transducers as
	they measure an o	•	. •	
	a) Proximity	b) Invasive	c) Loading	d) Inductive
10)	Quartz is an	, the surfa	aces on which charg	ge accumulates are
	provided with meta			
	a) Conductor		b) Insulator	
	, 1		d) None of above	
11)			half cell is measure	
	,	•	c) Radii of ions	, .
12)		sensors use the mo	ovement of electror	ns produced during
	redox reaction.		\ D :	"
	, .	•	cc) Piezoelectric	d) Optical
13)	acts	•		
			c) Transistor	
14)		-	in bourdon tubes.	
	a) Pressure to dis	placement	b) Pressure to vo	ltage
	c) Pressure to stra	ain	d) Pressure to for	rce



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.



- 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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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

Dura	tio	n : 30 Minutes		7 6			Mar	ks : 14
1. (Cho	oose the correct an	swer:				(14	×1=14)
	1)	biose redox reaction.	ensors use the m	ove	ment of electro	ns p	produced duri	ing
		a) Amperometric	b) Potentiometric	cc)	Piezoelectric	d)	Optical	
	2)	a) LED				d)	All of above	
	3)	a) Pressure to disp c) Pressure to stra	olacement	b)	Pressure to vo	ltag	le	
	4)	 quantities cannot be measured by capacitive transducers. Displacement Speed Moisture None of above 			6.			
	5)	description descri		b)	tween two junct Thomson effect None of above	ct	s formed by t	wo
	6)	In piezoelectric strastrain applied. a) Directly proportic) Equal		b)	e developed is Inversely prop Independent			to

7)	With the increase cell	in the intensity of	f lig	ght, the resista	nce	of photovoltaic
	a) Increases	b) Decreases	c)	Remains same	e d)	Separates
8)	repr	esents active tran	sdı	icer.		
	a) Strain gauge		,	Thermister		
	c) LVDT		d)	Thermo couple	Э	
9)	Capacitive transdu	icer are used for				
	a) Static measure	ment	b)	Dynamic meas	sure	ement
	c) Transient meas		-			
10)	erro	•		_		
	a) Systematic	b) Gross	c)	Random	d)	Kinetic
11)	is defi	_		-	ut qu	uantity to which
	the measuring sys	•				_
	a) Drift	•			-	
12)	Capacitive transdu					transducers as
	they measure an o	•				
	a) Proximity	•	•	_	•	
13)	Quartz is an		ces	on which char	ge a	ccumulates are
	provided with meta	allic electrodes.				
	a) Conductor		,	Insulator		
	c) Capacitor		,	None of above		
14)	Standard electrode					
	a) Voltage	b) ions apart	C)	Radii of ions	a)	Deposited ion



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

 $(4 \times 4 = 16)$

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.

Set R



- 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

S

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018 TRANSDUCER IN BIOMEDICAL INSTRUMENTATION

-	d Date : Tuesday, 1 10.00 a.m. to 1.00 լ			Max. Marks: 70
1	30 Ca 2) A o	0 minutes in Ans arries one mark. nswer MCQ/Obj e	ulsory. It should b wer Book Page No. ective type question to mention, Q.P. Se	3. Each question on Page No. 3
		MCQ/Objective T	ype Questions	
Duratio	n : 30 Minutes			Marks: 14
1. Ch	oose the correct an	swer:		(14×1=14)
1)	strain applied.	ional	tage developed is _ b) Inversely propor d) Independent	
2)	, .	in the intensity of	of light, the resistance	ce of photovoltaic
	a) Increases	b) Decreases	c) Remains same of	d) Separates
3)	a) Strain gauge c) LVDT	esents active tran	sducer. b) Thermister d) Thermo couple	
4)	Capacitive transdua) Static measure c) Transient measure	ment	b) Dynamic measud) Both a) and b)	rement
5)	error	is caused by care b) Gross	eless handling. c) Random	d) Kinetic
6)	is define the measuring systa.) Drift	tem does not resp	t charge in the input bond. c) Dead band	

7)	Capacitive transducers are also of they measure an object without me	called as transducers as echanical coupling.				
	a) Proximity b) Invasive	·				
8)	Quartz is an, the su provided with metallic electrodes. a) Conductor	rfaces on which charge accumulates are b) Insulator				
	c) Capacitor	d) None of above				
9)	Standard electrode potential for ar					
	a) Voltage b) lons apart	c) Radii of ions d) Deposited ion				
10)		movement of electrons produced during				
	redox reaction.					
	a) Amperometric b) Potentiome	tricc) Piezoelectric d) Optical				
11)	acts as detector in o	optical sensor.				
	a) LED b) Photo diode	e c) Transistor d) All of above				
12)	conversion take pla	ce in bourdon tubes.				
	a) Pressure to displacement					
	c) Pressure to strain	d) Pressure to force				
13)	quantities cannot be	e 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				



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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 O₂ cell and mention its applications.
- 5) Describe transconduction phenomenon for biosensor.

- 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.	

Set P

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018 BIOMEDICAL PROSTHETIC AND ORTHOTICS

BIOMEDICAL PROSTH	ETIC AND ORTHOTICS					
Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks : 70					
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						
Duration: 30 Minutes	Marks: 14					
1. Choose the correct answer:	(14×1=14)					
1) of the following is not star	ce 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 know	n 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 i the effort.	s positioned between the fulcrum and					
a) first class b) second class	c) third class d) fourth class					

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)		movemovement of a boo	ent is measured by dy part.	go go	niometry is the u	ipwa	ard or backward
	a)	Planter flexion	b) Adduction	c)	Abduction	d)	Dorsiflexion
9)	Th	e degree to which	ch ajoint is able to	mc	ve is referred a	s	
	a)	posture		b)	range of motion	n	
	c)	gait		d)	muscle strengt	h	
10)	Un	it of strain is					
	a)	Newton	b) Kg	c)	Nm	d)	Unit less
11)	A	clot formation in	blood vessels is a	lso	called		
	a)	Diffusion		b)	Drift		
	c)	Coagulation		d)	Hydrolysis		
12)	Dυ	ıring gait muscle	s usee	ne	gy.		
	a)	minimum	b) maximum	c)	stored	d)	kinetic
13)	A	cord or strap of o	dense tissue that o	on	nects a muscle	to b	oone is called a
	a)	tendon	b) ligament	c)	bursa	d)	arthritis
14)	Pro	otective layer tha	at covers dermis is	s kr	own as		
	a)	epidermis	b) epithelial	c)	muscle	d)	nerve



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 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.

Seat	
No.	

S.F. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018.

-	EDICAL PROST	, ,	PRTHOTICS	1, 2010
Day and Date: Thursd Time: 10.00 a.m. to 1.	•		Max. N	Marks : 70
	minutes in Ansi carries one man Answer MCQ/C	ver Book on Pa k. Dbjective type	ould be solved in finge No. 3. Each que questions on Pagen, Q.P. Set (P/Q/R/	estion e No .
Duration: 30 Minutes	MCQ/Objectiv	e Type Questio		Marks : 14
1. Choose the correct	t answer :		((14×1=14)
movement is measured by goniometry is the upward or backward movement of a body part.				
a) Planter flexi	ion b) Adduction	c) Abduction	on d) Dorsiflex	ion
2) The degree to	which ajoint is able	e to move is refe	erred 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	n in blood vessels	is also called		
a) Diffusion		b) Drift		
c) Coagulation	1	d) Hydrolys	sis	
5) During gait mu	scles 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 foll	lowing is not stand	ер	hase of gait.			
	a) Preswing		b)	Midswing			
	c) Loading respon	ise	d)	Post swing			
9)	Cadence is						
	a) Steps per gait of	cycle	b)	Steps per minu	ite		
	c) Walking time		d)	Stepping time			
10)	The ratio of stress	of strain is known	as				
	a) Modulus of elas	sticity	b)	Young's modul	us		
	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 effort.	r, the resistance is	ро	sitioned betwee	n th	ne fulcrum and	
	a) first class	b) second class	c)	third class	d)	fourth class	
13)	joints are c	apable only of side otation.	e to	side and bode a	nd	forth movement	
	a) Hinge	b) Gliding	c)	Pivot	d)	Condyloid	
14)	Following are basi	c types of stress e	XCE	ept			
	a) tensile stress	b) compressive	c)	shear	d)	volumetric	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 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.

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.

	ı	MCQ/Objective T	γpe	e Questions		
Duratio	on : 30 Minutes		, ,			Marks: 14
1. Ch	oose the correct an	swer:				(14×1=14)
1)	In a lever the effort.	the resistance is	ро	sitioned betwee	n th	ne fulcrum and
	a) first class	b) second class	c)	third class	d)	fourth class
2)	joints are c	•	e to	side and bode a	nd	forth movement
	a) Hinge	b) Gliding	c)	Pivot	d)	Condyloid
3)	Following are basic	c types of stress e	XCE	ept		
	a) tensile stress	b) compressive	c)	shear	d)	volumetric
4)	movem		go,	niometry is the u	pw:	ard or backward
	a) Planter flexion	b) Adduction	c)	Abduction	d)	Dorsiflexion
5)	The degree to which	ch ajoint is able to	mc	ove is referred a	S	
	a) posture		b)	range of motion	า	
	c) gait		d)	muscle strengt	h	

6)	Unit of strain is					
	a) Newton	b) Kg	c)	Nm	d)	Unit less
7)	A clot formation in	blood vessels is a	lso	called		
	a) Diffusion		b)	Drift		
	c) Coagulation		d)	Hydrolysis		
8)	During gait muscle	es usee	ne	rgy.		
	a) minimum	b) maximum	c)	stored	d)	kinetic
9)	A cord or strap of o	dense tissue that o	con	nects a muscle	to b	one is called a
	a) tendon	b) ligament	c)	bursa	d)	arthritis
10)	Protective layer that	at covers dermis is	s kr	nown as		
	a) epidermis	b) epithelial	c)	muscle	d)	nerve
11)	of the foll	owing is not stand	e p	hase of gait.		
	a) Preswing		b)	Midswing		
	c) Loading respon	ise	d)	Post swing		
12)	Cadence is					
	a) Steps per gait of	cycle	b)	Steps per minu	ıte	
	c) Walking time		d)	Stepping time		
13)	The ratio of stress	of strain is known	as			
	a) Modulus of elas	sticity	b)	Young's modul	us	
	c) Both a and b		d)	Hook's modulu	S	
14)	The shoulder and	hip joints are of		type.		
	a) ball and socket		b)	pivot		
	c) saddle		d)	gliding		



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.

Seat	
No.	

Set S

S.E. (Biomedical Engineering) (Part – II) (Old CGPA) Examination, 2018 BIOMEDICAL PROSTHETIC AND ORTHOTICS

	21011121			101100
•	d Date : Thursday 10.00 a.m. to 1.00			Max. Marks: 70
	2)	minutes in Answe carries one mark. Answer MCQ/Ob	er Book on Page i jective type que	be solved in first 30 No. 3. Each question stions on Page No. D.P. Set (P/Q/R/S) on
.	00 M	MCQ/Objective	Type Questions	
Duratio	on: 30 Minutes			Marks: 14
1. Ch	oose the correct a	nswer:		(14×1=14)
1)	Unit of strain is a) Newton	b) Kg	c) Nm	d) Unit less
2)	A clot formation in	n blood vessels is	also called	
_,	a) Diffusion		b) Drift	
	c) Coagulation		d) Hydrolysis	
3)	During gait musc	les use	energy.	
,	a) minimum		c) stored	d) kinetic
4)	A cord or strap of	dense tissue that	connects a musc	ele to bone is called a
	a) tendon	b) ligament	c) bursa	d) arthritis
5)	Protective layer t	hat covers dermis	is known as	
	a) epidermis	b) epithelial	c) muscle	d) nerve
6)	of the fo	ollowing is not star	nce phase of gait.	
	a) Preswing		b) Midswing	
	c) Loading respo	onse	d) Post swing	

7)	Cadence is					
	a) Steps per gait of	cycle	b)	Steps per minu	ute	
	c) Walking time		d)	Stepping time		
8)	The ratio of stress	of strain is known	as			
	a) Modulus of elas	sticity	b)	b) Young's modulus		
	c) Both a and b		d)	Hook's modulu	IS	
9)	The shoulder and I	hip joints are of		type.		
	a) ball and socket		b)	pivot		
	c) saddle		d)	gliding		
10)	In a lever the effort.	r, the resistance is	ро	sitioned betwee	n th	ne fulcrum and
	a) first class	b) second class	c)	third class	d)	fourth class
11)	joints are c		e to	side and bode a	ınd	forth movement
	a) Hinge	b) Gliding	c)	Pivot	d)	Condyloid
12)	Following are basic	c types of stress e	XCE	ept		
	a) tensile stress				d)	volumetric
13)	movem		/ gc	niometry is the u	ıpw	ard or backward
	a) Planter flexion	b) Adduction	c)	Abduction	d)	Dorsiflexion
14)	The degree to which	ch ajoint is able to	mo	ove is referred a	ıs	
	a) posture		b)	range of motion	n	
	c) gait		d)	muscle strengt	h	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.

Seat	
No.	

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 M	nutes				Marks: 14
1. Choose the	correct answer	:			(1×14=14)
	errors a		measuring ins	trument beca	luse of
A) Instru C) Rande			B) Environmer D) Human	ntal	
voltmete					ı r.m.s.
-	olex B) neter is a				
•	in measuring de				ty is
A) Voltag	ge B)	Resistance	C) Impedance	D) Either A)	or B)
5)	Axis modu	ulation is also ca	alled as intensi	ty modulation	
A) 2D	B)	X	C) Y	D) Z	
6) Multimet	er consumes		1 watt o	f power.	
A) < Anc	I = B)	More than	C) <	D) > & =	

7)	In magnetic type of re	corder, data is re	placed for		times.
	A) ∞	B) Triple	C) Multiple	D)	Dual
8)	A conve	rts physical and b	iological quantity	y int	o electrical quantity.
	A) Sensor	B) Transducer	C) Biosensor	D)	None of above
9)	A Piezoelectric force connected to charge is 50 mV/N. The gain	amplifier and ove	rall gain of trans	duc	
	A) 1 mV/PC	B) 1.5 mV/PC	C) 2.5 mV/PC	D)	4 mV/PC
10)	me	tal is used to mea	sure temperatur	e.	
	A) Aluminum		B) Platinum		
	C) Stainless steel		D) Copper		
11)	i	s the ratio of the c	hange in output	to c	change in the
	input.				
	A) Error	B) Resolution	C) Accuracy	D)	Sensitivity
12)	Common anode type	display requires a	an active		configuration
	for code conversion.	D) IP-I	O) Nie 1 eel	Β,	NATIONAL STATE
	A) Low	B) High	•	•	_
13)	In CRO, which of the	following is not a	-	gun	?
	A) Cathode		B) Grid		
	C) Accelerating Anod				
14)	Ink jet recorder gives		•		
	A) 1000	B) 10	C) 500	D)	2000



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:

 $(4 \times 4 = 16)$

- 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.

Seat	
No.	

et 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 Minute	es	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Marks: 14
1. Choose the cor	rect answer :			(1×14=14)
1) A A) Sensor	_ converts physical and B) Transducer	= -	-	-
connected to	ric force transducer has charge amplifier and ov The gain of the amplifier i	erall gain of tran	sducer and a	
A) 1 mV/PC	B) 1.5 mV/PC	C) 2.5 mV/PC	D) 4 mV/P	C
3)	metal is used to me	asure temperati	ıre.	
A) Aluminum	1	B) Platinum		
C) Stainless	steel	D) Copper		
4) input.	is the ratio of the	change in outpu	ıt to change i	n the
A) Error	B) Resolution	C) Accuracy	D) Sensiti	vity
5) Common and for code conv	ode type display requires version.	an active	confi	guration
A) Low	B) High	C) Neutral	D) Multi dig	git

	In CRO, which of the	-	=	gun ?
	A) Cathode		B) Grid	
	A) CathodeC) Accelerating AnodInk jet recorder gives	е	D) X-Y plates	
7)	Ink jet recorder gives	frequency respon	se up to	Hz.
	A) 1000	B) 10	C) 500	D) 2000
8)	erro	rs are inherent in	measuring inst	trument because of
	their mechanical struc	cture.		
	A) Instrumental		B) Environmen	tal
	C) Random		D) Human	
9)	wavefo	orms are most wid	ely accurately m	neasured 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 st	rain gauge, the	output quantity is
	A) Voltage	B) Resistance	C) Impedance	D) Either A) or B)
12)	Axis m	odulation is also d	alled as intensit	y modulation.
	A) 2D		C) Y	
13)	Multimeter consumes	i	1 watt of	f power.
	A) $<$ And $=$			
14)	In magnetic type of re	corder, data is re	placed for	times.
	A) ∞	B) Triple	C) Multiple	D) Dual



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:

 $(4 \times 4 = 16)$

- 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.

Seat	
No.	

Set F

S.E. (Biomedical Engg.) (Part – II) Examination, 2018 (CGPA) ELECTRONIC INSTRUMENTATION (Old)

Day and Date: Saturday, 19-5-2018	Max. Marks: 70
Day and Date: Galdrady, 13 3 2010	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 a	ınswer :		(1×14=14)
1) Axi	s modulation is also	called as intens	ity modulation.
A) 2D	B) X	C) Y	D) Z
2) Multimeter consur	nes	1 watt	of power.
A) $<$ And $=$	B) More than	C) <	D) > & =
3) In magnetic type of	of recorder, data is re	eplaced for	times.
A) ∞	B) Triple	C) Multiple	D) Dual
4) A co	nverts physical and	biological quant	ity into electrical quantity.
A) Sensor	B) Transducer	C) Biosensor	D) None of above
5) A Piezoelectric fo	rce transducer has	a charge sensiti	vity of 20 PC/N. It is
connected to char	ge amplifier and over	erall gain of tran	sducer and amplifier
is 50 mV/N. The g	ain of the amplifier is	s	
A) 1 mV/PC	B) 1.5 mV/PC	C) 2.5 mV/PC	D) 4 mV/PC
6)	metal is used to me	asure temperati	ıre.
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 Anod	е	D) X-Y plates		
10)	Ink jet recorder gives	frequency respor	nse up to		Hz.
	A) 1000	B) 10	C) 500	D)	2000
11)) errors are inherent in measuring instrument because of				nent because of
	their mechanical struc	cture.			
	A) Instrumental		B) Environmen	ıtal	
	C) Random		D) Human		
12)	wavefo	orms are most wic	lely accurately n	neas	sured with r.m.s.
	voltmeter.				
	A) Complex	B) Continuous	C) Dual	D)	Single
	A multimeter is a				
	A) PMMC	B) Digital	C) Electronic	D)	Phase
14)	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)



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:

 $(4 \times 4 = 16)$

- 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set R

Seat	
No.	

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

	INIO CO O DICCLIVE I	ype ducations		
Duration: 30 Minutes				Marks : 14
1. Choose the correct	answer:			(1×14=14)
1)	_ metal is used to me	asure temperati	ıre.	
A) Aluminum		B) Platinum		
C) Stainless stee	el	D) Copper		
2) input.	is the ratio of the	change in outpo	ut to	change in the
A) Error	B) Resolution	C) Accuracy	D)	Sensitivity
Common anode for code convers	type display requires ion.	an active		configuration
A) Low	B) High	C) Neutral	D)	Multi digit
A) Cathode	f the following is not a	a part of electror B) Grid D) X-Y plates	n gun	?
5) Ink jet recorder g A) 1000	gives frequency respo B) 10	onse up to C) 500		

6)		errors are inherent in	measuring ins	trument because of
	their mechanical	structure.		
	A) Instrumental		B) Environmen	tal
	C) Random		D) Human	
7)	wa	aveforms are most wid	ely accurately m	neasured with r.m.s.
	voltmeter.			
	A) Complex	B) Continuous	C) Dual	D) Single
8)	A multimeter is a	a		
	A) PMMC	B) Digital	C) Electronic	D) Phase
9)	In a strain measu	uring device using a st	rain gauge, the	output quantity is
	A) Voltage	B) Resistance	C) Impedance	D) Fither A) or B)
		ris modulation is also o		
	,	B) X	,	,
		ımes		
	A) < And =	B) More than	C) <	D) > & =
12)	In magnetic type	of recorder, data is re	placed for	times.
	A) ∞	B) Triple	C) Multiple	D) Dual
13)	A co	onverts physical and b	iological quantit	y into electrical quantity
	A) Sensor	B) Transducer	C) Biosensor	D) None of above
14)	A Piezoelectric fo	orce transducer has a	charge sensitiv	rity of 20 PC/N. It is
	connected to cha	arge amplifier and ove	rall gain of trans	ducer 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



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:

 $(4 \times 4 = 16)$

- 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set S

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Seat	9-1	_
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) O No 4 is assumed	and the should be a solve of the first 00

- 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 MCO/Objective type questions on Page No. 3.

,	orget to mention, Q.P. Set (P	•
MCQ/Object	tive Type Questions	
Duration : 30 Minutes		Marks : 14
1. Choose the correct answer:		(1×14=14)
 Change in a state occurs durir a) Pulse transition c) Clock pulse 	ng b) Outputs d) Inputs	
2) A combinational circuit can bea) AND gatec) NAND gate	designed using only b) OR gate d) NOR gate	
3) is the gray code to a) 101011 c) 011111	for the binary 101011. b) 110101 d) 111110	
4) Register is a group ofa) Binary cellc) Binary digit	b) Binary number d) Binary system	
5) A latch is sensita) Both level and edgec) Level	tive. b) Edge d) None	
6) A digital circuit that can store of a) XOR gatec) Gate	on bit is a b) Flip-flop d) Register	



7)	Stack is also known asa) FIFO c) LIFO	b)	emory. Flash LILO	
8)	The decimal equivalent of hex numb a) $(58.1836)_{10}$ c) $(18.1836)_{10}$	b)	3A.2F) ₁₆ is (57.1735) ₁₀ (58.1830) ₁₀	
9)	A single transistor can be used to but a) AND gate c) OR gate	b)	NAND gate NOT gate	digital logic gates.
10)	Simplified form of the function $f = (x \cdot a) x + y$ c) $x + xyz$	b)	+ xy) (x + z) is x + yz y + xz	S
11)	Slowest memory element is a) RAM c) Cache	•	ROM Hard drive	
12)	Excess 3 code is known asa) Weighted c) Algebraic	•	code. Redundancy Self complen	nenting
13)	The fast logic family is a) FCL c) TRL	,	DRL TTL	
14)	An 'n' variable k-map can have a) n² cell c) n ⁿ cell	,	2º cell n2º cell	



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:

 $(4 \times 4 = 16)$

- 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)
$$Y = \overline{AB} + A\overline{B}$$

b)
$$Y = \overline{ABC} + A\overline{BC} + A\overline{BC}$$

- 4) Explain working of Schottky TTL design with neat figure.
- 5) Define and differentiate latch and flip flop.
- 3. Attempt any 2 questions:

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Seat	0.4	
No.	Set	Q

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018 DIGITAL DESIGN

	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		
Duratio	n : 30 Minutes		Marks: 14	
1. Cho	oose the correct answer :		(1×14=14)	
1)	The decimal equivalent of hex numbers $(58.1836)_{10}$ c) $(18.1836)_{10}$	ber (3A.2F) ₁₆ is b) (57.1735) ₁₀ d) (58.1830) ₁₀		
2)	A single transistor can be used to ba) AND gatec) OR gate	uild b) NAND gate d) NOT gate	_ digital logic gates.	
3)	Simplified form of the function $f = (x a) x + y c) x + xyz$	(+ y + xy) (x + z) i b) x + yz d) y + xz	S	
4)	Slowest memory element is a) RAM c) Cache	b) ROM d) Hard drive		
5)	Excess 3 code is known as a) Weighted c) Algebraic	code. b) Redundancy d) Self compler		
6)	The fast logic family is a) FCL c) TRL	b) DRL d) TTL		

7)	An 'n' variable k-map can have a) n² cell c) n ⁿ cell	•	2 ⁿ cell n2 ⁿ cell
8)	Change in a state occurs during a) Pulse transition c) Clock pulse	,	Outputs Inputs
9)	A combinational circuit can be design a) AND gate c) NAND gate	b)	l using only OR gate NOR gate
10)	is the gray code for the a) 101011 c) 011111	b)	ary 101011. 110101 111110
l 1)	Register is a group of a) Binary cell c) Binary digit	-	Binary number Binary system
12)	A latch is sensitive. a) Both level and edge c) Level	•	Edge None
13)	A digital circuit that can store on bit is a) XOR gate c) Gate	b)	Flip-flop Register
14)	Stack is also known asa) FIFO c) LIFO	b)	emory. Flash LILO



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:

 $(4 \times 4 = 16)$

- 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)
$$Y = \overline{AB} + A\overline{B}$$

b)
$$Y = \overline{ABC} + A\overline{BC} + A\overline{BC}$$

- 4) Explain working of Schottky TTL design with neat figure.
- 5) Define and differentiate latch and flip flop.
- 3. Attempt any 2 questions :

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Seat	
No.	

c) x + xyz

Set R

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018 DIGITAL DESIGN

Day and Date : Tuesday Time : 10.00 a.m. to 1.00			Max. Marks : 70
,	minutes in Answe carries one mark. Answer MCQ/Obj	er Book Page No ective type ques	be solved in first 30 c. 3. Each question stions on Page No. 3 Set (P/Q/R/S) on Top
Danielia a coo Miranta	MCQ/Objective T	ype Questions	Maula : 4.4
Duration: 30 Minutes			Marks : 14
1. Choose the correct a	answer:		(1×14=14)
 A latch is Both level and Level 		b) Edge d) None	
 A digital circuit that a) XOR gate Gate 	nat can store on bit	is a b) Flip-flop d) Register	
3) Stack is also knoa) FIFOc) LIFO	own as	_ memory. b) Flash d) LILO	
4) The decimal equal (58.1836) ₁₀ c) (18.1836) ₁₀	ivalent of hex numb	ber (3A.2F) ₁₆ is b) (57.1735) ₁₀ d) (58.1830) ₁₀	
5) A single transistona) AND gatec) OR gate	or can be used to bu	uild b) NAND gate d) NOT gate	digital logic gates.
 Simplified form of a) x + y 	of the function $f = (x)$	+ y + xy) (x + z) i b) x + yz	S

d) y + xz



7)	Slowest memory element is a) RAM a) Casha	•	ROM Hard drive
8)	c) Cache Excess 3 code is known as	u)	Hard drive code.
O)	a) Weighted	b)	Redundancy
	c) Algebraic	•	Self complementing
9)	The fast logic family is		
	a) FCL	,	DRL
	c) TRL	d)	TTL
10)	An 'n' variable k-map can have		
	a) n² 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 design	ned	l using only
	a) AND gate	b)	OR gate
	c) NAND gate	d)	NOR gate
13)	is the gray code for the	bin	ary 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



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:

 $(4 \times 4 = 16)$

- 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) $Y = \overline{AB} + A\overline{B}$
 - b) $Y = \overline{ABC} + A\overline{BC} + A\overline{BC}$
- 4) Explain working of Schottky TTL design with neat figure.
- 5) Define and differentiate latch and flip flop.

3. Attempt any 2 questions:

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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
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Seat	0.4	
No.	Set	S

S.E. (Biomedical Engg.) (Part – II) (Old – CGPA) Examination, 2018 DIGITAL DESIGN

and bate in according to the state of the st	Day and Date : Tuesday, 22-5-2018	Max. Marks: 70
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Time: 10.00 a.m. to 1.00 p.m.

c) Clock pulse

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.

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 = a) x + yc) x + xyz	(x + y + xy) (x + z) is b) x + yz d) y + xz	
2) Slowest memory element isa) RAMc) Cache	b) ROM d) Hard drive	
3) Excess 3 code is known asa) Weightedc) Algebraic	code. b) Redundancy d) Self complementing	
4) The fast logic family isa) FCLc) TRL	b) DRL d) TTL	
5) An 'n' variable k-map can havea) n² cellc) nn cell	b) 2 ⁿ cell d) n2 ⁿ cell	
6) Change in a state occurs duringa) Pulse transition	b) Outputs	

d) Inputs



7)	A combinational circuit can be design a) AND gate c) NAND gate	ned using only b) OR gate d) NOR gate
8)	a) 101011 c) 011111	binary 101011. b) 110101 d) 111110
9)	Register is a group of a) Binary cell c) Binary digit	b) Binary numberd) Binary system
10)	A latch is sensitive. a) Both level and edge c) Level	b) Edge d) None
11)	A digital circuit that can store on bit is a) XOR gate c) Gate	s a b) Flip-flop d) Register
12)	Stack is also known as a) FIFO c) LIFO	_ memory. b) Flash d) LILO
13)	The decimal equivalent of hex numbers a) $(58.1836)_{10}$ c) $(18.1836)_{10}$	er (3A.2F) ₁₆ is b) (57.1735) ₁₀ d) (58.1830) ₁₀
14)	A single transistor can be used to bu a) AND gate c) OR gate	ild digital logic gates. b) NAND gate d) NOT gate



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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:

 $(4 \times 4 = 16)$

- 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)
$$Y = \overline{AB} + A\overline{B}$$

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:

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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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Seat		Set	D	
No.		Set		
	S F (Part - II) (F	Riomedical Enga) (Old CGPA) Examination 201	8	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

Day and Date: Thursday, Time: 10.00 a.m. to 1.00			Total Marks: 70
3 c 2) A	80 minutes in Ans earries one mark. Answer MCQ/Obj o	swer Book Page Nective type quest	d be solved in first No. 3. Each question Fions on Page No. 3 Set (P/Q/R/S) on Top
•	n rage.		
Duration : 30 Minutes	MCQ/Objective T	ype Questions	Marks : 14
1. Choose the correct ar	nswer:		(1×14=14)
	b) $\beta_1.\beta_2$	c) β_1/β_2	d) β_2/β_1
2) configurationa) Fixed biasc) Emitter followe			r
3) Typical value of controla) > 1c) undefined	urrent gain of a C	B configuration is b) between 1 and d) between 100 a	d 50
 Amplifier gain for leading should be minimue 43 		c) 10	arkhausen's criteria d) 29
5) componer		y oscillator feedba c) Transistor	_
6) The contact a) fixed bias c) emitter followe	onfiguration is freq	•	pedance matching. r bias
7) type o of the cycle. a) Class A	f power amplifier is	b) Class B or AB	on at less than 180°

8)	In class B operation active the maximum a) 0.5	m power dissipate		nsis	tor?
9)	In an unbiased emi	,	,	,	
	a) V _e	b) β	c) βV _e	d)	l _b
0)	Op-amps used as configuration.	a high and low	pass filter circuits	emp	oloy
	a) non-inverting		b) comparator		
	c) open loop		d) inverting		
l 1)	ampli				
	a) Class A	b) Class B	c) Class C	d)	Class AB
12)	amon	g the following am	plifier circuit exhibi	t the	output voltage
	in the form of phas	e inversion.			
	a) Adder		b) Subtractor		
	c) Integrator		d) Differentiator		
13)	A circuit whose out signals is considered				een the input
	a) common mode		b) darlington		
	c) differential		d) operational		
14)	The efficiency of a 15V and an output		•	ifier	for a supply of
	a) 25%	b) 33.3%	c) 50%	d)	78.5%



Seat	
No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

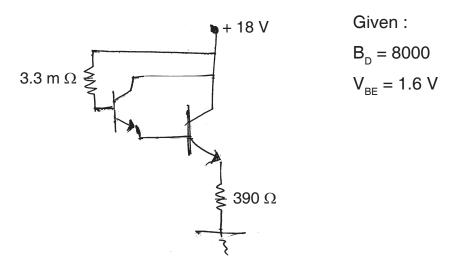
Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions :

- 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.



- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.

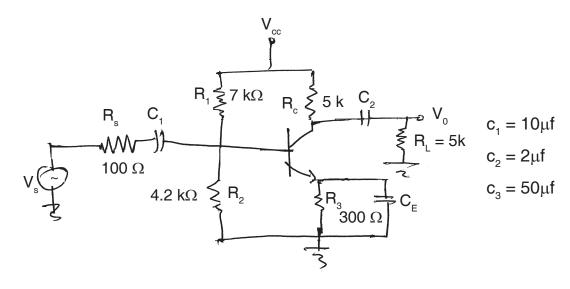


3. Attempt any two questions:

 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 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.

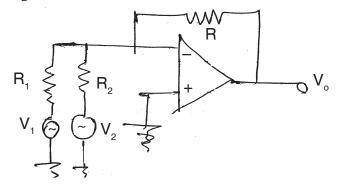
SECTION - II

4. Attempt any four questions :

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions:

- 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.

|--|--|

SLR-TC - 449

Seat	Cat	Q	
No.	Set	u	

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.					
	·	30 minutes in a carries one man Answer MCQ/C	Answer Book Page k. Objective type ques	Id be solved in first No. 3. Each question stions on Page No. 3 Set (P/Q/R/S) on Top		
		MCQ/Objectiv	e Type Questions			
Duration	on : 30 Minutes			Marks: 14		
1. Cł	noose the correct	answer:		(1×14=14)		
1)		num power dissip	on of V _{cc} should the pated by the output tr c) 0.707	ansistor?		
2)) In an unbiased of model.	emitter bias confiç	guration h _{ie} replaces .	in the ${ m V_e}$		
	a) V_e	b) β	c) βV_e	d) I _b		
3)	Op-amps used configuration.	as a high and lo	ow pass filter circuits	s employ		
	a) non-inverting	l	b) comparator			
4)	c) open loop		d) inverting			
4,	a) Class A	h) Class B	frequency multiplier. c) Class C	d) Class AB		
5)		ong the following	amplifier circuit exhibits b) Subtractor d) Differentiator			
6)		lered to be	onal to the difference type of amplible b) darlington d) operational			



7)	The efficiency of a 15V and an output a) 25%		is _			
8)	The current gain fo	r the Darlington co	onn	ection is		
9)	a) β_1 .(β_2 /2) configuration					P ₂ /P ₁
ŕ	a) Fixed biasc) Emitter follower		,	Voltage divider Emitter-collecte		
10)	Typical value of cu a) > 1 c) undefined	rrent gain of a Cl	b)	onfiguration is _ between 1 and between 100 a	50	
11)	Amplifier gain for R should be minimum		illat	ions to obey Ba	rkh	ausen's criteria
	a) 43	b) 4	c)	10	d)	29
12)	componen	t is used in Hartle	y os	scillator feedbac	ck s	ystem.
	a) Inductor	b) Capacitor	c)	Transistor	d)	Resistor
13)	The co a) fixed bias c) emitter follower		b)	tly used for imp voltage divider collector feedb	bia	S
14)	type of	power amplifier is	bia	sed for operatio	n a	t less than 180 $^\circ$
	of the cycle.					
	a) Class A		,	Class B or AB		
	c) Class C		a)	Class D		



Seat	
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S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

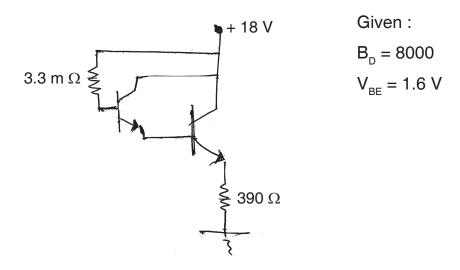
Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions:

- 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.



- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.

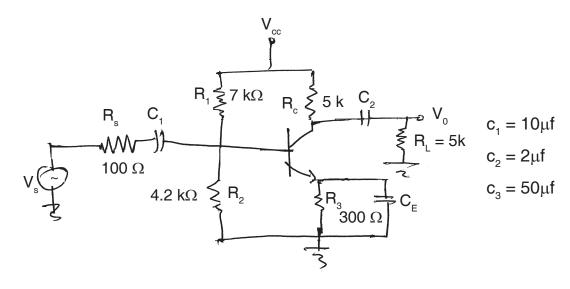


3. Attempt any two questions:

 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 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.

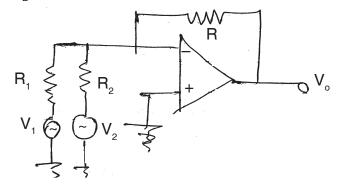
SECTION - II

4. Attempt any four questions :

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions :

- 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.

SLR-TC - 449

Seat No.			Set R
•	– II) (Biomedical Eng CTRONIC CIRCUITS	,	•
Day and Date : The Time : 10.00 a.m.	nursday, 24-5-2018 to 1.00 p.m.		Total Marks : 70
Instruction	30 minutes in a carries one mar 2) Answer MCQ/C	Answer Book Page k. Objective type que s	No. 3. Each question Stions on Page No. 3 Set (P/Q/R/S) on Top
	MCQ/Objectiv	e Type Questions	
Duration: 30 Minu	utes		Marks : 14
1. Choose the co	orrect answer :		(1×14=14)
1) co a) Inducto	omponent is used in Ha or b) Capacitor	rtley oscillator feedb c) Transistor	ack system. d) Resistor
2) The a) fixed bi c) emitter		requently used for in b) voltage divid d) collector feed	er bias
	_ type of power amplifie	er is biased for opera	tion at less than 180°
of the cycl a) Class A		b) Class B or A	В
c) Class (d) Class D	_

4) In class B operation at what friction of $V_{\rm cc}$ should the level of $V_{\rm L}(P)$ be to

5) In an unbiased emitter bias configuration h_{ie} replaces _____ in the V_{e}

6) Op-amps used as a high and low pass filter circuits employ _____

active the maximum power dissipated by the output transistor?

b) 0.636

b) β

b) comparator

d) 1

d) I_{b}

a) non-inverting

c) 0.707

c) βV_e

c) open loop

configuration.

a) 0.5

model.

a) V_{e}

d) inverting

7)	ampli	fier is used as fred	que	ncy multiplier.		
	a) Class A				d)	Class AB
8)	amon	g the following am	plif	ier circuit exhibit	the	e output voltage
	in the form of phas	e inversion.				
	a) Adder		,	Subtractor		
	c) Integrator		,	Differentiator		
9)	A circuit whose our signals is consider					veen the input
	a) common mode			darlington		
	c) differential		d)	operational		
10)	The efficiency of a 15V and an output	of $V/(D) = 10 V/i$	0			
	a) 25%	b) 33.3%	c)	50%	d)	78.5%
11)	The current gain for a) β_1 .(β_2 /2)	or the Darlington c	onr	ection is		
	a) $\beta_1 \cdot (\beta_2/2)$	b) $\beta_1.\beta_2$	c)	β_1/β_2	d)	β_2/β_1
12)	configuratio	ns has the lowest	ou	put impedance.		
	a) Fixed bias		b)	Voltage divider	•	
	c) Emitter follower	•	d)	Emitter-collecte	er	
13)	Typical value of cu	rrent gain of a C		_		
	a) > 1c) undefined		,	between 1 and between 100 a		
4.4\	•	00 mln n n n n n 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,			
14)	Amplifier gain for F should be minimur		ıııaı	lions to obey Ba	rkn	ausen s criteria
	a) 43	b) 4	c)	10	d)	29



Seat	
No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

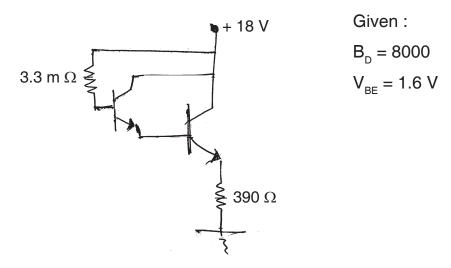
Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions:

- 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.



- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.

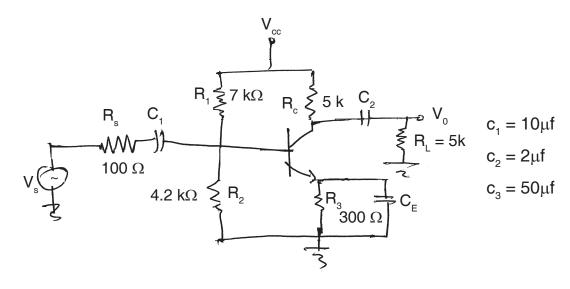


3. Attempt any two questions:

 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 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.

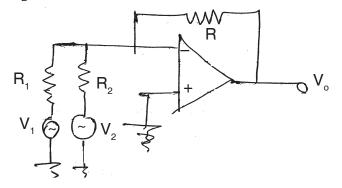
SECTION - II

4. Attempt any four questions:

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions :

- 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.

SLR-TC - 449

Seat	0.1	
No.	Set	5

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

-	nd Date : Thursday 10.00 a.m. to 1.00			Tota	al Marks : 70
	2)	30 minutes in Ar carries one mark. Answer MCQ/Ob	pulsory. It shounswer Book Page jective type ques t to mention, Q.P.	No. 3. Each stions on Pa	n question age No. 3
		MCQ/Objective	Type Questions		
Duratio	on: 30 Minutes	•			Marks: 14
1. Ch	oose the correct a	answer:			(1×14=14)
·	configuration. a) non-inverting c) open loop	·	pass filter circuitsb) comparatord) invertingequency multiplier.	. ,	
۷_			c) Class C		AB
3)	in the form of pha a) Adder c) Integrator		mplifier circuit exhib b) Subtractor d) Differentiator		voltage
4)		ered to be	ial to the difference type of amplification d) operational		e input
5)	•	a transformer co ut of V(P) = 10 V b) 33.3%	upled class A amp	olifier for a s	
6)	_	_	connection is c) β_1/β_2		

7)	configuration a) Fixed bias c) Emitter follower		t output impedance. b) Voltage divider d) Emitter-collecter		
8)	Typical value of cu a) > 1 c) undefined		•	50	
9)	Amplifier gain for R should be minimum a) 43		illations to obey Ba	rkhausen's criteria d) 29	
10)	componen	t is used in Hartle	,	ck system.	
11)	The co a) fixed bias c) emitter follower	nfiguration is frequ	uently used for imp b) voltage divider d) collector feedba	bias	
12)	type of of the cycle. a) Class A c) Class C	power amplifier is	biased for operationb) Class B or ABd) Class D	on at less than 180°	
13)	In class B operatio active the maximur a) 0.5		d by the output trar	nsistor?	
14)	In an unbiased emimodel. a) V _e	tter bias configurable) β	ation ${\sf h}_{\sf ie}$ replaces	d) I_b	



Seat	
No.	

S.E. (Part – II) (Biomedical Engg.) (Old CGPA) Examination, 2018 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II

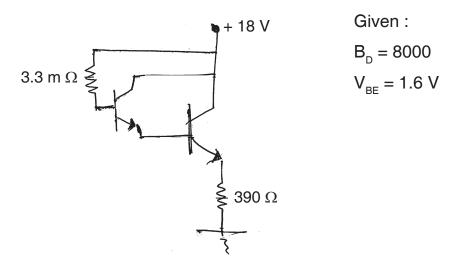
Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Attempt any four questions:

- 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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- 4) Draw and explain working of RC coupled oscillator with its frequency response.
- 5) Compare between class B amplifier with class C amplifier.

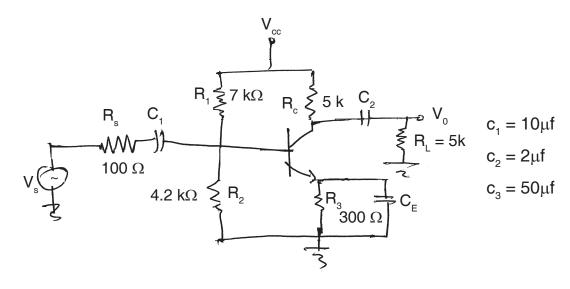


3. Attempt any two questions:

 $(6 \times 2 = 12)$

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 kΩ, $C_{_{\pi}}$ = 15 pf $~c_{_{\mu}}$ = 1pf.



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 - b) Position of Q point
 - c) Efficiency
 - d) Distortion.
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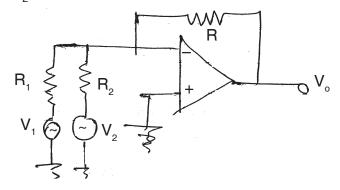
SECTION - II

4. Attempt any four questions:

- 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 $R_f=10k\Omega,\ R_1=2k\Omega,\ R_2=5k\Omega.$



5) Differentiate between first order and second order low pass butterworth filter.

5. Attempt any 2 questions:

- 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.



Seat		
No.	Set	P

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 BIOMEDICAL INSTRUMENTATION – I

Day and Date. Thursday, 3-3-2016 Total Marks. 7	Day and Date:	Thursday, 3-5-2018	Total Marks: 7
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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) F	-	t indicate full mari ata wherever requ		
Duratio	on : 30 Minutes	MCQ/Objective T	ype Questions		Marks : 14
1. Ch	oose the correct ar	iswer:			(14×1=14)
	A in efficient manner a) flame photo me c) ELISA	than photometers	6.		liation
2)	Pulse oximetry is busing 2 wavelengt a) collection c) saturation		,		nations
3)	Doppler shift is a na vessel. a) velocity c) viscosity	on invasive techn	ique to measure b b) acceleration d) volume	olood	in
4)	The presence of intransducer. a) photoelectric c) photo emissive	·	ipheral artery is de b) photovoltaic d) photodiode	etected by a _	
5)	The partial pressu exchange between a) WBC	n the lungs and th			
	•	•	•	•	P.T.O.

6)	conduction is the transrand middle wear to the internal ear.	nis	sion of sound t	hrou	ugh the external
	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	,	filter		
	c) oscillator	,	audio amplifie		
8)	The provides a positive for	orce	e for transportir	ng re	spiratory gases
	into an apneic patient.	h)	blood goe and	محريا	A.F.
	a) spirometerc) oxygenators	-	blood gas ana ventilator	iiyZe	;1
0)	The main function of a ventilator is to	,		n	nannar as clasa
9)	as natural respiration.) VE		ıaıı	namer as close
	a) heart	b)	thoracic cavity	,	
	c) lungs	,	cavity		
10)) White noise is a noise containing all frequencies in audible spectrum a				ole spectrum at
	a) different	h)	same		
	c) equal	,	approximate		
11)	are optical systems that	-		sola	tion of spectral
,	energy than optical filters.				or opconion
	a) Lens	b)	Monochromat	ors	
	c) Gratings	d)	Collimators		
12)	A colorimetric determination measurement nm.	ure	energetic spe	ctru	m ranges from
	a) 400 – 700	b)	1000 – 2300		
	c) 500 – 750	d)	250 – 550		
13)	A normal Ph of the extracellular fluid	d lie	es 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 range of 100 – 1000 M Ohm.		electric	cal r	esistance in the
	a) high	b)	low		
	c) light	d)	moderate		



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 1) Draw and explain working of anesthesia machine in short.
- 2) Explain working of evoked response audiometry.
- 3) Explain working of pulmonary function analyzer.



Seat		
No.	Set	Q
	-	1

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 BIOMEDICAL INSTRUMENTATION - I

	-1
Day and Date: Thursday, 3-5-2018 Time: 10.00 a.m. to 1.00 p.m.	Total Marks: 70
Instructions: 1) Q. No. 1 is compulsory. It should 30 minutes in Answer Book Page No carries one mark. 2) Answer MCQ/Objective type quest 3 only. Don't forget to mention, Quest Top of Page. 3) Figures to the right indicate full many 4) Assume suitable data wherever request.	No. 3. Each question stions on Page No. .P. Set (P/Q/R/S) on rks.
MCQ/Objective Type Questions Duration: 30 Minutes	Marks : 14
1. Choose the correct answer:	(14×1=14)
 1) The provides a positive force for transport gases into an apneic patient. a) spirometer b) blood gas an c) oxygenators d) ventilator 	
 2) The main function of a ventilator is to ventilate as natural respiration. a) heart b) thoracic cavit c) lungs d) cavity 	
3) White noise is a noise containing all frequencies in intensities. a) different b) same	audible spectrum at
c) equal d) approximate	

4) _____ are optical systems that provide better isolation of spectral energy than optical filters. b) Monochromators a) Lens

c) Gratings

- d) Collimators
- 5) A colorimetric determination measure energetic spectrum ranges from _____ nm.
 - a) 400 700

b) 1000 – 2300

c) 500 - 750

d) 250 – 550



6)	A normal Ph of the	extracellular fluid	d lies	in the range	of _	
	a) 7 – 9		b) 7	7.5 – 8.5		
	c) $6 - 7.5$		d) 7	7.35 – 7.45		
7)	The glass electrod	e exhibits a		electric	al re	esistance in the
	range of 100 – 100	00 M Ohm.				
	a) high		b) l			
	c) light		d) r	noderate		
•	Α			olates monoc	hro	matic radiation
	in efficient manner	•				
	a) flame photo me	ter	,	colorimeter		
٥)	c) ELISA			spectrophoton		
9)	Pulse oximetry is b using 2 wavelengtl		erial	oxygen		determinations
	a) collection	10.	b) c	deposition		
	c) saturation		•	eduction		
10)	Doppler shift is a n	on invasive techni	ique 1	to measure bl	ood	in
,	a vessel.		•			
	a) velocity		b) a	acceleration		
	c) viscosity		d) v	olume/		
11)	The presence of in	dicator in the peri	pher	al artery is de	tect	ed by a
	transducer.		h) r	shotovoltojo		
	a) photoelectricc) photo emissive		, .	ohotovoltaic ohotodiode		
12)	The partial pressur	re in the	<i>,</i> .		ovt	ent of oxygen
12)	exchange between				CAL	ent of oxygen
	a) WBC	b) RBC			d)	Plasma
13)	condu	uction is the transr	nissi	on of sound t	hrou	igh the external
•	and middle wear to	the internal ear.				
	a) bone	b) air	c) r	nuscle	d)	hearing
14)	A pure tone audio	meter consist of	an _			for having a
	precise control on	the frequency of c				
	a) amplifier		b) f			
	c) oscillator		a) a	audio amplifie	r	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 1) Draw and explain working of anesthesia machine in short.
- 2) Explain working of evoked response audiometry.
- 3) Explain working of pulmonary function analyzer.



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 guestion 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/Objectiv	ve Type Question	S
Duration	on : 30 Minutes		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Marks: 14
1. Cl	noose the correc	ot answer :		(14×1=14)
1)	-	veen the lungs and		the extent of oxygen d) Plasma
2)		ear to the internal e		nd through the external d) hearing
3)) A pure tone a	•	t of an of oscillations.	for having a
4)	into an apneic a) spirometer c) oxygenator	patient.		orting respiratory gases analyzer
5)) The main func as natural resp a) heart c) lungs		is to ventilate b) thoracic ca d) cavity	in a manner as close

6)	White noise is a noise containing all frequencies in audible spectrum at intensities.		
	a) different	b) same	
	c) equal	d) approximate	
7)	The state of the s	t provide better isolation of spectral	
	energy than optical filters.		
	a) Lens	b) Monochromators	
	c) Gratings	d) Collimators	
8)	A colorimetric determination measurement nm.	ure energetic spectrum ranges from	
	a) 400 - 700	b) 1000 – 2300	
	c) 500 – 750	d) 250 – 550	
9)	A normal Ph of the extracellular fluid	d lies in the range of	
	a) 7 – 9	b) 7.5 – 8.5	
	c) 6 – 7.5	d) 7.35 – 7.45	
10)	The glass electrode exhibits a	electrical resistance in the	
	range of 100 – 1000 M Ohm.		
	a) high	b) low	
	c) light	d) moderate	
11)	A is an instrument t	hat isolates monochromatic	
	radiation in efficient manner than pho	otometers.	
	a) flame photo meter	b) colorimeter	
	c) ELISA	d) spectrophotometer	
12)	Pulse oximetry is based upon the arteusing 2 wavelengths.	erial oxygen determinations	
	a) collection	b) deposition	
	c) saturation	d) reduction	
13)	Doppler shift is a non invasive technia vessel.	que to measure blood in	
	a) velocity	b) acceleration	
	c) viscosity	d) volume	
14)	The presence of indicator in the peri	pheral artery is detected by a	
	transducer.		
	a) photoelectric	b) photovoltaic	
	c) photo emissive	d) photodiode	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

- 1) Draw and explain working of anesthesia machine in short.
- 2) Explain working of evoked response audiometry.
- 3) Explain working of pulmonary function analyzer.

a) high

c) light

SLR-TC - 450

Seat		
No.	Set	S

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 BIOMEDICAL INSTRUMENTATION – I

-	d Date: Thui 10.00 a.m. to	rsday, 3-5-2018 1.00 p.m.	٦	Γotal Marks: 70
	Instructions	30 minutes in Anscarries one mark. 2) Answer MCQ/Obj 3 only. Don't forg Top of Page. 3) Figures to the righ	oulsory. It should be solutions of the solution of the solutio	ch question n Page No.
Duratio	on : 30 Minute	MCQ/Objective	Type Questions	Marks : 14
1. Ch	oose the corr	ect answer :		(14×1=14)
1)		is a noise containing a intensities.	all frequencies in audible	spectrum at
	a) different		b) same	
	c) equal		d) approximate	
2)			at provide better isolation	of spectral
		optical filters.	1 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
	a) Lensc) Gratings		b) Monochromatorsd) Collimators	
3)	,	ic determination meas	ure energetic spectrum r	anges from
	a) 400 - 700 c) 500 - 750		b) 1000 – 2300 d) 250 – 550	
4)	A normal Ph	of the extracellular flui	d lies in the range of	
	a) 7 – 9		b) 7.5 – 8.5	
	c) $6 - 7.5$		d) 7.35 – 7.45	
5)		ectrode exhibits a – 1000 M Ohm.	electrical resis	tance in the

b) low

d) moderate



	A in efficient manner			isolates monoc	chro	matic radiation
	a) flame photo mec) ELISA	ter	b)	colorimeter spectrophotor	nete	r
7)	Pulse oximetry is b using 2 wavelength					_determinations
	a) collectionc) saturation		-	deposition reduction		
8)	Doppler shift is a n a vessel.	on invasive techni	que	e to measure b	lood	in
	a) velocityc) viscosity		,	acceleration volume		
9)	The presence of intransducer.			-	tect	ed by a
	a) photoelectricc) photo emissive		b) d)	photovoltaic photodiode		
10)	The partial pressur exchange between a) WBC	n the lungs and the	e bl	ood.		
11)	condu	•	•		•	
,	and middle wear to	the internal ear.				
	a) bone					
12)	A pure tone audic precise control on					for having a
	a) amplifier	the frequency of c		filter		
	c) oscillator		,	audio amplifie	r	
13)	The proints an apneic pati		orc	e for transportir	ng re	espiratory gases
	a) spirometerc) oxygenators		•	blood gas ana ventilator	lyze	er
14)	The main function as natural respirati		ve	ntilate ir	n a n	nanner as close
	a) heart		,	thoracic cavity	/	
	c) lungs		d)	cavity		



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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 :

- 1) Draw and explain working of anesthesia machine in short.
- 2) Explain working of evoked response audiometry.
- 3) Explain working of pulmonary function analyzer.

Seat	0-4	D
No.	Set	P

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 BIOLOGICAL MODELING AND SIMULATION

	BIOLOGICAL MODELIN	IG AND SIMULATION
-	d Date : Friday, 4-5-2018 10.00 a.m. to 1.00 p.m.	Max. Marks : 70
	minutes in Answe carries one mark. 2) Answer MCQ/Obje	Isory. It should be solved in first 30 er Book Page No. 3. Each question ective type questions on Page No. 3 to mention, Q.P. Set (P/Q/R/S) on Top
	MCQ/Objective T	ype Questions
Duratio	n : 30 Minutes	Marks: 14
	oose the correct answer: The fibers in muscle spindle a) cannot contract b) are intervated by gamma fiber c) maintain tension on spindle recept d) b) and c)	(1×14=14) otor
2)	An active transport occurs a) into cell c) both into and out of	b) out of cell d) across the cell
3)	Goldman equation is also called as a) constant field c) constant permeability	equation. b) constant volume d) constant coefficient
4)	Diffusion of ions always takes place a) higher to lower c) higher to stable	from toconcentration. b) lower to higher d) stable to lower
5)	a) mV b) mA	
6)	potential. a) K ⁺ gradient c) Na ⁺ permeability	tor in setting the resting membrane b) Cl- gradient d) Active transport

	•		h)	lene curvature	anc	l focal length
,					anc	i local length
a)	Vasodilation		b)	Vasoconstriction	n	ed by
		ontraction along w	ith	increase rate of	he	at production is
a)	shivering	b) non shivering	c)	overlapping	d)	osmogenesis
	equation d	efines cell membr	ane	e current.		
a)	Nernst	b) Donnan	c)	Goldman	d)	Cable
	occurs due	to lack of Dopam	ine) .		
a)	Stretch reflex	b) Shivering	c)	Parkinsons	d)	Diffusion
	relationsh	nip defines relation	n be	etween diffusion	an	d drift.
a)	Ohm's	b) Faraday's	c)	Einstein's	d)	Donnan
	•	•		•		
a)	images	b) models	c)	simulations	d)	validations
	•			active transpor	t	
	a) c) 'Re a) c) Inc ca a)	a) lens movement c) pupil 'Regional temperat a) Vasodilation c) Both a) and b) Increase muscle co called a) shivering equation d a) Nernst occurs due a) Stretch reflex relationsh a) Ohm's are simplifi a) images transport	c) pupil 'Regional temperature difference wit a) Vasodilation c) Both a) and b) Increase muscle contraction along we called a) shivering b) non shivering ————————————————————————————————————	a) lens movement b) c) pupil d) 'Regional temperature difference within a) Vasodilation b) c) Both a) and b) d) Increase muscle contraction along with called a) shivering b) non shivering c) equation defines cell membrane a) Nernst b) Donnan c) occurs due to lack of Dopamine a) Stretch reflex b) Shivering c) relationship defines relation be a) Ohm's b) Faraday's c) are simplified representation of a) images b) models c) transport induces conformatio a) simple diffusion b)	a) lens movement c) pupil d) retina 'Regional temperature difference within an animal is obta) Vasodilation c) Both a) and b) lncrease muscle contraction along with increase rate of called a) shivering b) non shivering c) overlapping equation defines cell membrane current. a) Nernst b) Donnan c) Goldman coccurs due to lack of Dopamine. a) Stretch reflex b) Shivering c) Parkinsons relationship defines relation between diffusion a) Ohm's b) Faraday's c) Einstein's are simplified representation of objects. a) images b) models c) simulations transport induces conformational change in presentation.	a) lens movement b) lens curvature and c) pupil d) retina 'Regional temperature difference within an animal is obtain a) Vasodilation b) Vasoconstriction c) Both a) and b) d) Vasocirculation Increase muscle contraction along with increase rate of he called a) shivering b) non shivering c) overlapping d) ———————————————————————————————————



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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.



- 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:

- 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.

|--|

Seat	0-4	
No.	Set	Q

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 BIOLOGICAL MODELING AND SIMULATION

	BIOLOGICAL MODELIN	IG AND SIMULATION
•	nd Date : Friday, 4-5-2018 10.00 a.m. to 1.00 p.m.	Max. Marks: 70
	minutes in Answe carries one mark. 2) Answer MCQ/Obje	er Book Page No. 3. Each question ective type questions on Page No. 3 to mention, Q.P. Set (P/Q/R/S) on Top
Duratio	MCQ/Objective Ton: 30 Minutes	ype Questions Marks : 14
1. Ch	oose the correct answer :	(1×14=14)
1)	'Regional temperature difference wit a) Vasodilation c) Both a) and b)	chin an animal is obtained by b) Vasoconstriction d) Vasocirculation
2)	called	vith increase rate of heat production is
	a) shiveringc) overlapping	b) non shiveringd) osmogenesis
3)	a) Nernst b) Donnan	rane current. c) Goldman d) Cable
4)	occurs due to lack of Dopan a) Stretch reflex c) Parkinsons	nine. b) Shivering d) Diffusion
5)	relationship defines relation a) Ohm's c) Einstein's	n between diffusion and drift. b) Faraday's d) Donnan
6)	are simplified representation a) images b) models	of objects. c) simulations d) validations
7)	transport induces conformation a) simple diffusion c) faciliated diffusion	ational change in protein. b) active transport d) ion driven active transport

SLR-T	C – 451	-2-	
8)	The fibers in muscle spindle a) cannot contract b) are intervated by gamma fiber c) maintain tension on spindle red d) b) and c)	ceptor	
9)	An active transport occurs a) into cellc) both into and out of	b) out of cell d) across the cell	
10)	Goldman equation is also called a a) constant field c) constant permeability	b) constant volume	
11)	Diffusion of ions always takes place a) higher to lower c) higher to stable	ce from toconcentration. b) lower to higher d) stable to lower	
12)	a) mV b) mA	from the Nernst equation. c) coulombs d) tons/sec.	
13)	,	factor in setting the resting membra b) Cl- gradient d) Active transport	ne
14)	Ciliary muscles of eye controls the a) lens movement c) pupil	•	



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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.



- 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:

- 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.

Seat	0.4 🗖
No.	Set R

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 BIOLOGICAL MODELING AND SIMULATION

	BIOLOGICAL MO	ODELING AND SIMULATION	
-	d Date : Friday, 4-5-2018 10.00 a.m. to 1.00 p.m.	Ma	ax. Marks : 70
	minutes in carries one 2) Answer Me	s compulsory. It should be solved in Answer Book Page No. 3. Each mark. CQ/Objective type questions on Fit forget to mention, Q.P. Set (P/Q/R	question Page No. 3
	MCQ/Obj	ective Type Questions	
Duratio	n : 30 Minutes		Marks: 14
1. Ch	oose the correct answer :		(1×14=14)
1)		oduct from the Nernst equation. c) coulombs d) tons/s	sec.
2)	is the most imporpotential. a) K ⁺ gradient c) Na ⁺ permeability	rtant factor in setting the resting m b) Cl- gradient d) Active transport	embrane
3)	Ciliary muscles of eye contro a) lens movement c) pupil	ols the b) lens curvature and focal d) retina	length
4)	'Regional temperature difference a) Vasodilation c) Both a) and b)	rence within an animal is obtained by b) Vasoconstriction d) Vasocirculation	
5)	called	along with increase rate of heat productions along with increase rate of heat productions along with increase rate of heat productions.	
6)	equation defines cel	Il membrane current. an c) Goldman d) Cable)
7)	occurs due to lack of a) Stretch reflex c) Parkinsons	,	

SLR-TO	C – 45	1		-2-				
8)						tween diffusion		
0)	•		•	-	•	Einstein's	u)	Donnan
9)		•		representation models		objects. simulations	d)	validations
10)		transport				nal change in pr active transport		in.
	-	ciliated diffusi			,	ion driven activ		ansport
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)	a) int	tive transport o cell th into and ou			,	out of cell across the cell		
13)	a) co	nstant field			b)	equation. constant volum constant coeffice		nt
14)	a) hig	ion of ions al gher to lower gher to stable		s takes place	b)	n to lower to higher stable to lower	_co	ncentration.

Set R



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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.



- 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:

- 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.

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.

		ı	MCQ/Objec	tive Type	e Questions			
Duratio	n : 30 M		•	,,				Marks : 14
1. Ch	oose the	correct an	swer:					(1×14=14)
1)		•	efines cell r b) Donnar		e current. Goldman	d)	Cable	
2)		tch reflex	e to lack of I	b)				
3)			•		etween diffusio Einstein's			
4)			ied represe b) models		objects. simulations	d)	validatio	ns
5)	a) simp	_ transport ble diffusion ated diffusi		b)	nal change in p active transpo ion driven acti	ort		
6)	a) cann b) are i	ntain tensio	•					
7)	a) into	ve transport cell into and or		,	out of cell across the cel	II.		

8)	a) constant field	equation is also called as equation. Int field b) constant volume Int permeability d) constant coefficient			
9)	Diffusion of ions always takes place a) higher to lower c) higher to stable	from toconcentration. b) lower to higher d) stable to lower			
10)	is the unit for the product fro	m the Nernst equation.			
	a) mV b) mA	c) coulombs d) tons/sec.			
11)	is the most important fac	tor 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 wit	hin an animal is obtained by			
	a) Vasodilation	b) Vasoconstriction			
	c) Both a) and b)	d) Vasocirculation			
14)	Increase muscle contraction along w called	ith increase rate of heat production is			
	a) shivering b) non shivering	c) overlapping d) osmogenesis			

Set S



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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.



- 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:

- 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.

|--|--|

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

			,,,		
Dur	ation : 30 Minutes			Marks: 14	
1.	Choose the correct	answer:		(1×14=14)	
	1) INTEL 8085 A is	s pin	IC.		
	a) 8	b) 16	c) 32	d) 40	
	2) In 8085, name of	of the 16 bit registe	er is		
	a) Stack pointe	r	b) Program co	ounter	
	c) Both a) and	b)	d) None of ab	ove	
	3) The ROM progr	ammed during ma	nufacturing proces	ss itself is called	
	a) MROM	b) PROM	c) EPROM	d) EEPROM	
	4) A field programi	mable ROM is call	ed		
	a) MROM	b) PROM	c) FROM	d) FPROM	
	5) Output of the as	sembler in machir	ne codes is referre	d to as	
	a) Object progr	am	b) Source pro	gram	
	c) Macro instru	ction	d) Symbolic a	ddressing	

6)	The cycle required to fetch and execute an instruction in a 8085 microprocessor is			
	a) Clock cycle		b) Memory cycle	e
	c) Machine cycle		d) Instruction cy	cle
7)	A bus connected be transfer of information		•	that permits
	a) DMA	b) Memory	c) Address	d) Control
8)	Number of hex digit location are	-	esent the 20 bit ac	ddress of a memory
	a) 20	b) 16	c) 5	d) 4
9)	The field which is no	ever present in an	assembly langua	age statement is
	a) Opcode	b) Operand	c) Continue	d) Comment
10)	is the I	non-maskable inte	errupt from the fo	llowing.
	a) RST 7.5	b) RST 6.5	c) RST 5.5	d) RST 4.5
11)	The 8085 microprod	-	stal of frequency	6.25 MHz. The
	a) 320 ns	b) 640 ns	c) 960 ns	d) 1280 ns
12)	When an 8085 micr	oprocessor is res	et, the address b	us contains
	a) 0000 H	b) 002 CH	c) 0043 H	d) 003 CH
13)	Pick out the matchin	ng pair.		
	a) READY; RIM		b) HOLD; DMA	
	c) SID; SIM		d) S0; S1; wait s	status
14)	A microprocessor w	rith a 12-bit addre	ss but will be able	e to access
	a) 1 K bytes	b) 4 K bytes	c) 8 K bytes	d) 10 K bytes



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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, R7

ADD A, # 12 H

END.

3) Describe special function registers (SFRs) of 8051.

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Seat	
No.	

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	
Dur	ation: 30 Minute	es		Marks : 14
1.	Choose the cor	rect answer :		(1×14=14)
	,	nex digits needed to re	present the 20 bit	address of a memory
	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
	,	icroprocessor uses a c	crystal of frequenc	y 6.25 MHz. The
	a) 320 ns	b) 640 ns	c) 960 ns	d) 1280 ns
	5) When an 80	85 microprocessor is r	eset, the address	bus contains
	a) 0000 H	P) 003 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 s	status
7)	A microprocessor w	rith a 12-bit addre	ss l	but will be able	e 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 th	e 16 bit register is	S		
	a) Stack pointer		b)	Program coul	nter
	c) Both a) and b)		d)	None of abov	re
10)	The ROM programm	ned during manuf	act	uring process	itself is called
	a) MROM	b) PROM	c)	EPROM	d) EEPROM
11)	A field programmab	le 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 progra	am
	c) Macro instruction	า	d)	Symbolic add	Iressing
13)	The cycle required to fetch and execute an instruction in a 8085 microprocessor is				in a 8085
	a) Clock cycle		b)	Memory cycle	e
	c) Machine cycle		d)	Instruction cy	cle
14)		A bus connected between the CPU and main memory that permits transfer of information is known as bus.			that permits
	a) DMA	b) Memory	c)	Address	d) Control



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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, R7

ADD A, # 12 H

END.

3) Describe special function registers (SFRs) of 8051.

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

Dura	atio	n : 30 Minutes					Marks: 14
1.	Ch	noose the correct an	swer:				(1×14=14)
	1)	Output of the asser	mbler in machine	cod	es is referred	to as	
		a) Object program		b)	Source progr	ram	
		c) Macro instructio	n	d)	Symbolic add	dressing	
	2)	The cycle required microprocessor is _		ute	an instruction	in a 8085	
		a) Clock cycle		b)	Memory cycl	е	
		c) Machine cycle		d)	Instruction cy	/cle	
	3)	A bus connected be transfer of informat			-	that permits	;
		a) DMA	b) Memory	c)	Address	d) Control	
	4)	Number of hex digital	•	ese	nt the 20 bit a	ddress of a r	nemory
		a) 20	b) 16	c)	5	d) 4	

5)	The field which is no	he field which is never present in an assembly language statement is		
	a) Opcode	b) Operand	c) Continue	d) Comment
6)	is the I	non-maskable inte	errupt from the fo	llowing.
	a) RST 7.5	b) RST 6.5	c) RST 5.5	d) RST 4.5
7)	The 8085 microprod T-state value is		stal of frequency	6.25 MHz. The
	a) 320 ns	b) 640 ns	c) 960 ns	d) 1280 ns
8)	When an 8085 micr	oprocessor is res	et, the address b	us contains
	a) 0000 H	b) 002 CH	c) 0043 H	d) 003 CH
9)	Pick out the matching	ng pair.		
	a) READY; RIM		b) HOLD; DMA	
	c) SID; SIM		d) S0; S1; wait s	status
10)	A microprocessor w	ith a 12-bit addre	ss but will be able	e 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 th	e 16 bit register is	S	
	a) Stack pointer		b) Program coul	nter
	c) Both a) and b)		d) None of abov	re
13)	The ROM programm	ned during manuf	facturing process	itself is called
	a) MROM	b) PROM	c) EPROM	d) EEPROM
14)	A field programmab	le ROM is called		
	a) MROM	b) PROM	c) FROM	d) FPROM



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

- 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:

 $(6 \times 2 = 12)$

- 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, R7

ADD A, # 12 H

END.

3) Describe special function registers (SFRs) of 8051.

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SLR-TC - 452

Seat	
No.	

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

Dur	atior	n : 30 Minutes				Marks: 14
1.	Cho	oose the correct ans	swer:			(1×14=14)
	1)	is the r	non-maskable inte	errupt from the fo	llowing.	
		a) RST 7.5	b) RST 6.5	c) RST 5.5	d) RST 4.5	
	,	The 8085 microprod T-state value is	•	stal of frequency	6.25 MHz. T	he
		a) 320 ns	b) 640 ns	c) 960 ns	d) 1280 ns	
	3)	When an 8085 micr	oprocessor is res	et, the address b	us contains _	
		a) 0000 H	b) 002 CH	c) 0043 H	d) 003 CH	
	4)	Pick out the matchir	ng pair.			
		a) READY; RIM		b) HOLD; DMA		
		c) SID; SIM		d) S0; S1; wait s	status	
	5)	A microprocessor w	ith a 12-bit addre	ss but will be able	e to access _	
		a) 1 K bytes	b) 4 K bytes	c) 8 K bytes	d) 10 K byt	es

6)	INTEL 8085 A is	pin IC.				
	a) 8	b) 16	c)	32	d) 40	
7)	In 8085, name of th	e 16 bit register is	S			
	a) Stack pointer		b)	Program cour	nter	
	c) Both a) and b)		d)	None of above	е	
8)	The ROM programr	ned during manut	fact	uring process	itself is called	
	a) MROM	b) PROM	c)	EPROM	d) EEPROM	
9)	A field programmab	le ROM is called				
	a) MROM	b) PROM	c)	FROM	d) FPROM	
10)	Output of the assen	nbler in machine o	cod	es is referred t	o as	
	a) Object program		b) Source program			
	c) Macro instruction		d) Symbolic addressing			
l 1)	The cycle required to microprocessor is _		ute	an instruction	in a 8085	
	a) Clock cycle		b)	Memory cycle)	
	c) Machine cycle		d)	Instruction cy	cle	
12)	A bus connected be transfer of informati				that permits	
	a) DMA	b) Memory	c)	Address	d) Control	
13) Number of hex digits needed to represent the 20 bit address of a memoral location are					ldress of a memory	
	a) 20	b) 16	c)	5	d) 4	
14)	The field which is no	ever present in ar	n as	ssembly langua	age statement is	
	a) Opcode	b) Operand	c)	Continue	d) Comment	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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, R7

ADD A, # 12 H

END.

3) Describe special function registers (SFRs) of 8051.



Seat			
No.	Set	Р	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 PRINCIPLES OF COMMUNICATION

-	nd Date : Mond 10.00 a.m. to	-			Total Marks : 70
		30 minutes in carries one ma 2) Answer MCQ	Answer ark. Objectiv	Book Page No e type question	be solved in first b. 3. Each question ons on Page No. 3 et (P/Q/R/S) on Top
Duratio	on : 30 Minutes	MCQ/Objecti	ve Type	Questions	Marks : 14
Daratio	on . oo wiinates				Marks . 14
1. Ch	noose the corre	ct answer :			(1×14=14)
·	a) at the transc) in informat	ion source	b) i d) a	n the channel at destination	
2)		- • •	oise becc	mes of great in	mportance at high
	frequencies that a) shot noise c) impulse no		,	random noise transit time nois	se
3)	i	s the most reliable	measurer	ment for compai	ring amplifier noise
	characteristic. a) Signal to n c) Shot noise	oise ratio	,	Noise factor Thermal noise	
4)	In a low level be	AM system, amp	lifiers foll	owing the mod	ulated stage must
	a) linear deviduec) class C am		•	narmonic device nonlinear device	
5)	is	the ratio of modul	ating pov	ver to total pow	er at 100 percent
	modulation. a) 1:3	b) 1:2	c) 2	2:3	d) none



6)	The modulation index of an AM wave power is	is changed from 0 to 1. The transmitted
	a) unchanged	b) halved
	c) doubled	d) increase by 50%
7)	is an indirect way of	,
')	a) Reactance FET modulator	-
	c) Armstrong modulator	d) Reactance bipolar modulator
8)	pulse modulation syst	
O)	a) PCM	b) Differential PCM
	c) PWM	d) Delta
۵)	Channel coding is used to	u) 20.10
3)	a) secure the channel	
	b) minimize interference	
	c) protect information against noise	
	d) protect against unnecessary fapp	ing of signal
10)	ASK is a result of combination of shi	ft keying and modulation.
,		c) amplitude d) none
11)	OSI reference model defines a networ	king 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 dimens	sions.
	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



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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 ary QAM.

5. Attempt any 2:

 $(6 \times 2 = 12)$

- 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.

Set P



Seat		
No.	Set	Q

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 PRINCIPLES OF COMMUNICATION

	PF	RINCIPLES	OF COM	MUNICATION	N	
-	d Date : Monday, 10.00 a.m. to 1.00				Tota	ıl Marks : 70
	2) A	30 minutes carries one l Answer MC	in Answe mark. Q/Objecti	sory. It should r Book Page N ve type quest nention, Q.P. S	No. <mark>3. Each</mark> F ions on P a	question age No. 3
Duratio	n : 30 Minutes	MCQ/Obje	ctive Type	Questions		Marks: 14
1. Ch	oose the correct a	nswer:				(1×14=14)
	a) PCM c) PWM Channel coding is a) secure the cha b) minimize interf c) protect informa d) protect agains	s used to annel erence ation agains	b) d) t noise	Differential PC Delta	CM	
3)	ASK is a result of a) digital			eying and amplitude		lulation.
ŕ	OSI reference modin layer a) 5 FSK is used most a) telephony c) radio transmiss	er. b) 7 :ly in	c) b)	g framework to i 10 telegraphy none of the ab	d) 11	rotocols
6)	QAM usesa) in phase	as the		ns. both a and b	d) none	

7)	The noise that affe	ects PCM is		noise.		
	a) transmission	b) quantizing	c)	transit	d)	both a and b
8)	In a communicatio	•		_		
	a) at the transmitte	er	b)	in the channel		
	c) in information s	ource	d)	at destination		
9)	One of the following frequencies that is	• ,.	bed	comes of great	imp	ortance at high
	a) shot noise		b)	random noise		
	c) impulse noise		d)	transit time noi	se	
10)	is the	most reliable meas	sure	ement for compa	ırinç	g 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	s fo	llowing the mod	aluk	ted stage must
	be					
	a) linear devices		,	harmonic device		
	c) class C amplifie	er	d)	nonlinear devi	ces	
12)	is the I	ratio of modulating	gpc	wer to total pov	ver	at 100 percent
	modulation.					
	a) 1:3	b) 1:2	c)	2:3	d)	none
13)	The modulation ind power is	lex of an AM wave	is c	hanged from 0 to	o 1.	The transmitted
	a) unchanged		,	halved		
	c) doubled		d)	increase by 50	%	
14)	is a					
	a) Reactance FET					
	c) Armstrong mod	lulator	a)	Reactance bip	olar	modulator



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set Q



Seat		
No.	Set	K

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 PRINCIPLES OF COMMUNICATION

		PRINCIPLES OF	COM	MUNICATI	ON	
•	d Date : Mond 10.00 a.m. to	•			Tota	al Marks : 70
1		1) Q. No. 1 is co 30 minutes in a carries one man 2) Answer MCQ/C only. Don't forg of Page.	Answe k. Objecti	r Book Page ve type que	e No. 3. Each	n question age No. 3
Duratio	n : 30 Minutes	MCQ/Objectiv	е Туре	e Questions		Marks : 14
1. Ch	oose the corre	ct answer :				(1×14=14)
1)	is modulation.	the ratio of modula	ting po	wer to total p	oower at 100 p	percent
	a) 1:3	b) 1:2	c)	2:3	d) none	
2)	The modulation power is	on index of an AM wa	ıve is c	hanged from	0 to 1. The tran	nsmitted
	a) unchanged	d	,	halved		
	c) doubled		d)	increase by	50%	
3)		_ is an indirect way				
		FET modulator modulator				
4)		pulse modulation s				
	a) PCM		,	Differential	PCM	
5 \	c) PWM	ag is used to	u)	Delta		
3)	Channel coding a) secure the	•				
	b) minimize ii					
	· ·	ormation against no				
	d) protect aga	ainst unnecessary f	apping	of signal		



6)	ASK is a result of com	nbination of shi	ft k	eying and		modulation.
	a) digital b)	analog	c)	amplitude	d)	none
7)	OSI reference model d in layer.	efines a networ	kin	g framework to ir	npl	ement protocols
	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 abo	ove	
9)	QAM uses	_ as the dimens	sior	ns.		
	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 sy	ystem noise is	affe	ects the signal		
	a) at the transmitter		b)	in the channel		
	c) in information sour					
12)	One of the following t	ypes of noise	bec	comes of great i	mp	ortance at high
	frequencies that is					
	a) shot noise		b)	random noise		
	c) impulse noise		d)	transit time noi	se	
13)	is the mo	st reliable meas	sure	ement for compa	ring	g amplifier noise
,	characteristic.			•		
	a) Signal to noise rati	0	b)	Noise factor		
	c) Shot noise		d)	Thermal noise		
14)	In a low level AM sys	tem, amplifiers	fo	llowing the mod	lula	ted stage must
,	be			· ·		J
	a) linear devices		b)	harmonic device	es	
	c) class C amplifier		d)	nonlinear device	es	



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set R



Seat			
No.	Set	S	

T.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018

P	RINCIPLES OF	COMMUNICATIO	N	,
Day and Date: Monday Time: 10.00 a.m. to 1.0				Total Marks: 70
	30 minutes in All carries one mark. Answer MCQ/Ob	npulsory. It should nswer Book Page I njective type ques It to mention, Q.P.	No. s	3. Each question s on Page No. 3
Duration: 30 Minutes	MCQ/Objective	Type Questions		Marks : 14
 Choose the correct ASK is a result of a) digital 	of combination of s b) analog	c) amplitude	d)	none
2) OSI reference mo in la a) 5 3) FSK is used mo	yer. b) 7	c) 10	d)	
a) telephonyc) radio transmi	ssion	b) telegraphyd) none of the al	oove	
	b) quadrature	c) both a and b	d)	none
5) The noise that a a) transmission		noise. c) transit	d)	both a and b
6) In a communicationa) at the transmc) in information	itter	s affects the signal b) in the channe d) at destination		
7) One of the follow frequencies that a) shot noise c) impulse noise	is	be becomes of great b) random noise d) transit time no	,	ortance at high



8)	is the most reliable meas	surement 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 be	following the modulated stage must
	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 power is	s changed from 0 to 1. The transmitted
	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 syst	em 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 fapp	ing of signal
	, i	



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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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

Set S

c) 2

terms.

a) Cosine

c) Even

a) Another rectangle

c) Triangular

Seat No.					Set P
Т	T.E. (Biomedical	Engineering) SIGNALS	-	· I) (CGPA) Exami	nation, 2018
-	nd Date : Tuesday : 10.00 a.m. to 1.0				Max. Marks: 70
	ŕ	30 minutes in carries one ma Answer MCQ	Answer ark. V Objecti	ory. It should be so Book Page No. 3. It should be so Book Page No. 3. It was to be so Book Page No	Each question on Page No. 3
Durati	ion : 30 Minutes	MCQ/Object	ive Type	Questions	Marks : 14
1. C	hoose the correct	answer:			(14×1=14)
1) The area under	the curve $\int_{-\infty}^{+\infty} \delta$	(t)dt is		
	a) ∞ c) 0		,	Unity Undefined	
2	a) Given x(n) = a ⁿ , a) An energy sig c) Neither a) no	gnal	,	Power signal Both a) and b)	
3	The discrete-tima) 6	e signal x(n) =	(-1) ⁿ is p	eriodic with fundam 4	ental period

d) 0

b) Square

d) Sinc

b) Sine

d) Odd harmonics

5) The Fourier series of a real, even periodic signal will contain only ______

4) The autocorrelation of a rectangular pulse is _____ pulse.



- 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) 2δ(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



Seat	
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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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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

$$g(n) = a^{n/3}u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, ... \\ 0, & \text{elsewhere} \end{cases}$$
 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:

 $(2\times6=12)$

1) Determine the unilateral z transform of the following signals:

a)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

b)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

 \uparrow
c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$

- 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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Set Q

Max. Marks: 70

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018 SIGNALS AND SYSTEM

Day and Date: Tuesday, 8-5-2018

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.

of	Page.		,	`	, .
Duration: 30 Minutes	MCQ/Object	ive Type Q	uestions		Marks : 14
Baration : 00 Miliates					Marks: 14
1. Choose the correct and	swer:				(14×1=14)
1) Fourier transform of	of a d.c. signa	al with unity	strength is		
a) Zero		b) 1			
c) 2πδ(w)		d) 2δ	(w)		
2) The DTFT is period	dic with perio	od			

- a) π b) 2π c) $\pi/2$ d) $\pi/4$
- 3) Z transform converts convolution of time signals to
 - a) Additionb) Multiplicationc) Subtractiond) 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) $\frac{1}{z-n}$



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	
ŕ	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 $\int_{-\infty}^{+\infty} \delta(t) dt$ i	s
	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
ŕ	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 periterms.	odic signal will contain only
	a) Cosine	b) Sine
	c) Even	d) Odd harmonics
13)	Odd signal satisfies x(t) =	a, caa namenee
10)	a) $x(-t)$	b) $-x(-t)$
	c) $-x(t + T/2)$	d) $x(t + T/2)$
1/1	,	, , ,
· + <i>)</i>	The DTFS coefficients of a real and a) Real and odd	b) Imaginary and even
	c) Real and even	d) Imaginary and odd
	o, Hoar and over	a, imaginary and odd



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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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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

$$g(n) = a^{n/3}u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, ... \\ 0, & \text{elsewhere} \end{cases}$$
 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:

 $(2\times6=12)$

1) Determine the unilateral z transform of the following signals:

a)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

$$1) = \{1, 2, 5, 4, 0, 3\}$$

b)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

 \uparrow
c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$

- 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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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.

c) $\pi/2$

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.

-	ctive Type Questions	Mada da
Duration: 30 Minutes		Marks: 14
1. Choose the correct answer:		(14×1=14)
 The Fourier series of a real, ev terms. 	en periodic signal will contain only _	
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 re-	al 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. sig	nal with unity strength is	
a) Zero	b) 1	
c) 2πδ(w)	d) 2δ(w)	
5) The DTFT is periodic with per	riod	
a) π	b) 2π	

d) $\pi/4$

6)	Z transform converts convolution of t	time	e signals to
	a) Addition	b)	Multiplication
	c) Subtraction	d)	Division
7)	The step response of a LTI system wastep u(n) is	/hei	n the impulse response h(n) is unit
	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	ba	sed on using
,	a) Constant coefficient		Only cosine functions
	c) Only sine functions	-	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 $\int_{-\infty}^{+\infty} \delta(t) dt$ i	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 p	periodic with fundamental period
	a) 6	b)	4
	c) 2	d)	0
14)	The autocorrelation of a rectangular	pul	se is pulse.
	a) Another rectangle	b)	Square
	c) Triangular	d)	Sinc



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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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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

$$g(n) = a^{n/3}u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, ... \\ 0, & \text{elsewhere} \end{cases}$$
 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:

 $(2\times6=12)$

1) Determine the unilateral z transform of the following signals:

a)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

b)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

b)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

 \uparrow
c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$

- 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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Max. Marks: 70

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2018 SIGNALS AND SYSTEM

Day and Date: Tuesday, 8-5-2018

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:

 $(14 \times 1 = 14)$

- 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) n²
- 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



6)	The area under the curve $\int_{-\infty}^{+\infty} \delta(t) dt$ is	S
	a) ∞ c) 0	b) Unityd) Undefined
7)	Given $x(n) = a^{ n }$, $ a < 1$ is a) An energy signal c) Neither a) nor b)	b) Power signald) Both a) and b)
8)	The discrete-time signal $x(n) = (-1)^n$ a) 6 c) 2	is periodic with fundamental period b) 4 d) 0
9)	The autocorrelation of a rectangular a) Another rectangle c) Triangular	pulse is pulse. b) Square d) Sinc
10)	The Fourier series of a real, even periterms. a) Cosine c) Even	odic signal will contain only b) Sine d) Odd harmonics
11)	Odd signal satisfies $x(t) = a$ a) $x(-t)$ c) $-x(t + T/2)$	b) -x (-t) d) x(t + T/2)
12)	The DTFS coefficients of a real and a) Real and odd c) Real and even	even periodic signal are b) Imaginary and even d) Imaginary and odd
13)	Fourier transform of a d.c. signal with a) Zero c) $2\pi\delta(w)$	n unity strength is b) 1 d) 2δ(w)
14)	The DTFT is periodic with period a) π c) $\pi/2$	b) 2π d) $\pi/4$



Seat	
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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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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

$$g(n) = a^{n/3}u\left(\frac{n}{3}\right) = \begin{cases} a^{n/3}, & n = 0, 3, 6, ... \\ 0, & \text{elsewhere} \end{cases}$$
 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:

 $(2\times6=12)$

1) Determine the unilateral z transform of the following signals:

a)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

b)
$$x(n) = \{1, 2, 5, 4, 0, 3\}$$

 \uparrow
c) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 3\}$

- 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

No.

T.E. (Biomedical Engg.) (Part II) (CGPA) Examination, 2018 BIOMEDICAL INSTRUMENTATION – II

Day and Date : Monday, 14-5-2018	Total Marks: 70
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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.

		0 , 0 , 0 , 0 , 0	. ype ddeediene	•	
Dur	ation: 30 Minutes				Marks: 14
1.	Fill in the blanks :				(1×14=14)
	1) a to beat.	re designed to mea	sure and record fo	oetal heart rate	on beat
	a) Cardiotocogi	aph	b) GSR		
	c) Doppler		d) Oscillomet	ers	
	2) Range of thresh	old of perception o	of electric shock is	s about	mA.
	a) 2	b) 4	c) 3	d) 1	
	3) sh with the electric	•	by the subject by	an accidenta	l contact
	a) Micro	b) Macro	c) Minute	d) Gross	
	4) The respiratory	cycle is accomplis	hed by	_ in the thorac	cic volume.
	a) air	b) volume	c) capacity	d) change	S
	5) The most promi eyes are closed	•	attern of an awake	e, relaxed adu	It whose
	a) alpha	b) theta	c) delta	d) beta	

6)	A telemedicine prog	gram consists of a	ı 2 way		
	a) communication	b) analysis	c) categories	d) conduction	
7)	Bioelectric potential	s are generated a	at a le	evel.	
	a) muscular	b) cellular	c) refractory	d) depolarization	'n
8)	Motion artifact is red	duced to a negligi	ble magnitude by	/ab	rasion
	a) motion	b) skin	c) gel	d) membrane	
9)	The me degree of absolute			sed when the high	est
	a) invasive	b) polarized	c) direct	d) indirect	
10)	The Rheographic m the cuff.	ethod utilizes	elec	ctrodes for attach	ing
	a) 2	b) 3	c) 4	d) 5	
11)	The phonocardiograconnected with the	•		rding the	
	a) conduction	b) indirect B.P.	c) pumping	d) circulation	
12)	The first heart soun	d is	_ in pitch than sed	cond heart sound	l.
	a) lower	b) medium	c) very low	d) higher	
13)	If an external stimuluits response is calle		-	9	
	a) spinal cord	b) midbrain	c) brain	d) ear	
14)	Apnoea is theheart and circulation		eathing that prece	ede the arrest of	the
	a) pumping	b) conduction	c) cessation	d) circulation	



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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:

 $(4 \times 4 = 16)$

- 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**:

 $(2 \times 6 = 12)$

- 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.
- Explain the technique used for measurement of body temperature with suitable diagram.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 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:

- 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.

SLR-TC - 455

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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.

Dura	atio	n : 30 Minutes				Marks : 14
1.	Fil	l in the blanks :				(1×14=14)
	1)	Motion artifact is red	duced to a negligi	ble magnitude by	<i>'</i>	_ abrasion.
		a) motion	b) skin	c) gel	d) membra	ine
	2)	The medicate of absolute a			sed when the	highest
		a) invasive	b) polarized	c) direct	d) indirect	
	3)	The Rheographic m the cuff.	ethod utilizes	elec	ctrodes for at	ttaching
		a) 2	b) 3	c) 4	d) 5	
	4)	The phonocardiograconnected with the	•		rding the	
		a) conduction	b) indirect B.P.	c) pumping	d) circulation	on
	5)	The first heart soun	d is	_ in pitch than sed	cond heart s	ound.
		a) lower	b) medium	c) very low	d) higher	

6)	If an external stimuli its response is called		•	e	
	a) spinal cord	b) midbrain	c) brain	d) ear	
7)	Apnoea is theheart and circulation	of bren.	eathing that prece	ede the arrest of the	
	a) pumping	b) conduction	c) cessation	d) circulation	
8)	are d to beat.	esigned to measu	re and record foe	tal heart rate on beat	
	a) Cardiotocograph	1	b) GSR		
	c) Doppler		d) Oscillometer	S	
9)	Range of threshold	of perception of e	electric shock is a	aboutmA.	
	a) 2	b) 4	c) 3	d) 1	
10)	shock with the electric wir		y the subject by a	n accidental contact	
	a) Micro	b) Macro	c) Minute	d) Gross	
11)	The respiratory cyc	le is accomplishe	d by	in the thoracic volume.	
	a) air	b) volume	c) capacity	d) changes	
12)	The most prominent eyes are closed is _	•	ern of an awake,	relaxed adult whose	
	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 potential	ls are generated a	at a le	evel.	
	a) muscular	b) cellular	c) refractory	d) depolarization	



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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:

 $(4 \times 4 = 16)$

- 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**:

 $(2\times6=12)$

- 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:

 $(4 \times 4 = 16)$

- 1) Explain working of fetal scalp pH measurement with necessary diagram.
- 2) Define micro, gross and leakage current, explain its occurrence.

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- 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:

- 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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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.

Dura	atio	n : 30 Minutes					Marks: 14
1.	Fil	I in the blanks :					(1×14=14)
	1)	The most prominent eyes are closed is _	•	rn	of an awake, r	ela	xed adult whose
		a) alpha	b) theta	c)	delta	d)	beta
	2)	A telemedicine prog	gram consists of a	2	way		
		a) communication	b) analysis	c)	categories	d)	conduction
	3)	Bioelectric potential	s are generated a	ıt a	le	vel.	
		a) muscular	b) cellular	c)	refractory	d)	depolarization
	4)	Motion artifact is re-	duced to a negligi	ble	magnitude by		abrasion.
		a) motion	b) skin	c)	gel	d)	membrane
	5)	The medegree of absolute	•			ed	when the highest
		a) invasive	b) polarized	c)	direct	d)	indirect

6)	The Rheographic m the cuff.	ethod utilizes	elec	ctrodes for attaching
	a) 2	b) 3	c) 4	d) 5
7)	The phonocardiograconnected with the	•		rding the
	a) conduction	b) indirect B.P.	c) pumping	d) circulation
8)	The first heart soun	d is	$_{\scriptscriptstyle \perp}$ in pitch than sec	cond heart sound.
	a) lower	b) medium	c) very low	d) higher
9)	If an external stimuluits response is calle		-	9
	a) spinal cord	b) midbrain	c) brain	d) ear
10)	Apnoea is theheart and circulation		eathing that prece	ede the arrest of the
	a) pumping	b) conduction	c) cessation	d) circulation
11)	are de	esigned to measu	re and record foet	al heart rate on beat
	to beat.			
	a) Cardiotocograph	l	•	
	c) Doppler		d) Oscillometers	5
12)	Range of threshold	of perception of e	electric shock is a	boutmA.
	a) 2	b) 4	c) 3	d) 1
13)	shock with the electric wiri		the subject by a	n accidental contact
	a) Micro	b) Macro	c) Minute	d) Gross
14)	The respiratory cycl	e is accomplished	d by i	n the thoracic volume.
	a) air	b) volume	c) capacity	d) changes



Seat	
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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:

 $(4 \times 4 = 16)$

- 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**:

 $(2 \times 6 = 12)$

- 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.
- Explain the technique used for measurement of body temperature with suitable diagram.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain working of fetal scalp pH measurement with necessary diagram.
- 2) Define micro, gross and leakage current, explain its occurrence.

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- 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:

- 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.

SLR-TC - 455

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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.

Dura	atio	n : 30 Minutes			Marks : 14
1.	Fil	I in the blanks :			(1×14=14)
	1)	The Rheographic method the cuff.	ethod utilizes	elec	ctrodes for attaching
		a) 2	b) 3	c) 4	d) 5
	2)	The phonocardiograconnected with the	•		ording the
		a) conduction	b) indirect B.P.	c) pumping	d) circulation
	3)	The first heart soun	d is	_ in pitch than se	cond heart sound.
		a) lower	b) medium	c) very low	d) higher
	4)	If an external stimule its response is called	• •	•	e
		a) spinal cord	b) midbrain	c) brain	d) ear
	5)	Apnoea is theheart and circulation		eathing that prece	ede the arrest of the
		a) pumping	b) conduction	c) cessation	d) circulation



6)	are d	esigned to measu	re and record foet	tal heart rate on beat	
	to beat.				
	a) Cardiotocograph	1	b) GSR		
	c) Doppler		d) Oscillometers	S	
7)	Range of threshold	of perception of e	electric shock is a	boutmA.	
	a) 2	b) 4	c) 3	d) 1	
8)	shock with the electric wiri		the subject by a	n accidental contact	
	a) Micro	b) Macro	c) Minute	d) Gross	
9)	The respiratory cyc	le is accomplished	d by i	in the thoracic volume	
	a) air	b) volume	c) capacity	d) changes	
10)	The most prominen eyes are closed is _		ern of an awake, ı	relaxed adult whose	
	a) alpha	b) theta	c) delta	d) beta	
11)	A telemedicine prog	gram consists of a	ı 2 way		
	a) communication	b) analysis	c) categories	d) conduction	
12)	Bioelectric potential	s are generated a	at a le	evel.	
	a) muscular	b) cellular	c) refractory	d) depolarization	
13)	Motion artifact is red	duced to a negligi	ble magnitude by	/ abrasio	n.
	a) motion	b) skin	c) gel	d) membrane	
14)	The medegree of absolute			sed when the highest	
	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:

 $(4 \times 4 = 16)$

- 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**:

 $(2 \times 6 = 12)$

- 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.
- Explain the technique used for measurement of body temperature with suitable diagram.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 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:

- 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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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.

Duratio	on : 30 Minutes			Marks	: 14
1. Ch	oose the correct ar	nswer:			14
1)	An object whichis called a black be		liation incident upon	it at all wavelengths	
	a) radiates	b) incidents	c) scatter	d) absorbs	
2)	A bolometer is a _	dete	ctor heated by inci	dent radiation.	
	a) radiation	b) energy	c) heat	d) thermal	
3)	A figure of merit for equivalent temperature	•	nic imaging system	is the	
	a) noise		b) temperature		
	c) heat		d) energy		
4)	Pulse echo imagin	ng is performed by	a tra	ansducer.	
	a) rotating	b) stationary	c) flexible	d) spectral	
5)	Phased array ultra	sound scanner is	useful for	scanning.	
	a) nerves	b) lever	c) stomach	d) cardiac	

6)	The characteristic impedance of and refraction.	ultrasound determines degree of
	a) incidence b) transmission	c) reflection d) intensity
7)	Ultrasonic energy is transmitted throu	ugh a medium is like a
	a) radiation b) wave motion	c) reflection d) conduction
8)	is calculated estimate absorption of ultrasound.	of temperature increase with tissue
	a) thermal index	b) acoustic impedance
	c) mechanical index	d) wavelength index
9)	The penetrating ability of an X-ray be	eam is governed by
	a) Kilovoltage or wavelength	b) Time
	c) Milliamperage	d) Source-to-film distance
10)	The voltage and waveform applied transformer primarily determines the	to the X-ray tube by a high-voltage
	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 field can be exactly simulated by a lig	n a by which the X-ray ght field.
	a) grids	b) strips
	c) optical device	d) light source
13)	Fluoroscopy image is always observe	ed in room.
	a) vacuum b) dark	c) brighter d) evacuated
14)	The infrared rays are electromagnetic than the radio frequencies.	waves with a frequency
	a) lower b) higher	c) moderate d) none of above



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:

 $(4 \times 4 = 16)$

- 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:

- 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.

-4-



SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 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:

- 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.



Seat No.	Set	Q
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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.

Duration: 30 Minutes	Marks : 14
1. Choose the correct answer:	14
absorption of ultrasound.	ate of temperature increase with tissue
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
 The voltage and waveform applie transformer primarily determines the 	ed to the X-ray tube by a high-voltage
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)		ually provided with y simulated by a lig			y which the X-ray
	a) grids		b)	strips	
	c) optical device		d)	light source	
6)	Fluoroscopy image	e is always observe	d ir	າ	room.
	a) vacuum	b) dark	c)	brighter	d) evacuated
7)	The infrared rays a than the radio freq	re electromagnetic uencies.	wa	ves with a frequ	ency
	a) lower	b) higher	c)	moderate	d) none of above
8)	An object which is called a black bo	all radia ody.	atio	n incident upon it	at all wavelengths
	a) radiates	b) incidents	c)	scatter	d) absorbs
9)	A bolometer is a _	detect	or	heated by incide	ent radiation.
	a) radiation	b) energy	c)	heat	d) thermal
10)	A figure of merit fo equivalent tempera	r the thermographic ature difference.	in c	naging system is	s the
	a) noise		b)	temperature	
	c) heat		d)	energy	
11)	Pulse echo imagin	g is performed by a	ι	trar	nsducer.
	a) rotating	b) stationary	c)	flexible	d) spectral
12)	Phased array ultra	sound scanner is u	sef	ul for	scanning.
	a) nerves	b) lever	c)	stomach	d) cardiac
13)	The characteristi	ic impedance of refraction.	ultr	asound deterr	mines degree of
	a) incidence	b) transmission	c)	reflection	d) intensity
14)	Ultrasonic energy	is transmitted throu	gh	a medium is like	e a
	a) radiation	b) wave motion	c)	reflection	d) conduction



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:

 $(4 \times 4 = 16)$

- 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.



Seat No.		Set	R
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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.

Duratio	n : 30 Minutes			Marks:	14
1. Ch	oose the correct an	swer:			14
1)	Phased array ultra	sound scanner is u	seful for	scanning.	
	a) nerves	b) lever	c) stomach	d) cardiac	
2)	The characterist and	•	ultrasound deterr	mines degree of	
	a) incidence	b) transmission	c) reflection	d) intensity	
3)	Ultrasonic energy	is transmitted throu	igh a medium is like	e a	
	a) radiation	b) wave motion	c) reflection	d) conduction	
4)	absorption of ultra		of temperature inc	crease with tissue	
	a) thermal index		b) acoustic imped	lance	
	c) mechanical inc	lex	d) wavelength ind	lex	
5)	The penetrating at	oility of an X-ray be	am is governed by		
	a) Kilovoltage or	wavelength	b) Time		
	c) Milliamperage		d) Source-to-film	distance	

6)	The voltage and waveform applied to the X-ray tube by a high-voltage transformer primarily determines the				
	a) Quantity of rad	iation	b)	Duration of exp	oosure
	c) Penetrating ab	ility	d)	X-ray beam div	/ergence
7)	In small capacity X	-ray machines		tubes a	re used.
	a) stationary	b) rotating	c)	steady	d) circular
8)	Collimators are us field can be exactly	• •			y which the X-ray
	a) grids		b)	strips	
	c) optical device		d)	light source	
9)	Fluoroscopy image	e is always observe	d ir	1	room.
	a) vacuum	b) dark	c)	brighter	d) evacuated
10)	The infrared rays a than the radio freq		wav	ves with a frequ	ency
	a) lower	b) higher	c)	moderate	d) none of above
11)	An object which	all radia	atior	n incident upon it	t at all wavelengths
	is called a black bo	ody.			
	a) radiates	b) incidents	c)	scatter	d) absorbs
12)	A bolometer is a _	detect	tor h	neated by incide	ent radiation.
	a) radiation	b) energy	c)	heat	d) thermal
13)	A figure of merit fo equivalent tempera	• .	c im	aging system is	s the
	a) noise		b)	temperature	
	c) heat		d)	energy	
14)	Pulse echo imagin	g is performed by a	a	tra	nsducer.
	a) rotating	b) stationary	c)	flexible	d) spectral



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:

 $(4 \times 4 = 16)$

- 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:

- 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.

-4-



SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 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:

- 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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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.

Duration:	30 Minutes			Marks: 14
1. Choos	e the correct an	swer:		14
•	•	waveform applied trily determines the	•	by a high-voltage
a)	Quantity of rad	iation	b) Duration of e	xposure
c)	Penetrating ab	ility	d) X-ray beam of	divergence
2) In :	small capacity X	(-ray machines	tubes	are used.
a)	stationary	b) rotating	c) steady	d) circular
•		ually provided with y simulated by a lig		by which the X-ray
a)	grids		b) strips	
c)	optical device		d) light source	
4) Flu	oroscopy image	e is always observe	ed in	_ room.
a)	vacuum	b) dark	c) brighter	d) evacuated
,	e infrared rays a In the radio freq	•	waves with a freq	uency
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.			at all wavelengths	
	a) radiates	b) incidents	c)	scatter	d) absorbs
7)	A bolometer is a _	detec	tor I	neated by incide	ent radiation.
	a) radiation	b) energy	c)	heat	d) thermal
8)	A figure of merit for equivalent temper	or the thermographicature difference.	c im	naging system is	s the
	a) noise		b)	temperature	
	c) heat		d)	energy	
9)	Pulse echo imagir	ng is performed by a	a	trar	nsducer.
	a) rotating	b) stationary	c)	flexible	d) spectral
10)	Phased array ultra	asound scanner is u	ısef	ul for	scanning.
	a) nerves	b) lever	c)	stomach	d) cardiac
11)	The characterist	ic impedance of refraction.	ultr	asound deterr	mines degree of
	a) incidence	b) transmission	c)	reflection	d) intensity
12)	Ultrasonic energy	is transmitted throu	ıgh	a medium is like	e a
	a) radiation	b) wave motion	c)	reflection	d) conduction
13)		alculated estimate	of t	temperature inc	rease with tissue
	absorption of ultra	souna.	b)	acquetic imped	lanco
	a) thermal index	dex	•	acoustic imped	
1 1)	•		-	_	
14)		bility of an X-ray be		Time	
	a) Kilovoltage or	waveleligili	,		Р.,
	c) Milliamperage		d)	Source-to-film	distance



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:

 $(4 \times 4 = 16)$

- 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:

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.



Sea No				Set P
	T.E. (Part – II)	-	ngg.) (CGPA) Exa DL SYSTEMS	mination, 2018
•	and Date : Friday, : : 2.30 p.m. to 5.30			Max. Marks: 70
	·	30 minutes in A carries one mar Answer MCQ/0	Answer Book Page I k. Dbjective type que s	Id be solved in first No. 3. Each question Stions on Page No. 3 Set (P/Q/R/S) on Top
Dura	tion : 30 Minutes	MCQ/Objectiv	e Type Questions	Marks : 14
1. (Choose the correct	answer:		
	1) By using obtained.	eleme	ent mechanical trans	slational systems are
	a) mass	b) spring	c) dash pot	d) all above
	2) Transient state	analysis deals wi	th	
	a) magnitude of	error	b) nature of res	ponse
	c) both a) and b)	d) none of the a	above
	3)	is the type of c	losed loop system	for the plant transfer
	function G(s) =	$\frac{\zeta}{2}$ (1+s) and with	unity feedback.	
	a) 1		c) 3	d) 0
	4) Lead compensa	tor is used to imp	prove	

5) Adding a pole to a system transfer function in terms of compensator

b) lag

d) lag-lead

b) steady state response

d) none of the above

a) transient response

represents a _____ compensator.

c) both a) and b)

a) lead

c) lead-lag

6)	For type I system v	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.Mve		d) P.Mve			
8)	Number of roots in $s^3 - 4s^2 + s + 6 = 0$	of roots in left hand of s-plane if characteristic equation is $+ s + 6 = 0$ is				
	a) 1	b) 2	c) 3	d) 0		
9)	The value of gain r	he 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 s	der of system $G(s) = \frac{s+6}{s(s-2)(s-4)}$.				
	a) 2	b) 3	c) 4	d) 5		
11)	Slope of asymptot octave.	e in Bode plot of	2 nd order system i	s per		
	a) 18 dB	b) 12 dB	c) 6 dB	d) 3 dB		
12)	Settling time for 5%	% tolerance band i	S			
	a) 3 T	b) 4 T	c) 5 T	d) 2 T		
13)	• •	e polynomial $P(s) = 2s^5 + s^4 + 4s^3 + 2s^2 + 3s + 15$, number of roots lie in right half plane of s-plane is				
	a) 4	b) 2	c) 3	d) 1		
14)	Electrical analogousystem is	rical analogous element for damper element in mechanical translational m is				
	a) capacitor	b) inductor	c) resistor	d) any of above		
						



Seat	
No.	

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018 CONTROL SYSTEMS

Day and Date: Friday, 18-05-2018

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

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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 $E_o(s)/E_i(s)$.

$$e_{i}(t) = \frac{100 \text{ k}\Omega}{100 \text{ k}\Omega}$$

- 4) Describe any four properties of signal flow graph.
- 5) Define and compare between relative stability and absolute stability.
- 3. Attempt any two questions:

 $(6 \times 2 = 12)$

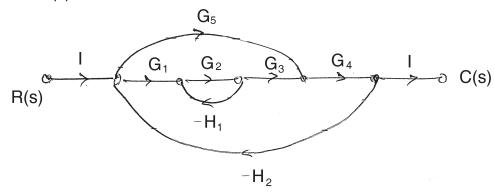
1) Find the range of values of 'k' for which the following system is stable.

a)
$$s^4 + ks^3 + s^2 + s + 1 = 0$$

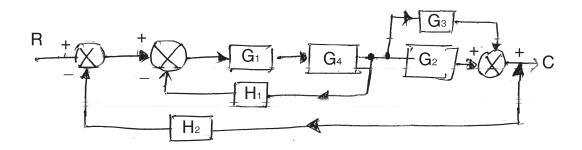
b)
$$G(s) H(s) = \frac{k}{(s+2)(s+4)(s^2+6s+25)}$$
.



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.

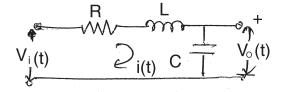


SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

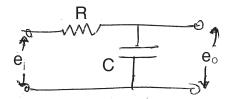
1) Define state variables and state model concept and obtain the state model for given electrical system.



- 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:

- 1) Draw the Nyquist plot for a system with $G(s) H(s) = \frac{10(s+3)}{s(s-1)}$ 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 $G(s) \, H(s) = \frac{80(s+5)}{s^2(s+50)} \, .$
- 3) Sketch the root locus for system with $G(s) H(s) = \frac{k(s+4)}{s(s^2+2s+2)}$.

Seat No.

Set

Max. Marks: 70



T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018 CONTROL SYSTEMS

Day and Date: Friday, 18-05-2018

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 $G(s) = \frac{s+6}{s(s-2)(s-4)}$.
 - a) 2

- b) 3
- c) 4

- d) 5
- 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
 - a) 4

- b) 2
- c) 3
- d) 1

7)	Electrical analogous element for damper element in mechanical translational system is					
	a) capacitor	b) inductor	c)	resistor	d)	any of above
8)	By usingobtained.	element	me	chanical transla	tion	nal systems are
	a) mass	b) spring	c)	dash pot	d)	all above
9)) Transient state analysis deals with					
	a) magnitude of error		b) nature of response			
	c) both a) and b)		d)	none of the abo	ove	
10)	is	the type of close	ed I	oop system for	the	e plant transfer
	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
11)	Lead compensator	is used to improv	e			
	a) transient respor	nse	b)	steady state re	spo	nse
	c) both a) and b)		d)	none of the abo	ove	
12)	Adding a pole to a represents a	-			com	npensator
	a) lead		b)	lag		
	c) lead-lag		d)	lag-lead		
13)	For type I system v	vith parabolic inpu	ıt, tl	ne steady state	erro	or is
	a) zero		b)	finite constant		
	c) infinite		d)	indeterminate		
14)	A system is stable	for				
	a) G.M. and P.M. I	ooth +ve	b)	G.M. and P.M.	bot	h –ve
	c) G.Mve		d)	P.M. –ve		



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:

 $(4 \times 4 = 16)$

- 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 $E_{\rm o}(s)/E_{\rm i}(s)$.

$$e_{i}(t) = \frac{100 \text{ k}\Omega}{100 \text{ k}\Omega}$$

- 4) Describe any four properties of signal flow graph.
- 5) Define and compare between relative stability and absolute stability.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

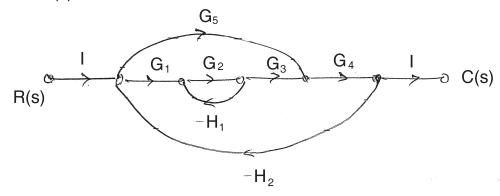
1) Find the range of values of 'k' for which the following system is stable.

a)
$$s^4 + ks^3 + s^2 + s + 1 = 0$$

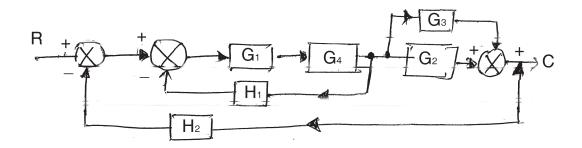
b)
$$G(s) H(s) = \frac{k}{(s+2)(s+4)(s^2+6s+25)}$$
.



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.

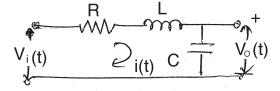


SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

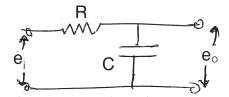
1) Define state variables and state model concept and obtain the state model for given electrical system.



- 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:

- 1) Draw the Nyquist plot for a system with $G(s) H(s) = \frac{10(s+3)}{s(s-1)}$ 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 $G(s) \, H(s) = \frac{80(s+5)}{s^2(s+50)} \, .$
- 3) Sketch the root locus for system with $G(s) H(s) = \frac{k(s+4)}{s(s^2+2s+2)}$.

Seat	
No.	



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 T	уре	Questions		
Duratio	on: 30 Minutes					Marks: 14
1. Ch	oose the correct an	swer:				
1)	Adding a pole to a represents a	•			compensato	or
	a) lead		b)	lag		
	c) lead-lag		d)	lag-lead		
2)	For type I system	with parabolic inpu	ut, th	ne 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.Mve		d)	P.M. –ve		
4)	Number of roots in $s^3 - 4s^2 + s + 6 = 0$	•	ne i	f characteristic	equation is	
	a) 1	b) 2	c)	3	d) 0	
5)	The value of gain r	margin of the syste	em	having G(s) H(s	(s) = 8/(s + 2)) ³ is
	a) 8	b) 2	c)	6	d) 4	



Find the order of s	system G(s) = $\frac{s}{s(s-s)}$	$\frac{s+b}{2)(s-4)}$.	
a) 2	b) 3	c) 4	d) 5
Slope of asymptotoctave.	te in Bode plot of	2 nd order system i	is per
a) 18 dB	b) 12 dB	c) 6 dB	d) 3 dB
Settling time for 5% tolerance band is			
a) 3 T	b) 4 T	c) 5 T	d) 2 T
			5, number of roots
a) 4	b) 2	c) 3	d) 1
Electrical analogousystem is	us element for dam	per element in mech	nanical translational
a) capacitor	b) inductor	c) resistor	d) any of above
By usingobtained.	element	mechanical transla	ational systems are
a) mass	b) spring	c) dash pot	d) all above
Transient state an	alysis deals with		
a) magnitude of e	rror	b) nature of response	onse
c) both a) and b)		d) none of the ab	ove
is	s the type of clos	ed loop system for	r the plant transfer
function G(s) = $\frac{k}{s^2}$	(1+s) and with un	ity feedback.	
a) 1	b) 2	c) 3	d) 0
Lead compensator	r is used to improv	/e	
a) transient respo	nse	b) steady state re	esponse
c) both a) and b)		d) none of the ab	
	a) 2 Slope of asymptomoctave. a) 18 dB Settling time for 50 a) 3 T For the polynomial which lie in right has a) 4 Electrical analogous system is a) capacitor By using	a) 2 b) 3 Slope of asymptote in Bode plot of octave. a) 18 dB b) 12 dB Settling time for 5% tolerance band a) 3 T b) 4 T For the polynomial $P(s) = 2s^5 + s^4 + 4$ which lie in right half plane of s-plan a) 4 b) 2 Electrical analogous element for dam system is a) capacitor b) inductor By using element obtained. a) mass b) spring Transient state analysis deals with a) magnitude of error c) both a) and b) is the type of close function $G(s) = \frac{k}{s^2}(1+s)$ and with un a) 1 b) 2 Lead compensator is used to improve a) transient response	Slope of asymptote in Bode plot of 2^{nd} order system octave. a) 18 dB



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 :

 $(4 \times 4 = 16)$

- 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 $E_{\rm o}(s)/E_{\rm i}(s)$.

- 4) Describe any four properties of signal flow graph.
- 5) Define and compare between relative stability and absolute stability.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

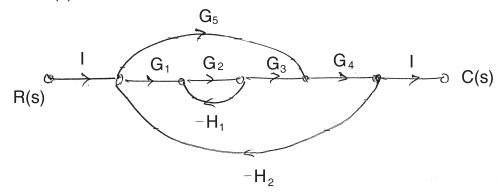
1) Find the range of values of 'k' for which the following system is stable.

a)
$$s^4 + ks^3 + s^2 + s + 1 = 0$$

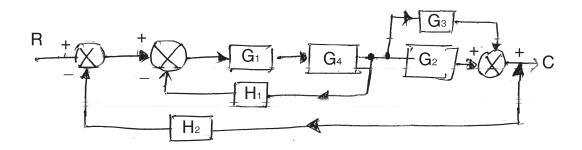
b)
$$G(s) H(s) = \frac{k}{(s+2)(s+4)(s^2+6s+25)}$$
.



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.

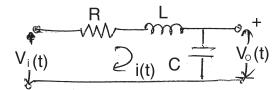


SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

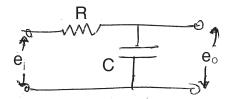
1) Define state variables and state model concept and obtain the state model for given electrical system.



- 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:

- 1) Draw the Nyquist plot for a system with $G(s) H(s) = \frac{10(s+3)}{s(s-1)}$ 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 $G(s) \, H(s) = \frac{80(s+5)}{s^2(s+50)} \, .$
- 3) Sketch the root locus for system with $G(s) H(s) = \frac{k(s+4)}{s(s^2+2s+2)}$.



Seat	
No.	

P.T.O.

T.F. (Part - II) (Riomedical Enga.) (CGPA) Examination, 2018.

	1.L. (Part – II) (L	CONTROL S	SYSTEMS	mation, 2010
	d Date : Friday, 18- 2.30 p.m. to 5.30 p.			Max. Marks: 70
,	30 ca 2) A o	0 minutes in Anst arries one mark. nswer MCQ/Obje	wer Book Page No ective type quest	be solved in first 3. Each question ions on Page No. 3 Set (P/Q/R/S) on Top
Duratio	n : 30 Minutes	MCQ/Objective T	ype Questions	Marks : 14
	oose the correct an	swer:		Marke . Tr
1)	Find the order of s	ystem G(s) = $\frac{s}{s(s-1)}$	$\frac{s+6}{2)(s-4)}$.	
	a) 2	b) 3		d) 5
2)	Slope of asymptot octave.	e in Bode plot of	2 nd order system i	s per
	a) 18 dB	b) 12 dB	c) 6 dB	d) 3 dB
3)	Settling time for 5%	% tolerance band i	S	
	a) 3 T	b) 4 T	c) 5 T	d) 2 T
4)	For the polynomial which lie in right ha			, number of roots
	a) 4	b) 2	c) 3	d) 1
5)	Electrical analogou system is	s element for damp	oer element in mech	nanical translational
	a) capacitor	b) inductor	c) resistor	d) any of above
6)	By usingobtained.	element	mechanical transla	ational systems are
	a) mass	b) spring	c) dash pot	d) all above

8) _ ft. a 9) L a c 10) A a c 12) A a c 13) N	a) magnitude of er c) both a) and b) unction $G(s) = \frac{k}{s^2}$ (a) 1 Lead compensator a) transient respon	the type of close I+s) and with unitb) 2	d) ed l ty fe	nature of respo none of the abo loop system for eedback.	
8) _ ft a 9) L a c 11) F a c 12) A a c 13) N	unction $G(s) = \frac{k}{s^2}$ a) 1 Lead compensator	I+s) and with unite b) 2	ed l	loop system for	
ft. a 9) L a c 10) A a c 11) F a c 12) A a c 13) N	unction G(s) = $\frac{k}{s^2}$ (1 a) 1 Lead compensator	I+s) and with unite b) 2	ty fe	loop system for eedback.	the plant transfer
ft. a 9) L a c 10) A a c 11) F a c 12) A a c 13) N	unction G(s) = $\frac{k}{s^2}$ (1 a) 1 Lead compensator	I+s) and with unite b) 2	ty fe	eedback.	
a 9) L a c 10) A a c 12) A a c 13) N	a) 1 Lead compensator	b) 2			
a c 10) A re a c 11) F a c 12) A a c 13) N	·		U)	3	d) 0
10) A re a c 11) F a c 12) A a c	a) transient respor	is used to improv	e		
10) A re a c 11) F a c 12) A a c 13) N	,	ise	b)	steady state res	sponse
11) F a c 12) A a c 13) N	c) both a) and b)		d)	none of the abo	ove
11) F a c 12) A a c	Adding a pole to a epresents a				compensator
11) F a c 12) A a c	a) lead		b)	lag	
a c 12) A a c 13) N	c) lead-lag		d)	lag-lead	
c 12) A a c 13) N	or type I system v	vith parabolic inpu	ıt, th	he steady state	error is
12) A a c 13) N	a) zero		b)	finite constant	
a c 13) N	c) infinite		d)	indeterminate	
c 13) N	A system is stable	for			
13) N	a) G.M. and P.M. I	ooth +ve	b)	G.M. and P.M.	both –ve
•	c) G.M. –ve		d)	P.M. –ve	
	1	left hand of s-plar	ne it	f characteristic e	equation is
a	Number of roots in $6^3 - 48^2 + 8 + 6 = 0$		c)	3	d) 0
14) T		b) 2	٥,		,
a	$s^3 - 4s^2 + s + 6 = 0$,	,		,



Seat	
No.	

T.E. (Part – II) (Biomedical Engg.) (CGPA) Examination, 2018 CONTROL SYSTEMS

Day and Date: Friday, 18-05-2018

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

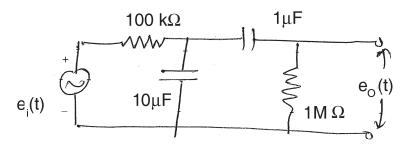
SECTION - I

2. Attempt any four questions :

 $(4 \times 4 = 16)$

Marks: 56

- 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 $E_{\rm o}(s)/E_{\rm i}(s)$.



- 4) Describe any four properties of signal flow graph.
- 5) Define and compare between relative stability and absolute stability.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

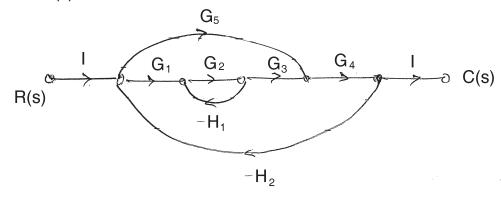
1) Find the range of values of 'k' for which the following system is stable.

a)
$$s^4 + ks^3 + s^2 + s + 1 = 0$$

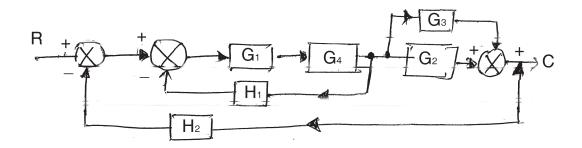
b)
$$G(s) H(s) = \frac{k}{(s+2)(s+4)(s^2+6s+25)}$$
.



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.

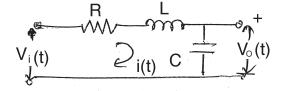


SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

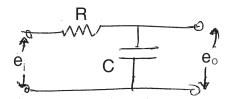
1) Define state variables and state model concept and obtain the state model for given electrical system.



- 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:

- 1) Draw the Nyquist plot for a system with $G(s) H(s) = \frac{10(s+3)}{s(s-1)}$ 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 $G(s) \, H(s) = \frac{80(s+5)}{s^2(s+50)} \, .$
- 3) Sketch the root locus for system with $G(s) H(s) = \frac{k(s+4)}{s(s^2+2s+2)}$.

SLR-TC - 458

Seat	
No.	

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	e Type Questions
Dura	ation : 30 Minutes	Marks : 14
1.	Choose the correct answer:	14
	1) The region of convergence of $x/(3)$	$1+2x+x^2$) is
	a) 0 b) 1	c) Negative d) Positive
	2) The transforming relations perform	ned by DTFT are
	a) Linearity	b) Modulation
	c) Shifting and convolution	d) All above
	3) The circular convolution of the sec $X_2(n) = \{1, 2, 3, 4\}$ is	quences $X_1(n) = \{2, 1, 2, 1\}$ and
	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 inspecification has to be optimised.	_ region of the filter the frequency
	a) Stop band	b) Pass band
	c) Transition band	d) None of above

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 free	quency WK in the	e fre	equency respo	nse	e of an FIR filter	
	is						
7)	a) $\frac{\pi}{M}$ (K + α) IJR filters are of	b) $\frac{4\pi}{M}$ (K + α)	c)	$\frac{8\pi}{M}$ (K + α)	d)	$\frac{2\pi}{M}$ (K + α)	
• ,	a) Recursive	Tididio:	h)	Non-recursive	ż		
	c) Reversive		•	Non-reversive			
8)	In frequency samplir	ng method transit	,			e of	
,	a) π/M filters o	_			-		
9)	filters	exhibit their depe	nde	ency upon the	sys	stem design for	
	the stability purpose						
	a) DFT	b) FIR	c)	IIR	d)	FFT	
10)	The sensitivity of filter	er coefficient qua	ntiz	ation for FIR f	iltei	r is	
	a) Low	b) Moderate	c)	High	d)	Unpredictable	
11)	For a linear phase fi	Iter, if Z, is zero t	hen	, the value of	Z ^{−1} ,	or	
	a) Zero	b) Unity	c)	Infinity	d)	Unpredictable	
12)	If x(n) and x(k) are a	n N-point DFT pa	air,	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 value	es		
14)	Time shifting of disc	rete time signal n	nea	ns	_		
	a) $Y(n] = X(n - k]$		b)	Y(n] = X (-n)	– k]		
	c) $Y(n] = -X (n - k)$]	d)	Y(n] = X (n +	k]		





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.

$$SECTION - I (4 \times 4 = 16)$$

- 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:

- 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 $x(t) = \sin(2\pi ft)$ with f = 50 Hz.
- 3) Define and explain following term:
 - a) Auto correlation
 - b) Cross correlation
 - c) Circular correlation.

SECTION - II

-4-

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

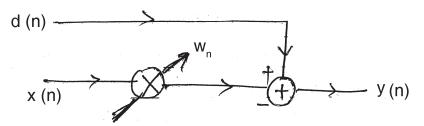
- 1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
- 2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{1}^{M=1/2} h(n) \sin \omega \, (T-n) = 0 \, .$
- 3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s + 0.2}{(s + 0.2)^2 + 9}.$
- 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:

 $(6 \times 2 = 12)$

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.

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SLR-TC - 458

Seat	l	
No.	Set	Q

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018 DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 21-5-2018 Total Marks Time : 2.30 p.m. to 5.30 p.m.					70			
 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 T	уре	Questions			
Durat	ioi	n : 30 Minutes					Marks:	: 14
1. (Ch	oose the correct a	nswer:					14
1) In frequency sampling method transition band is a multiple of								
2	2)	a) $\frac{\pi}{M}$ filter	b) $\frac{2\pi}{M}$ rs exhibit their depo	c) end	$\frac{\pi}{2M}$		2πM	
_	,	the stability purpo		0110	oney apon the	Oy c	nom decign for	
		a) DFT	b) FIR	c)	IIR	d)	FFT	
3	3)	The sensitivity of	filter coefficient qua	antiz	zation for FIR f	ilte	r is	
		a) Low	b) Moderate	c)	High	d)	Unpredictable	
4	-	For a linear phase 1/Z, is	e filter, if Z, is zero	ther	n, the value of	Z ^{−1} ,	or	
		a) Zero	b) Unity	c)	Infinity	d)	Unpredictable	
5	5)	If x(n) and x(k) are	e an N-point DFT p	air,	the $X(K + N) =$	=	?	
		a) X (– K)	b) - X (K)	c)	X (K)	d)	None of above	
6	3)	ROC does not ha	ve					
		a) Zeros		b)	Poles			
	c) Negative value d) Positive values							

a) Recursivec) Reversive

7)	Time shifting of discrete time signal n	neans
	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 $x/(1+2)$	$2x + x^2$) is
	a) 0 b) 1	c) Negative d) Positive
9)	The transforming relations performed	l by DTFT are
	a) Linearity	b) Modulation
	c) Shifting and convolution	d) All above
10)	The circular convolution of the seque $X_2(n) = \{1, 2, 3, 4\}$ is	ences $X_1(n) = \{2, 1, 2, 1\}$ and
	a) {14, 14, 16, 16}	b) {16, 16, 14, 14}
	c) {2, 3, 6, 4}	d) {14, 16, 14, 16}
l 1)	To reduce side lobes in respecification has to be optimised.	egion of the filter the frequency
	a) Stop band	b) Pass band
	c) Transition band	d) None of above
12)	The values of cut off frequencies in g	eneral 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 is	e frequency response of an FIR filter
	a) $\frac{\pi}{M}$ (K + α) b) $\frac{4\pi}{M}$ (K + α)	c) $\frac{8\pi}{M}$ (K + α) d) $\frac{2\pi}{M}$ (K + α)
14)	IJR filters are of nature	

b) Non-recursive

d) Non-reversive







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
$$(4\times4=16)$$

- 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.

$$x \ (n) = \begin{cases} A, & \text{for } 0 \leq n \leq 2-1 \\ 0, & \text{otherwise} \end{cases}.$$

- 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:

- 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 $x(t) = \sin(2\pi ft)$ 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:

 $(4 \times 4 = 16)$

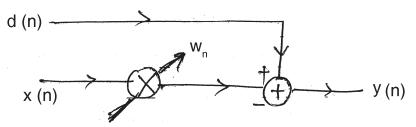
- 1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
- 2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{1}^{M=1/2} h(n) \sin \omega \, (T-n) = 0 \, .$
- 3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s+0.2}{(s+0.2)^2+9}\,.$
- 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:

 $(6 \times 2 = 12)$

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

Set	D
Set	H

Seat No.

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.

		N	ICQ/Objective Ty	ype Questions		
Dura	atio	n : 30 Minutes				Marks: 14
1.	Ch	noose the correct ans	swer:			14
	1)	The values of cut of	ff frequencies in g	jeneral depend or	າ	
		a) Type of the wind	low	b) Length of the	window	
		c) None of above		d) Both a) and b	o)	
	2)	The equation for fre	equency WK in the	e frequency respo	onse of an FII	R filter
		a) $\frac{\pi}{M}$ (K + α) IJR filters are of			d) $\frac{2\pi}{M}$ (K + ϵ	α)
	3)	a) Recursive	riature.	b) Non-recursive	Δ	
		c) Reversive		d) Non-reversive		
	4)	In frequency sampli	ing method transi	,		
	7)		•		•	
		a) $\frac{\pi}{M}$	b) $\frac{2\pi}{M}$	c) $\frac{\pi}{2M}$	d) 2πM	
	5)	filters	exhibit their depe	endency upon the	system desi	gn for
		the stability purpose			-	
		a) DFT	b) FIR	c) IIR	d) FFT	

6)	The sensitivity of filt	er coefficient qua	antiz	ation for FIR f	ilte	r is		
•	a) Low	b) Moderate				Unpredictable		
7)	For a linear phase find 1/Z, is	ilter, if Z, is zero	ther	n, the value of	Z −1,	or		
	a) Zero	b) Unity	c)	Infinity	d)	Unpredictable		
8)	If x(n) and x(k) are a	an N-point DFT p	air,	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 value	es			
10)	Time shifting of disc	_						
	a) $Y(n] = X(n - k]$			b) $Y(n] = X (-n-k]$ d) $Y(n] = X (n + k]$				
	c) $Y(n] = -X(n-k)$	(]	d)	Y(n] = X(n +	k]			
11)	The region of conve	ergence of $x/(1+x)$	2x +	- x ²) is				
	a) 0	b) 1	c)	Negative	d)	Positive		
12)	The transforming re	lations performed	d by	DTFT are				
	a) Linearity		b)	Modulation				
	c) Shifting and conv	volution	d)	All above				
13)	The circular convolution $X_2(n) = \{1, 2, 3, 4\}$ is		ence	es X ₁ (n) = {2, 1	, 2,	1} and		
	a) {14, 14, 16, 16}		b)	{16, 16, 14, 1	4}			
	c) {2, 3, 6, 4}		d)	{14, 16, 14, 1	6}			
14)	To reduce side lobe specification has to		regi	on of the filter	the	frequency		
	a) Stop band		b)	Pass band				
	c) Transition band		d)	None of abov	е			



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
$$(4\times4=16)$$

- 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:

- 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 $x(t) = \sin(2\pi ft)$ 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:

 $(4 \times 4 = 16)$

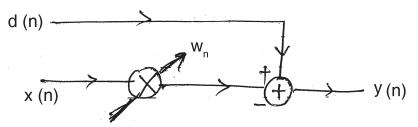
- 1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
- 2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{n=1/2}^{M=1/2} h(n) \sin \omega \, (T-n) = 0 \, .$
- 3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s + 0.2}{(s + 0.2)^2 + 9}.$
- 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:

 $(6 \times 2 = 12)$

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

et 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

		,	, , , , , , , , , , , , , , , , , , , ,				
Dur	ation: 30 Minutes			Marks	: 14		
1.	Choose the correct answer :						
	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 h	nave					
	a) Zeros		b) Poles				
	c) Negative va	lue	d) Positive va	alues			
	5) Time shifting of discrete time signal means						
	a) $Y(n] = X(n - k]$		b) $Y(n] = X (-n - k]$				
	c) $Y(n) = -X(r)$	า – kl	d) $Y(n) = X(r)$	า + kl			



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 _ specification has to be op	on of the filter t	he frequency			
	a) Stop band		b) Pass band			
	c) Transition band		d) None of above			
10)	The values of cut off freq					
	a) Type of the window		b) Length of the window			
	c) None of above		d) Both a) and b)			
11)	The equation for frequencis	cy WK in the fre	equency respor	nse of an FIR filter		
10)	a) $\frac{\pi}{M}$ (K + α) b) $\frac{4}{M}$	$\frac{4\pi}{M}(K+\alpha)$ c)	$\frac{8\pi}{M}$ (K + α)	d) $\frac{2\pi}{M}$ (K + α)		
12)	IJR filters are of		Non rocuroixo			
	a) Recursive	•	Non-recursive			
c) Reversive d) Non-reversive 13) In frequency sampling method transition band is a multip						
10)				ipie oi		
	a) $\frac{\pi}{M}$ b) $\frac{2}{M}$	$\frac{\pi}{\sqrt{1}}$ c)	$\frac{\pi}{2M}$	d) 2πM		
14)	filters exhibit their dependency upon the system design for the stability purpose.					
	a) DFT b) F	IR c)	IIR	d) FFT		





Seat No.

T.E. (Part – II) (Biomedical Engineering) (CGPA) Examination, 2018 DIGITAL SIGNAL PROCESSING

-3-

Day and Date: Monday, 21-5-2018 Marks: 56

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

SECTION – I
$$(4\times4=16)$$

- 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:

- 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 $x(t) = \sin(2\pi ft)$ 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:

 $(4 \times 4 = 16)$

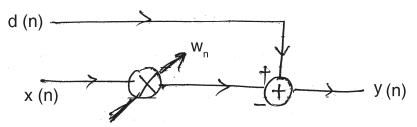
- 1) Apply bilinear transformation to, $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
- 2) The length of FIR filter is 13. If the filters has a linear phase show that $\sum_{1}^{M=1/2} h(n) \sin \omega \, (T-n) = 0 \, .$
- 3) Convert the analog filter into a digital filter whose system function is, $H(s) = \frac{s + 0.2}{(s + 0.2)^2 + 9}.$
- 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:

 $(6 \times 2 = 12)$

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.

Seat	Sat	D
No.	Set	

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:

 $(1 \times 14 = 14)$

- 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		
ŕ	a) Serial Communication Internetc) System Connection Interface	-	Interface
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 a) SRAM b) RAM	have ? c) EPROM	d) DRAM
9)	Which of the following algorithms ten a) First Come First Served c) Earliest Deadline First	b) Shortest Job F	irst
10)	If the resources are always preempt	ed from the same p	process,
	can occur. a) Deadlock b) System crash	c) Aging	d) Starvation
11)	The problem of priority inversion car a) Priority inheritance protocol c) Both a) and b)	•	on protocol entioned
12)	What will happen if a non-recursive a) Starvation b) Deadlock		
13)	The keeps state informati a) CPU b) OS		
14)	 μCOS-II task scheduling mechanism a) Cooperative as well as preemptive b) Cyclic only c) Preemptive only d) Preemptive as well as time slicing 	re	



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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(4 \times 3 = 12)$

- 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 μ COS-II.
- 5) Explain in detail operation of timer and memory management in RTOS.

5. Answer any two:

 $(2 \times 8 = 16)$

- 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-IC -	459
Seat No.				Set	Q
	T.E. (Biom	nedical) (Part – II EMBEDDI) (CGPA) Exami ED SYSTEM	nation, 2018	
-	and Date : Wedne : 2.30 p.m. to 5.30	•		Total Marks	s:70
		30 minutes in A carries one mark Answer MCQ/O	nswer Book Page :. D bjective type q u	be solved in first No. 3. Each question nestions on Page I P. Set (P/Q/R/S) or	No. 3
Durat	ion : 30 Minutes	MCQ/Objective	e Type Questions	Mark	s · 14
	Choose the correct			(1×14	4=14)
1	 What kind of mean a) SRAM 	emory does an OT b) RAM	P have ? c) EPROM	d) DRAM	
2	 Which of the fol a) First Come I c) Earliest Dea 	First Served	ends to minimize tl b) Shortest Jo d) Longest Jol		?
3	can occur.	are always preemb) System cra		ne process, d) Starvation	_
2	1) The problem of	priority inversion o		rsion protocol	
5	5) What will happe a) Starvation	en if a non-recursiv b) Deadlock	re mutex is locked c) Aging	more than once? d) Signaling	
6	•	keeps state inform b) OS		e of I/O components.	

- 7) $\mu \text{COS-II}$ 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



R-T	C - 459	-2-			
8)	What are the essert embedded system a) Ability to fit on a b) Low power con c) Fast data proced All of the above	? a single chip sumption essing for real-time			esign metrics of an
9)	Which abstraction sequential program designing an embera) System	n into finite-state	ma	chine and regis	ss by converting a ter transfers while d) Logic
10)	Which memory sto a) SRAM	orage is widely use b) DRAM		n PCs and Embe Flash memory	•
11)	Which type of non high priority of an ia) User mode c) Interrupt Mode	nterrupt?	b)	mode is entere Fast Interrupt N Supervisor Mod	Mode (FIQ)
12)	Which parameter/s embedded system a) Time to prototy c) Time to product	? pe	b)	me to market' d Time to refine All of the above	-
13)	SCI stands for a) Serial Commun c) System Connec		,	Serial Connect None	Interface

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

c) Suspended state

b) Ready state

d) Terminated state



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:

 $(4 \times 3 = 12)$

- 1) What are the different processor used in embedded system? Explain with their advantages and disadvantages.
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- 4) What is pipelining? Explain with an example and how it is advantage in processor?
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 $(2 \times 8 = 16)$

- 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:

 $(4 \times 3 = 12)$

- 1) Explain different C programing elements.
- 2) Explain inter task communication in RTOS.
- 3) Define task and explain different task states with diagram.
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- 1) Draw and explain in detail interfacing of touch screen input to the embedded system.
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can occur. a) Deadlock

					SLR-1	TC —	459
Seat No.						Set	R
	T.E. (Biome	edical) (Part – II) EMBEDDEI	•	•	tion, 2018	3	
•	nd Date : Wedneso 2.30 p.m. to 5.30	•			Tota	al Mark	s:70
	2)	Q. No. 1 is compu 30 minutes in Ans carries one mark. Answer MCQ/Ob only. Don't forge of Page.	swer ject	Book Page No	tions on	question Page	No. 3
Durati	on : 30 Minutes	MCQ/Objective	Туре	Questions		Mark	s: 14
Durain	on . So Minutes					iviain	.5 . 14
1. Cł	noose the correct a	answer:				(1×1	4=14)
1)	•	r/s is/are included i	n 'Ti	me to market' o	design metr	ric of a	n
	embedded syste a) Time to proto		b)	Time to refine			
	c) Time to produ	• •	•	All of the abov	е		
2)) SCI stands for						
	a) Serial Commuc) System Conn	unication Internet ection Interface		Serial Connection	t Interface		
3)			n the		to the	proces	S
4)) What kind of men a) SRAM	mory does an OTP b) RAM		e ? EPROM	d) DRAM		
5)	Which of the folloga) First Come Fic) Earliest Dead		b)	o minimize the Shortest Job F Longest Job F	irst	w time	?

6) If the resources are always preempted from the same process, _____

b) System crash c) Aging

d) Starvation

7)	The problem of priority inversion car a) Priority inheritance protocol c) Both a) and b)	•	
8)	What will happen if a non-recursive a) Starvation b) Deadlock		
9)	The keeps state information a) CPU b) OS	on about the use of c) Kernel	f I/O components. d) Shell
10)	 μCOS-II task scheduling mechanism a) Cooperative as well as preemptive b) Cyclic only c) Preemptive only d) Preemptive as well as time slicing 	/e	
11)	What are the essential tight constrained embedded system? a) Ability to fit on a single chip b) Low power consumption c) Fast data processing for real-time d) All of the above		esign metrics of an
12)	Which abstraction level undergo the sequential program into finite-state designing an embedded system?	machine and regis	ter transfers while
13)	a) Systemb) BehaviourWhich memory storage is widely usea) SRAMb) DRAM	ed in PCs and Emb	•
14)	Which type of non-privileged proceshigh priority of an interrupt? a) User mode c) Interrupt Mode (IRQ)	ssor mode is entere b) Fast Interrupt Mod	Mode (FIQ)



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:

 $(4 \times 3 = 12)$

- 1) What are the different processor used in embedded system? Explain with their advantages and disadvantages.
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SECTION - II

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- 2) Explain inter task communication in RTOS.
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 - a) Embedded communication using GSM modem.
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Seat	Set	
No.	Set	5

T.E. (Biomedical) (Part – II) (CGPA) Examination, 2018 EMBEDDED SYSTEM

Day and Date : Wednesday, 23-5-2018	Total Marks: 70
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Time: 2.30 p.m. to 5.30 p.m.

d) All of the above

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.

		of Page.		
Duratio	on . 20 Minutes	MCQ/Objective	Type Question	
Duratio	on: 30 Minutes			Marks: 14
1. Ch	oose the correc	et answer :		(1×14=14)
1)	can occur.	, , , ,		me process,
	•	b) System cras	, ,	d) Starvation
2)	•	f priority inversion ca eritance protocol l b)	•	
3)	What will happ a) Starvation	en if a non-recursive b) Deadlock		d more than once ? d) Signaling
4)	Thea) CPU			se of I/O components. d) Shell
5)	a) Cooperativeb) Cyclic onlyc) Preemptive	cheduling mechanisie as well as preempti only as well as time slicir	ve	
6)	embedded sysa) Ability to fitb) Low power	stem ? on a single chip		he design metrics of an



7)	Which abstraction level sequential program into designing an embedded	finite-state ma			-	•
	a) System b) E	Sehaviour c	;) F	RT	d) Logic	
8)	Which memory storage a) SRAM b) D	-		PCs and Embe lash memory	-	
9)	Which type of non-privil high priority of an interru	•	or n	node is entere	d due to	raising of
	a) User modec) Interrupt Mode (IRQ)	,	,	Fast Interrupt N Supervisor Mod	`	,
10)	Which parameter/s is/ar embedded system?	e included in 'T	Tim	ne to market' d	esign me	etric of an
	a) Time to prototypec) Time to produce in b	,	,	Time to refine All of the above)	
11)	SCI stands for					
	a) Serial Communicationc) System Connection	-	,	Serial Connect None	Interface	9
12)	In a time-sharing operatis completed, the proce a) Blocked state c) Suspended state	ss goes from th b)	ne r) F		o the	a process
13)	What kind of memory do a) SRAM b) F			? EPROM	d) DRA	M
14)	Which of the following a a) First Come First Ser c) Earliest Deadline Fir	ved b)) S	minimize the p Shortest Job Fi ongest Job Fi	rst	ow time?



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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(4 \times 3 = 12)$

- 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 μ COS-II.
- 5) Explain in detail operation of timer and memory management in RTOS.

5. Answer any two:

 $(2 \times 8 = 16)$

- 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.	

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

ur	atio	n : 30 Minutes				ľ	Marks : 14
1.	Cr	noose the correct ar	nswer:				
	1)	A is u	sed to improve the	e sp	atial resolutio	n of a gamma	camera.
		a) Grids		b)	Digital camer	a	
		c) Scanner		d)	Collimator		
	2)	Attenuation describ	oes both absorptio	n ar	nd scattering o	of	
		a) resolution	b) radiation	c)	specificity	d) dose	
	3)	Absorbed dose is the material.	ne radiation energy	y ab	sorbed per un	it mass of	
		a) absorbing	b) radiating	c)	scattering	d) reflecting	
	4)	Exposure expresse	es the	_ of	an gamma ra	y beam.	
		a) dose	b) intensity	c)	quality	d) resolution	
	5)	The isotope of radi	oactive elements	are	usually produ	ced	
		a) reactor	b) cyclotron	c)	radio tracer	d) PHA	
	6)	The SPECT techni angles around the	•		_ to record in	nages at a ser	ries of
		a) rectilinear scan	ner	b)	gamma came	era	
		c) multiscanner		d)	collimator		P.T.O.

7)	PET is an imaging r	nodality for obtair	ning _	cro	oss sectional images.
	a) invitro	b) invivo	c) p	olaner	d) linear
8)	SPECT cameras de of single photon.	tects only	th	at produce a	cascaded emission
	a) Single image		b) 5	Slice of image	es
	c) Radio nuclides		d) S	SD image	
9)	The half life of a rac	lioactive isotope is	s giv	en by t ^{1/2} =	
	a) $\frac{\lambda}{0.693}$	b) $\frac{0.693}{\lambda}$	c) -	$\frac{2\times10^5}{\lambda}$	d) $\frac{\lambda}{2 \times 10^5}$
10)	Gamma particles co of light.	onstitutes	ra	adiation that t	ravels at the speed
	a) ultraviolet		b) i	nfrared	
	c) electromagnetic		d) I	ight	
11)	A scintillator is a light invisible range.		e wh	nich purchase	s minute flashes of
	a) magnetic	b) crystalline	c) (gaseous	d) diffused
12)	The gamma camera	a is a stationary in	nagir	ng device for	the
	a) Organ of interest	t	b) (Collimation	
	c) Resolution		d) (Organ depth	
13)	The gamma emission	on change in nucl	eon	number is	
	a) zero		b) c	definate	
	c) increase by 1		d) d	decrease by 1	
14)	Radioactive decay i	s a pr	roces	SS.	
	a) random		b) r	nonspontaned	ous
	c) regular		d) r	massive	



Seat	
No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 NUCLEAR MEDICINE

Day and Date: Thursday, 3-5-2018

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

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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 $\frac{1}{16}^{th}$ 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 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.	

Set



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 $t^{1/2} =$ ______ b) $\frac{0.693}{\lambda}$ c) $\frac{2 \times 10^5}{\lambda}$ d) $\frac{\lambda}{2 \times 10^5}$ 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

6)	The gamma emission	on change in nucl	eon number is	
	a) zero		b) definate	
	c) increase by 1		d) decrease by	[,] 1
7)	Radioactive decay i	s a pı	rocess.	
	a) random		b) nonspontane	eous
	c) regular		d) massive	
8)	A is us	sed to improve the	e spatial resoluti	on of a gamma camera.
	a) Grids		b) Digital came	era
	c) Scanner		d) Collimator	
9)	Attenuation describe	es both absorptio	n and scattering	of
	a) resolution	b) radiation	c) specificity	d) dose
10)	Absorbed dose is th material.	e radiation energy	absorbed per u	nit mass of
	a) absorbing	b) radiating	c) scattering	d) reflecting
11)	Exposure expresse	s the	of an gamma r	ay beam.
	a) dose	b) intensity	c) quality	d) resolution
12)	The isotope of radio	active elements a	are usually produ	uced
	a) reactor	b) cyclotron	c) radio tracer	d) PHA
13)	The SPECT technic angles around the p		to record i	images at a series of
	a) rectilinear scann	er	b) gamma cam	nera
	c) multiscanner		d) collimator	
14)	PET is an imaging r	modality for obtair	ning c	ross sectional images.
	a) invitro	b) invivo	c) planer	d) linear



Seat	
No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 NUCLEAR MEDICINE

Day and Date: Thursday, 3-5-2018

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

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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 $\frac{1}{16}^{th}$ 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.



5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 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.	

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 b) cyclotron c) radio tracer d) PHA a) reactor 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 $t^{1/2} =$ ______ b) $\frac{0.693}{\lambda}$ c) $\frac{2 \times 10^5}{\lambda}$ d) $\frac{\lambda}{2 \times 10^5}$

6)	Gamma particles con of light.	nstitutes		radiation that t	rav	els at the speed
	a) ultraviolet		b)	infrared		
	c) electromagnetic		d)	light		
7)	A scintillator is alight invisible range.	substance	e w	hich purchase	s n	ninute flashes of
	a) magnetic k	o) crystalline	c)	gaseous	d)	diffused
8)	The gamma camera	is a stationary im	nag	ing device for	the	
	a) Organ of interest		b)	Collimation		
	c) Resolution		d)	Organ depth		
9)	The gamma emission	n change in nucle	eor	number is		
	a) zero		b)	definate		
	c) increase by 1		d)	decrease by 1		
10)	Radioactive decay is	a pr	OC	ess.		
	a) random		b)	nonspontaneo	ous	
	c) regular		d)	massive		
11)	A is use	ed to improve the	sp	atial resolution	n of	a gamma camera.
	a) Grids		b)	Digital camera	a	
	c) Scanner		d)	Collimator		
12)	Attenuation describes	s both absorptior	n a	nd scattering o	f	
	a) resolution b	o) radiation	c)	specificity	d)	dose
13)	Absorbed dose is the material.	radiation energy	ab	sorbed per uni	t ma	ass of
	a) absorbing b	o) radiating	c)	scattering	d)	reflecting
14)	Exposure expresses	the	of	an gamma ray	y be	eam.
	a) dose	o) intensity	c)	quality	d)	resolution



Seat	
No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 NUCLEAR MEDICINE

Day and Date: Thursday, 3-5-2018

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

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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 $\frac{1}{16}^{th}$ 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 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.	

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.

c) regular

- 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 d) light c) electromagnetic 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

d) massive



6)	A is us	sed to improve the	e spatial resolut	tion of a gamma camera.
	a) Grids		b) Digital cam	era
	c) Scanner		d) Collimator	
7)	Attenuation describe	es both absorption	n and scatterin	g of
	a) resolution	b) radiation	c) specificity	d) dose
8)	Absorbed dose is th material.	e radiation energy	absorbed per u	unit mass of
	a) absorbing	b) radiating	c) scattering	d) reflecting
9)	Exposure expresse	s the	of an gamma	ray beam.
	a) dose	b) intensity	c) quality	d) resolution
10)	The isotope of radio	active elements a	are usually prod	duced
	a) reactor	b) cyclotron	c) radio trace	r d) PHA
11)) The SPECT technique uses a to record images at a series of angles around the patient.			
	a) rectilinear scann	er	b) gamma car	mera
	c) multiscanner		d) collimator	
12)	PET is an imaging r	nodality for obtain	ning	cross sectional images.
	a) invitro	b) invivo	c) planer	d) linear
13)	SPECT cameras de of single photon.	tects only	_ that produce	a cascaded emission
	a) Single image		b) Slice of ima	ages
	c) Radio nuclides		d) SD image	
14)	The half life of a rac	lioactive isotope is	s given by $t^{1/2}$ =	
	a) $\frac{\lambda}{0.693}$	b) $\frac{0.693}{\lambda}$	c) $\frac{2\times10^5}{\lambda}$	d) $\frac{\lambda}{2\times10^5}$



Seat	
No.	

B.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2018 NUCLEAR MEDICINE

Day and Date: Thursday, 3-5-2018

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

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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 $\frac{1}{16}^{th}$ 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 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.	Set	Р
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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 Questic	ons
Duration: 30 Minutes	3		Marks: 14
1. Choose the corre	ect answer:		(1×14=14)
1) PHC stands f	or		
a) Programn	nable Health Centre	b) Primary	Hospital Centre
c) Primary H	lealth Centre	d) Prograr	nmable Hospital Centre
2) Among these	not type of network to	pology	
a) Ring	b) Bus	c) Star	d) Hash
3) HMIS fails be	cause of	_	
a) Incomplet	e entering of data		
b) Lack of co	ommunication		
c) Difficult u	o gradation in hardwar	e and softwa	re
d) All of the	above		
4) Among these	which is not type of ki	nowledge in e	expert system.
a) Declarativ	e knowledge	b) Procedo	ural knowledge
c) Heuristic	knowledge	d) Standa	rd knowledge



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:

 $(3 \times 4 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(3 \times 4 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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 intraoperative imaging for 3-D navigation system.
- 3) Write and explain different types of data transferred used in telemedicine.



Seat No.	Set	Q
140.		

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 f	unction is considered in
 a) Inventory module 	b) Communication module
c) General information module	d) Administration module
2) Render means	
a) Convert a numerical represen	ntation 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 availa	able 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

5)	Tel	e-medicine incl	udes			
	a)	Video conferen	ncing	b) Digital image transmission		
	c) Both a) and b)			d)	None	
6)	CS	T stands for				
	a)	Cost-Saver Tee	chnology	b)	Client Server T	echnology
	c)	Computer Serv	er Technology	d)	None	
7)		nultaneous view he benefits of _	ing of images by ma	any	consultants and	distant institution
	a)	ASP	b) PACS	c)	POE	d) Al
8)	PH	C stands for				
	a)	Programmable	Health Centre	b)	Primary Hospita	al 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 ent	ering of data			
	b)	Lack of commu	ınication			
	c)	Difficult up grad	dation in hardware	and	d software	
	d)	All of the above	Э			
11)	Am	ong these whic	h is not type of kno	wle	edge in expert sy	vstem.
	a)	Declarative know	owledge	b)	Procedural kno	wledge
	c)	Heuristic know	ledge	d)	Standard know	ledge
12)		is the	heart of WEB brow	wse	r.	
	a)	HTTP	b) WWW	c)	HTML	d) CGI
13)	Wh	nich is not relate	d to blood bank mo	odu	le.	
	a)	Inventory		,	Donors	
	,	Storage		,	Performance	
14)		•	olved in the develo	-		
	a)	Feasibility		b)	Design	
	c)	Coding		d)	Conversion	



Seat	
No.	

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:

 $(3\times 4=12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(3 \times 4 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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 intraoperative imaging for 3-D navigation system.
- 3) Write and explain different types of data transferred used in telemedicine.



Seat	Set	R
No.	Sei	n

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 t	he heart of WEB b	rowser.		
	b) WWW		d) CGI	
2) Which is not rela	ated to blood bank	module.		
a) Inventory		b) Donors		
c) Storage		d) Performand	ce	
3) This step is not	involved in the dev	elopment of HMIS	.	
a) Feasibility		b) Design		
c) Coding		d) Conversion	1	
4) Public grievance	es and feedback fu	nction is considere	ed in	
a) Inventory mo	odule	b) Communic	ation module	
c) General info	rmation module	d) Administrat	tion module	
5) Render means _				
a) Convert a nu	umerical represent	ation of an object i	into visual rep	oresentation
b) Convert visu	al representation o	of an object into nu	umerical repre	esentation
c) Both a) and	b)			
d) None				

6)	The best tele-medicine tool available on					
	a) TV			b)	Telephone	
	c) Mobile			d)	Internet	
7)	Au	to-analyzers car	n carry out			
	a)	20 or more, 150	0	b)	20 or less, 150	
	c)	2, 150		d)	2,15	
8)	Tel	le-medicine inclu	udes			
	,	Video conferen	cing	•	Digital image tr	ansmission
	-	Both a) and b)		d)	None	
9)		ST stands for				
		Cost-Saver Ted		,	Client Server T	echnology
4.0\			er Technology			
10)	 Simultaneous viewing of images by many consultants and distant institution in the benefits of 				distant institution	
	a)	ASP	b) PACS	c)	POE	d) Al
11)	PH	IC stands for				
	a)	Programmable	Health Centre	b)	Primary Hospita	al Centre
	c)	Primary Health	Centre	d) Programmable Hospital Centre		
12)	Am	nong these not ty	ype of network topo	olog	ЭУ	
	a)	Ring	b) Bus	c)	Star	d) Hash
13)	ΗM	IIS fails because	e of			
	a)	Incomplete ente	ering of data			
	b)	Lack of commu	nication			
	c)	Difficult up grad	dation in hardware	anc	d software	
	-	All of the above				
14)			h is not type of kno	wle	edae in expert sv	vstem.
,		Declarative kno			Procedural kno	
			_	,		· ·
	C)	Heuristic knowl	euge	u)	Standard know	ieuge



Seat	
No.	

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:

 $(3 \times 4 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(3 \times 4 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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 intraoperative imaging for 3-D navigation system.
- 3) Write and explain different types of data transferred used in telemedicine.



I	
Seat	
1	
No.	
140.	

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 Minute	es			Marks: 14
Choose the corr	rect answer:			(1×14=14)
1) The best tel	e-medicine tool availab	le on	_	
a) TV		b) Telephone	;	
c) Mobile		d) Internet		
2) Auto-analyz	ers can carry out			
a) 20 or mo	ore, 150	b) 20 or less,	150	
c) 2, 150		d) 2,15		
3) Tele-medicii	ne includes	_		
a) Video co	onferencing	b) Digital ima	ge transmissio	on
c) Both a) a	and b)	d) None		
4) CST stands	for			
a) Cost-Sa	ver Technology	b) Client Sen	ver Technolog	y
c) Compute	er Server Technology	d) None		
,	is viewing of images by	many consultants	s and distant in	stitution
a) ASP	b) PACS	c) POE	d) Al	

6)	PHC stands for					
	a)	Programmable	Health Centre	b)	Primary Hospita	al Centre
	c)	Primary Health	Centre	d)	Programmable	Hospital Centre
7)	Am	ong these not t	ype of network topo	olog	JY	
	a)	Ring	b) Bus	c)	Star	d) Hash
8)	ΗN	IIS fails becaus	e of			
	a)	Incomplete ent	ering of data			
	b)	Lack of commu	unication			
	c)	Difficult up grad	dation in hardware	and	d software	
	d)	All of the above	Э			
9)	Am	nong these whic	h is not type of kno	wle	edge in expert sy	/stem.
	a)	Declarative know	owledge	b)	Procedural kno	wledge
	c)	Heuristic know	ledge	d)	Standard know	ledge
10)		is the	heart of WEB brov			
	,	HTTP	,			d) CGI
11)			ed to blood bank mo			
	•	Inventory		,	Donors	
10)	•	Storage	volved in the develo	,	Performance	
12)		Feasibility	olved in the develo	-	Design	
	•	Coding		,	Conversion	
13)	•	•	and feedback funct	•		1
	a)	Inventory mode	ule	b)	Communication	n module
	c)	General inform	ation module	d)	Administration	module
14)	Re	nder means				
	•		•		-	visual representation
	-		representation of a	n o	bject into nume	rical representation
		Both a) and b)				
	d)	None				



Seat	
No.	

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:

 $(3 \times 4 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(3 \times 4 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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 intraoperative imaging for 3-D navigation system.
- 3) Write and explain different types of data transferred used in telemedicine.

a) EMF

				SLR-10 - 462
Seat No.				Set P
	•		rt – I) (CGPA) Examir TRUMENTATION – II	
-	nd Date : Saturday 2.30 p.m. to 5.30			Max. Marks : 70
	2)	minutes in And carries one man Answer MCQ /	npulsory. It should be swer Book Page No. 3 k. Objective type questi get to mention, Q.P. S	3. Each question ions on Page No. 3
		MCQ/Objectiv	e Type Questions	
Duration	on: 30 Minutes	•	,	Marks: 14
1. Ch	noose the correct a	ınswer:		14
1)	In aa a) Pace maker c) Ultrasonic dia		-,	
2)	contr	action of the he	ous cardiac emergend art muscle. nous c) S.A. node	
3)	-	emoves	other than harmful v	vastes.
4)	Faradic current i current intensity. a) Period	s a sequences b) Pulses	ofwith a de	efined shape and
5)	,	ich the necessa	ry synchronism is lost is k c) Heart attack	known as
6)	Surgical diathern a) low frequency c) high frequenc	ny machine cons	sists of a po b) high voltage d) medium frequen	wer oscillator.

7) Ultrasonic generators are constructed on _____ effect.

b) Faraday

c) Piezoelectric d) Magnetic

8)	The coil type dialyzer consists of a tub wound into a coil.	e made up of the material
	a) Transparent	b) Biocompatiable
	c) Semipermeable membrane	d) Hollow fiber
9)	Heart block occurs whenever the co impulses from the atria to	the ventricles property.
	a) Signal b) Pulse	
10)		
	a) Uremiac) Kidney failure	b) Chronic renal failure
	c) Kidney failure	d) None of the above
11)	is the exchange of things of	lissolved in fluid across the membrane
•	due to difference in amount of solute	S.
	a) Drift b) Osmosis	c) Ultrafilteration d) Diffusion
12)	In coagulation electric arc	s intentionally generated between
	the electrode and tissue.	
	a) Spray b) Soft	c) Forced d) Spark
13)	An external pacemaker may apply 50 cm ² electrode on the chest.	upto pulses through
	a) 80 mA b) 8 A	c) 40 mA d) 100 mA
14)	The hazards associated withcurrent density at a rate other than at	units is burns caused by excess which it is to be present. b) Defibrillator



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

|--|--|

c) Kidney failure

the electrode and tissue.

50 cm² electrode on the chest.

a) 80 mA b) 8 A

a) Drift

a) Spray

due to difference in amount of solutes.

b) Osmosis

b) Soft

SLR-TC - 462

Seat No.		Set Q
		: – I) (CGPA) Examination, 2018 RUMENTATION – III
-	nd Date : Saturday, 5-5-2018 2.30 p.m. to 5.30 p.m.	Max. Marks: 70
	minutes in Ansi carries one mark 2) Answer MCQ/O	pulsory. It should be solved in first 30 wer Book Page No. 3. Each question bjective type questions on Page No. 3 et to mention, Q.P. Set (P/Q/R/S) on Top
.		Type Questions
Duratio	on : 30 Minutes	Marks: 14
1. Cł	noose the correct answer:	14
1)	The coil type dialyzer consists of a wound into a coil.a) Transparentc) Semipermeable membrane	b) Biocompatiable
2)		conduction system fails to transmit the a to the ventricles property. c) Fibrillation d) Pacing
3)) is the clinical state res	ulting from renal failure. b) Chronic renal failure

4) _____ is the exchange of things dissolved in fluid across the membrane

5) In _____ coagulation electric arcs intentionally generated between

6) An external pacemaker may apply upto _____ pulses through

d) None of the above

c) Forced

c) Ultrafilteration d) Diffusion

d) Spark

a) Electrosurgery	rate other than a	t wh	nich it is to be p Defibrillator		•
a) Pace maker			b) Shortwave diathermy		
contrac	ction of the heart n	nus	cle.		· ·
a) Protein	b) Salt	c)	Insulin	d)	Glycogen
current intensity.					
a) Period	b) Pulses	c)	Cycles	d)	Waves
	_	-			
Surgical diathermy a) low frequency c) high frequency		b)	•		
, , ,					
Jitrasonic generato	ors are constructe	d or	n ef	fec	t.
,					
Ultrasonic generate					
	a) Electrosurgery b) Heart rate mete n a ap a) Pace maker b) Ultrasonic diath Ventricular fibrilla contract a) Synchronous Haemodialysis rem a) Protein Faradic current is current intensity. a) Period A condition in whice a) Fibrillation Surgical diathermy	a) Electrosurgery b) Heart rate meter n a approximately 4000 a) Pace maker b) Ultrasonic diathermy Ventricular fibrillation is a serious contraction of the heart r a) Synchronous Haemodialysis removes a) Protein b) Salt Faradic current is a sequences of current intensity. a) Period b) Pulses A condition in which the necessary s a) Fibrillation b) Heart block Surgical diathermy machine consists	b) Electrosurgery b) Heart rate meter d) n a approximately 4000 v is a) Pace maker b) C) Ultrasonic diathermy d) Ventricular fibrillation is a serious ca contraction of the heart mus a) Synchronous b) Asynchronous c) Haemodialysis removes others) Protein b) Salt c) Faradic current is a sequences of current intensity. a) Period b) Pulses c) A condition in which the necessary syncial Fibrillation b) Heart block c) Surgical diathermy machine consists of	b) Defibrillator c) Heart rate meter d) Pacemaker n a approximately 4000 v is initially applied a) Pace maker b) Shortwave diat c) Ultrasonic diathermy d) Defibrillator Ventricular fibrillation is a serious cardiac emergen contraction of the heart muscle. a) Synchronous b) Asynchronous c) S.A. node Haemodialysis removes other than harmful a) Protein b) Salt c) Insulin Faradic current is a sequences of with a courrent intensity. a) Period b) Pulses c) Cycles A condition in which the necessary synchronism is lost a) Fibrillation b) Heart block c) Heart attack Surgical diathermy machine consists of a per	c) Heart rate meter d) Pacemaker n a approximately 4000 v is initially applied to a) Pace maker b) Shortwave diather b) Ultrasonic diathermy d) Defibrillator Ventricular fibrillation is a serious cardiac emergency contraction of the heart muscle. a) Synchronous b) Asynchronous c) S.A. node d) Haemodialysis removes other than harmful wate. a) Protein b) Salt c) Insulin d) Faradic current is a sequences of with a definite current intensity. a) Period b) Pulses c) Cycles d) A condition in which the necessary synchronism is lost is kea) Fibrillation b) Heart block c) Heart attack d) Surgical diathermy machine consists of a power



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

				SLR-TC – 462
Seat No.				Set R
	•		– I) (CGPA) Exar RUMENTATION -	
•	d Date : Saturday, 2.30 p.m. to 5.30 p			Max. Marks: 70
,	2) A	ninutes in Answ carries one mark. Answer MCQ/O b	ver Book Page No pjective type que	ne solved in first 30 o. 3. Each question estions on Page No. 3 o. Set (P/Q/R/S) on Top
Duratio	on : 30 Minutes	MCQ/Objective	Type Questions	Marks : 14
	oose the correct a		synchronism is los	t is known as
'/	a) Fibrillation	•	c) Heart attack	
2)	Surgical diatherm a) low frequency c) high frequency		ts of a b) high voltage d) medium frequ	
3)	Ultrasonic genera a) EMF		ted on c) Piezoelectric	
4)	The coil type dialy wound into a coil. a) Transparent c) Semipermeabl		ube made up of the b) Biocompatiab d) Hollow fiber	material
5)	Heart block occur	s whenever the o	,	fails to transmit the roperty. d) Pacing
6)		•	ulting from renal fail b) Chronic renal d) None of the a	lure. failure

7) ______ is the exchange of things dissolved in fluid across the membrane

b) Osmosis c) Ultrafilteration d) Diffusion

due to difference in amount of solutes.

a) Drift

a) Period b) Pulses c) Cycles d) Waves



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

SLR-TC - 462

Seat	Set	
No.	Set	5

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

		WOW/ODJCCHVC	Type Gues	110113		
Duratio	on: 30 Minutes	}			M	larks : 14
1. Ch	oose the corre	ect answer :				14
1)		the clinical state resure	-			
2)		the exchange of thing nce in amount of solu b) Osmosis	utes.			rane
3)	the electrode	coagulation electric and tissue. b) Soft		, ,		n
4)	50 cm ² electr	pacemaker may apposed on the chest. b) 8 A	•	·		
5)	The hazards current densition a) Electrosur	associated with ty at a rate other thar	units at which it i b) Defibr	is burns o s to be pro illator	caused by ex	cess
6)	a) Pace mak	approximately 400 er diathermy	b) Shorty	vave diath	-	: .

7)		tion is a serious ction of the heart r	•	ency resulting from
	a) Synchronous	b) Asynchronous	s c) S.A. node	d) Pericardium
8)	Haemodialysis rem	noves	other than harmfu	ıl wastes.
	a) Protein	b) Salt	c) Insulin	d) Glycogen
9)	current intensity.	•		defined shape and
	a) Period	b) Pulses	c) Cycles	d) Waves
10)	A condition in which	•	•	
	a) Fibrillation	b) Heart block	c) Heart attack	d) Tachycardia
11)	Surgical diathermy a) low frequencyc) high frequency		s of a b) high voltage d) medium frequ	
12)	Ultrasonic generate	ors are constructe	ed on e	effect.
	a) EMF	b) Faraday	c) Piezoelectric	d) Magnetic
13)	The coil type dialyz wound into a coil.	er consists of a tub	oe made up of the	material
	a) Transparent		b) Biocompatiab	le
	a) Transparentc) Semipermeable			le
14)	c) Semipermeable Heart block occurs	e membrane	d) Hollow fiber onduction system	fails to transmit the
14)	c) Semipermeable Heart block occurs	e membrane s whenever the co es from the atria to	d) Hollow fiber onduction system	fails to transmit the operty.
14)	c) Semipermeable Heart block occurs impuls	e membrane s whenever the co es from the atria to	d) Hollow fiber onduction system on the ventricles pr	fails to transmit the operty.



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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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 :

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

SLR-TC - 463

Seat	
No.	

B.E. (Biomedical Engg.) (CGPA) (Part – I) Examination, 2018 PRINCIPLES OF IMAGE PROCESSING

Total Marks: 70 Day and Date: Monday, 7-5-2018

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 guestion 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: $(14 \times 1 = 14)$ 1) Digital image with intensity level in range of [0, L-1] is called b) histogram c) graph d) truth table a) k_{man} 2) Image can be blurred using a) low pass filtering b) contouring d) high pass filter c) erosion 3) In $M \times N$, 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 is the tool used in tasks such as zooming, shrinking, rotating 5) _____ 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 c) Contrast a) Noise b) Saturation d) Brightness

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 opera work directly in	ting directly on pixels of input image		
	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, highlin an image often is desired.	ighting a specific range of gray levels		
	a) gray level slicing	b) bit plane slicing		
	c) contrast stretching			
) of the following occurs in unsharp masking.			
11)	of the following occur	s in unsharp masking.		
11)		s in unsharp masking.		
11)	a) Blurring original image	s in unsharp masking.		
11)				
11)	a) Blurring original imageb) Adding mask to original image			
11) 12)	a) Blurring original imageb) Adding mask to original imagec) Subtracting blurred image from ord) All above	iginal		
	a) Blurring original imageb) Adding mask to original imagec) Subtracting blurred image from ord) All above	iginal derivative operator.		
12)	 a) Blurring original image b) Adding mask to original image c) Subtracting blurred image from or d) All above is a second order of 	iginal derivative operator. c) Gaussian d) None of above		
12)	 a) Blurring original image b) Adding mask to original image c) Subtracting blurred image from or d) All above is a second order of a) Histogram b) Laplacian What is accepting or rejecting certain 	iginal derivative operator. c) Gaussian d) None of above		
12)	 a) Blurring original image b) Adding mask to original image c) Subtracting blurred image from or d) All above is a second order of a) Histogram b) Laplacian What is accepting or rejecting certain a) filtering b) eliminating 	iginal derivative operator. c) Gaussian d) None of above frequency components called as		
12) 13)	 a) Blurring original image b) Adding mask to original image c) Subtracting blurred image from or d) All above is a second order of a) Histogram b) Laplacian What is accepting or rejecting certain a) filtering b) eliminating 	iginal derivative operator. c) Gaussian d) None of above frequency components called as c) slicing d) none of above ag a filter mask over the image and		
12) 13)	a) Blurring original image b) Adding mask to original image c) Subtracting blurred image from or d) All above is a second order of a) Histogram b) Laplacian What is accepting or rejecting certain a) filtering b) eliminating is a process of movin	iginal derivative operator. c) Gaussian d) None of above frequency components called as c) slicing d) none of above ag a filter mask over the image and		
12) 13)	a) Blurring original image b) Adding mask to original image c) Subtracting blurred image from or d) All above is a second order of a) Histogram b) Laplacian What is accepting or rejecting certain a) filtering b) eliminating is a process of moving computing the sum of products at each	iginal derivative operator. c) Gaussian d) None of above frequency components called as c) slicing d) none of above ag a filter mask over the image and ch location.		



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

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.

	2	1	2	1
f(x, y) =	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 - 463

Seat No.	Set	Q
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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.

d) All above

- 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: $(14 \times 1 = 14)$ 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. b) frequency domain a) linear spatial 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

5)	is a second order derivative operator.			
	a) Histogram	b) Laplacian	c) Gaussian	d) None of above
6)	What is accepting o	r rejecting certain	frequency comp	onents called as
	a) filtering	b) eliminating	c) slicing	d) none of above
7)	is a computing the sum	=	_	over the image and
	a) Convolution	or production at our		
	,		d) Nonlinear spatial filtering	
8)	Digital image with intensity level in range of [0, L – 1] is called			
,		-	c) graph	
9)) Image can be blurred using			
	a) low pass filtering	I	b) contouring	
	c) erosion		d) high pass filter	
10)	In $M \times N$, M is a nu	mber of		
	a) intensity levels	b) colors	c) rows	d) columns
11)	A continuous image	e is digitized at	points.	
	a) random	b) vertex	c) contour	d) sampling
12)	is the	e tool used in task	s such as zoomin	g, shrinking, rotating
	etc.			
	a) Sampling	b) Interpolation	c) Filters	d) None of above
13)	B) 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 dif	ferences betweer	n images is based	I on the principle of
	a) Additivity		b) Homogeneity	
	c) Subtraction		d) None of the a	bove



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

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.

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.

c) order static

- 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: $(14 \times 1 = 14)$ _____ is the tool used in tasks such as zooming, shrinking, rotating 1) etc. b) Interpolation c) Filters d) None of above a) Sampling 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 b) Homogeneity a) Additivity 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 d) none of the above c) inverse transformation 5) Median filters belong to _____ category of filter. a) linear spatial b) frequency domain

d) sharpening

6)	In typ in an image often is		ighting a specific range of gray levels				
	a) gray level slicing		b) bit plane slicing				
	c) contrast stretching		d) byte level slice				
٦١	•		, ,	o .			
7)		_	s in unsharp mas	sking.			
	a) Blurring original	J					
	b) Adding mask to		,				
	c) Subtracting blurr	red image from or	iginal				
	d) All above						
8)	is	a second order of	derivative operato	or.			
	a) Histogram	b) Laplacian	c) Gaussian	d) None of above			
9)	What is accepting of	r rejecting certain	n frequency components called as				
	a) filtering	b) eliminating	c) slicing	d) none of above			
10)	is a	process of movir	ng a filter mask o	over the image and			
	computing the sum	of products at each	ch location.				
	a) Convolution		b) Correlation				
	c) Linear and spatia	al filtering	d) Nonlinear spa	atial filtering			
11)	Digital image with ir	ntensity level in ra	nge of [0, L – 1] i	s called			
	a) k _{map}	b) histogram	c) graph	d) truth table			
12)	Image can be blurre	ed using					
	a) low pass filtering		b) contouring				
	c) erosion		d) high pass filter				
13)	In M × N, M is a nu	mber of					
,	a) intensity levels		c) rows	d) columns			
14)	A continuous image						
· ' <i>)</i>	a) random						
	a, random	S, VOITON	o, contour	a, bamping			



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:

 $(4 \times 4 = 16)$

- 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 :

 $(6 \times 2 = 12)$

- 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.

SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

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.

a) filtering

- 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: $(14 \times 1 = 14)$ 1) In _____ type of slicing, highlighting a specific range of gray levels in an image often is desired. b) bit plane slicing a) gray level 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. b) Laplacian c) Gaussian d) None of above a) Histogram 4) What is accepting or rejecting certain frequency components called as

b) eliminating c) slicing d) none of above

5)	is a computing the sum	_		vei	the image and		
	a) Convolution		b) Correlation				
	c) Linear and spatia	al filtering	d)	Nonlinear spa	atia	filtering	
6)	Digital image with in	ntensity level in ra	ng	e of [0, L – 1] i	s ca	alled	
	a) k _{map}	b) histogram	c)	graph	d)	truth table	
7)	Image can be blurre	ed using					
	a) low pass filtering	I	b)	contouring			
	c) erosion		d)	high pass filte	er		
8)	In $M \times N$, M is a nu	mber of					
	a) intensity levels	b) colors	c)	rows	d)	columns	
9)	A continuous image	e is digitized at		points.			
	a) random	b) vertex	c)	contour	d)	sampling	
10)	etc.	e tool used in task	SS	uch as zoomin	g, s	hrinking, rotating	
	a) Sampling	b) Interpolation	c)	Filters	d)	None of above	
11)	The difference in in levels in an image is	-	the	highest and	the	lowest intensity	
	a) Noise	b) Saturation	c)	Contrast	d)	Brightness	
12)	Enhancement of dif	ferences betweer	ı im	nages is based	l on	the principle of	
	a) Additivity		b)	Homogeneity			
	c) Subtraction		d)	None of the a	bov	/e	
13)	Image processing a work directly in	approaches opera	ıtin	g directly on p	ixel	s of input image	
	a) transform domai	n	b)	spatial domai	n		
	c) inverse transform	nation	d)	none of the a	bov	re e	
14)	Median filters belon	g to	_ c	ategory of filte	r.		
	a) linear spatial		b)	frequency do	mai	n	
	c) order static		d)	sharpening			



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:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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.

SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

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.

Seat	
No.	

Set

Р

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:

 $(14 \times 1 = 14)$

- 1) Organization effectiveness comprises all except
 - a) Productivity power
 - b) Adaptability to change
 - c) Flexibility in structure and strategy
 - d) Rigidity in structure
- 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 que body fluids, secretions and substance a) Hematology c) Blood bank			
8)	Gas sterilization is done using a) Ethylene oxide c) Methylene oxide	b) Ethylene dioxided) Steam		
9)	 is the skeleton of organiaa) Organizational functionc) Decentralization			
10)	Which is the nurse-patient ratio in ge a) 2:10 b) 2:6	neral wards within a hospital ? c) 1:5 d) 1:3		
11)	The total process of collecting, handl and final treatment of waste is called a) Sewage c) Dustbin	ing, packing, storage, transportation b) Disposal of hospital waste 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 materi a) Drugs and medicine c) Supplies	al used in hospital and community? b) Transport d) Equipment and instrument		
14)	Which of the service is not part of preaa) Sentinel surveillanceb) Nutritional counsellingc) Non communicable disease prevedd) OPD prevention			



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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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.

Seat	
No.	

Set Q

	B.E. (Biomedical) (Part – I) (C HOSPITAL MA	
•	d Date : Tuesday, 8-5-2018 2.30 p.m. to 5.30 p.m.	Max. Marks : 70
	carries one mark. 2) Answer MCQ/Obj	Ilsory. It should be solved in first 30 or Book Page No. 3. Each question ective type questions on Page No. let to mention, Q.P. Set (P/Q/R/S) on
	MCQ/Objective Ty	/pe Questions
Duratio	on: 30 Minutes	Marks: 14
1. Ch	oose the correct answer :	(14×1=14)
1)	Gas sterilization is done using a) Ethylene oxide c) Methylene oxide	b) Ethylene dioxided) Steam
2)	 is the skeleton of organa) Organizational functionc) Decentralization	
3)	Which is the nurse-patient ratio in ge a) 2:10 b) 2:6	neral wards within a hospital ? c) 1:5 d) 1:3
4)	The total process of collecting, handl and final treatment of waste is called a) Sewage c) Dustbin	ing, packing, storage, transportation b) Disposal of hospital waste d) None
5)	Which of the following should be incluin hospital? a) A list materials c) Taking an inventory	
6)	Which of the following is not a materia) Drugs and medicine c) Supplies	al used in hospital and community? b) Transport d) Equipment and instrument



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 a) Productivity powerb) Adaptability to changec) Flexibility in structure and strategyd) Rigidity in structure	·	
9)	Concept behind changing the role of all except a) Rising cost of hospital care c) Shortage of hospital bed	•	
10)	Which of the following is a basic of cl a) Hospital practice c) Educational purpose	assification of hospital ? b) Length of stay of patient d) Medical staff	
11)	Which of the following is a function of a) First aid c) Immediate resuscitation	f emergency care ? b) Dietary management d) Hospitalization	
12)	Which of the following facility is not n a) Examination room c) Observation area	eeded in emergency department ? b) Treatment room d) Cafeteria	
13)	What are the primary objectives of human hospital services? a) To motivate the employees b) To create good organization relation c) Co-ordination d) Contribution of services		
14)	The section performs que body fluids, secretions and substance a) Hematology c) Blood bank		



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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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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	B.E. (Biomedical) (Part – I) (CGPA) Examination, 2018 HOSPITAL MANAGEMENT				
-	nd Date : Tuesday, 8-5-2018 2.30 p.m. to 5.30 p.m.		Ma	x. Marks : 70	
	carries one mark. 2) Answer MCQ/Ob j	er Book l ijective t	Page No. 3 . Each qu	uestion Page No.	
Durati	MCQ/Objective Ty	ype Que	estions	Marka i 14	
Duraii	on : 30 Minutes			Marks: 14	
1. Ch	noose the correct answer:			(14×1=14)	
1)	Which of the following facility is not ra) Examination roomc) Observation area		atment room	ment ?	
2)	What are the primary objectives of he hospital services? a) To motivate the employees b) To create good organization relat c) Co-ordination d) Contribution of services		source managemen	t in	
3)	The section performs q body fluids, secretions and substanc a) Hematology c) Blood bank	ces found b) Biod		nalysis of	
4)	Gas sterilization is done using a) Ethylene oxide c) Methylene oxide	b) Ethy	ylene dioxide am		
5)	a) Organizational functionc) Decentralization	b) Org	anization structure ordination		



6)	Which is the nurse-a) 2:10	patient ratio in gel b) 2:6		al wards within a	a hospital ? d) 1 : 3
7)	The total process o and final treatment a) Sewage c) Dustbin		b)	, packing, storag Disposal of hos None	-
8)	Which of the followin hospital? a) A list materials c) Taking an invention		b)	d in efficient mat Procurement All of the above	-
9)	Which of the following a) Drugs and medical Control of the following and the f	-	b)	ised in hospital Transport Equipment and	-
10)	Which of the service a) Sentinel surveille b) Nutritional couns c) Non communica d) OPD prevention	ance selling .ble disease preve			
11)	Organization effection a) Productivity powers b) Adaptability to cc c) Flexibility in struct d) Rigidity in struct	ver hange cture and strategy		I except	
12)	Concept behind cha	anging the role of	hos	spital from indoc	or care includes
	a) Rising cost of hosc) Shortage of hos	•	•	Increase of hos Economic impo	•
13)	Which of the following a) Hospital practice c) Educational purp	e	b)	sification of hosp Length of stay Medical staff	
14)	Which of the following a) First aid c) Immediate resus		b)	nergency care ? Dietary manag Hospitalization	ement



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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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.

Seat	
No.	

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:

 $(14 \times 1 = 14)$

- 1) Which is the nurse-patient ratio in general wards within a hospital? b) 2:6 c) 1:5 a) 2:10 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?
 - a) A list materials

- b) Procurement
- c) Taking an inventory
- d) All of the above
- 4) 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
- 5) Which of the service is not part of preventive care?
 - a) Sentinel surveillance
 - b) Nutritional counselling
 - c) Non communicable disease prevention
 - d) OPD prevention



6)	Organization effectiveness comprises a) Productivity powerb) Adaptability to changec) Flexibility in structure and strategyd) Rigidity in structure	·
7)	Concept behind changing the role of all except	•
	a) Rising cost of hospital carec) Shortage of hospital bed	b) Increase of hospital bedd) Economic importance
8)	Which of the following is a basic of cl a) Hospital practice c) Educational purpose	assification of hospital ? b) Length of stay of patient d) Medical staff
9)	Which of the following is a function of a) First aid c) Immediate resuscitation	emergency care ? b) Dietary management d) Hospitalization
10)	Which of the following facility is not n a) Examination room c) Observation area	b) Treatment room d) Cafeteria
l1)	What are the primary objectives of human hospital services? a) To motivate the employees b) To create good organization relation c) Co-ordination d) Contribution of services	
12)	The section performs que body fluids, secretions and substance a) Hematology c) Blood bank	
13)	Gas sterilization is done using a) Ethylene oxide c) Methylene oxide	b) Ethylene dioxide d) Steam
14)	is the skeleton of organia) Organizational function c) Decentralization	zation. b) Organization structure d) Co-ordination



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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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:

 $(4 \times 3 = 12)$

- 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:

 $(2 \times 8 = 16)$

- 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.

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.

 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:

 $(14 \times 1 = 14)$

- 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



6)	Protons in different molecules differ in all of the following ways except		
	a) T1	b)	T2
	c) Gyromagnetic ratio	d)	Precession frequency
7)	7) The mathematical technique that involves the estimation of an unknivalue from values on either side of its known as		
	a) Filtering	b)	Interpolation
	c) Convolution	d)	Summation
8)	The CT number (Hounsfield unit) of fa	at c	lepends on
	a) kV	b)	mAs
	c) Reconstruction algorithm	d)	Nothing-it is constant
9)	Which of the following is not common	ıly ı	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 prima and tissue during CT examination.	ary	interaction between x-ray photons
	a) Bremsstrahlung effect	b)	Characteristic effect
	c) Compton effect	d)	Coherent scatter
11)	Ring artifacts on the CT image are as tube detector relationship.	sso	ciated with of the following
	a) Rotate-Nutate	b)	Rotate-Stationary
	c) Rotate-Rotated	d)	Translate-Rotate
12)	of the following reconstruction CT scanners.	tio	n methods is used by most modern
	a) Back projection	b)	Iterative method
	c) Fourier transforms	d)	Filtered back projection
13)	Larmor frequency depends upon the		
	a) individual nucleus		magnetic flux density
	c) both a and b	d)	energetic flux unit
14)	The process by which electrons are p tube is known as		•
	a) rectification	,	anode heel effect
	c) thermionic emission	d)	isotropic emission



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B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018 MEDICAL IMAGING – II

Day and Date: Tuesday, 15-5-2018

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

2. Attempt any four:

 $(4 \times 4 = 16)$

Marks: 56

 Differentiate between plain CT and spiral CT and explain different types of CT artifacts.

SECTION - I

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(2 \times 6 = 12)$

- 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.	

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t 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.

	Page.	
	MCQ/Objective	Type Questions
Durati	on : 30 Minutes	Marks: 14
1. C	Choose the correct answer:	(14×1=14)
1) The CT number (Hounsfield unit) o	fat depends on
	a) kV	b) mAs
	c) Reconstruction algorithm	d) Nothing-it is constant
2) Which of the following is not comme	only used as a CT scintillation detector?
	a) Ceramic rare earth	b) silver halide
	c) Bismuth germinate	d) cadmium tungstate
3	and tissue during CT examination.	mary interaction between x-ray photons
	a) Bremsstrahlung effect	b) Characteristic effect
	c) Compton effect	d) Coherent scatter
4	 Ring artifacts on the CT image are tube detector relationship. 	associated with of the following
	a) Rotate-Nutate	b) Rotate-Stationary
	c) Rotate-Rotated	d) Translate-Rotate
5	of the following reconstr	uction methods is used by most modern
	a) Back projection	b) Iterative method
	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 p tube is known as	roduced at the cathode of a CT x-ray	
	a) rectification	b) anode heel effect	
	c) thermionic emission	d) isotropic emission	
8)	The 'filter' in filtered back projection r	efers to	
	a) Bowtie filter between the beam an	nd patient	
	b) Conversion between attenuation a	and Hounsfield units	
	c) Conversion between fan-beam an	d parallel geometry	
	d) Fix for the blurring inherent to bac	k projection	
9)	Dose in CT can be reduced by which o (assuming other factors constant)?	f the following parameter adjustments	
	a) Increasing kV	b) Increasing mAs	
	c) Increasing Pitch	d) Increasing scan length	
10)	Increasing the number of rows in MD a) Greater spatial resolution c) Greater axial coverage	CT principally allows for b) Greater temporal resolution d) Greater contrast resolution	
11)	If a signal is undersampled, aliasing value a) Amplitude misregistration c) Phase misregistration	will result and cause b) Frequency misregistration d) Noise	
12)	In MR imaging, matrix size determine	es	
	a) Field of view	b) Aliasing	
	c) Resolution	d) Bandwidth	
13)	Protons in different molecules differ in	n all of the following ways except	
	a) T1	b) T2	
	c) Gyromagnetic ratio	d) Precession frequency	
14)	The mathematical technique that invalue from values on either side of its		
	a) Filtering	b) Interpolation	
	c) Convolution	d) Summation	



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018 MEDICAL IMAGING – II

Day and Date: Tuesday, 15-5-2018

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

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(2 \times 6 = 12)$

- 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.

Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018 MEDICAL IMAGING – II

	MILDIOAL IIII	AGI	IIVG — II
•	ate : Tuesday, 15-5-2018 p.m. to 5.30 p.m.		Total Marks : 70
Instr	carries one mark. 2) Answer MCQ/Object	ver l	y. It should be solved in first Book Page No. 3. Each question type questions on Page No. 3 only. n, Q.P. Set (P/Q/R/S) on Top of
	MCQ/Objective Ty	уре	Questions
Duration: 3	30 Minutes		Marks: 14
1. Choose	e the correct answer :		(14×1=14)
a) F c) F 2) Pro	IR imaging, matrix size determine Field of view Resolution tons in different molecules differ i	b) d) in al	
a)	Gyromagnetic ratio	,	T2 Precession frequency
3) The valu a) F	, ,	volv s kn b)	es the estimation of an unknown
4) The a) k	e CT number (Hounsfield unit) of f	fat d b)	
a) (ich of the following is not commor Ceramic rare earth Bismuth germinate	b)	used as a CT scintillation detector? silver halide cadmium tungstate

6) _____ of the following it the primary interaction between x-ray photons and tissue during CT examination.

b) Characteristic effect

d) Coherent scatter

a) Bremsstrahlung effect

c) Compton effect

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 reconstruc CT scanners.	tior	n methods is used by most modern
	a) Back projection	b)	Iterative method
	c) Fourier transforms	d)	Filtered back projection
9)	Larmor frequency depends upon the		
	a) individual nucleus	,	magnetic flux density
	c) both a and b	d)	energetic flux unit
10)	The process by which electrons are p tube is known as	roc	uced at the cathode of a CT x-ray
	a) rectification	•	anode heel effect
	c) thermionic emission	d)	isotropic emission
11)	The 'filter' in filtered back projection re	efe	rs to
	a) Bowtie filter between the beam an	d p	atient
	b) Conversion between attenuation a	ınd	Hounsfield units
	c) Conversion between fan-beam an	d p	arallel geometry
	d) Fix for the blurring inherent to back	k p	rojection
12)	Dose in CT can be reduced by which of (assuming other factors constant)?	f th	e following parameter adjustments
	a) Increasing kV	b)	Increasing mAs
	c) Increasing Pitch	d)	Increasing scan length
13)	Increasing the number of rows in MD	СТ	principally allows for
	a) Greater spatial resolution	,	Greater temporal resolution
	c) Greater axial coverage	d)	Greater contrast resolution
14)	If a signal is undersampled, aliasing va) Amplitude misregistrationc) Phase misregistration	b)	result and cause Frequency misregistration Noise



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018 MEDICAL IMAGING – II

Day and Date: Tuesday, 15-5-2018

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

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

 $(2 \times 6 = 12)$

- 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.

Seat	
No.	

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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.

	raye.	
	MCQ/Objective T	ype Questions
Dura	ation : 30 Minutes	Marks: 14
1.	Choose the correct answer:	(14×1=14)
	1) of the following it the prin and tissue during CT examination.	nary interaction between x-ray photons
	 a) Bremsstrahlung effect 	b) Characteristic effect
	c) Compton effect	d) Coherent scatter
	Ring artifacts on the CT image are a tube detector relationship.	associated with of the following
	a) Rotate-Nutate	b) Rotate-Stationary
	c) Rotate-Rotated	d) Translate-Rotate
	3) of the following reconstru	ction methods is used by most modern
	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 tube is known as	produced at the cathode of a CT x-ray
	a) rectification	b) anode heel effect
	c) thermionic emission	d) isotropic emission



6)	The 'filter' in filtered back projection r	efe	rs to	
	a) Bowtie filter between the beam and patient			
	b) Conversion between attenuation a	and	Hounsfield units	
	c) Conversion between fan-beam an	d p	arallel geometry	
	d) Fix for the blurring inherent to bac	k p	rojection	
7)	Dose in CT can be reduced by which o (assuming other factors constant)?	of th	e following parameter adjustments	
	a) Increasing kV	b)	Increasing mAs	
	c) Increasing Pitch	d)	Increasing scan length	
8)	Increasing the number of rows in MD	СТ	principally allows for	
	a) Greater spatial resolutionc) Greater axial coverage	,	Greater temporal resolution Greater contrast resolution	
9)	If a signal is undersampled, aliasing value a) Amplitude misregistration c) Phase misregistration	b)	result and cause Frequency misregistration Noise	
10)	In MR imaging, matrix size determine	es		
	a) Field of view	b)	Aliasing	
	c) Resolution	d)	Bandwidth	
11)	Protons in different molecules differ in	n al	I of the following ways except	
	a) T1	b)	T2	
	c) Gyromagnetic ratio	d)	Precession frequency	
12)	The mathematical technique that invalue from values on either side of its			
	a) Filtering	b)	Interpolation	
	c) Convolution	d)	Summation	
13)	The CT number (Hounsfield unit) of fa	at c	lepends on	
	a) kV	b)	mAs	
	c) Reconstruction algorithm	d)	Nothing-it is constant	
14)	Which of the following is not common	າly ເ	used as a CT scintillation detector?	
	a) Ceramic rare earth	b)	silver halide	
	c) Bismuth germinate	d)	cadmium tungstate	



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2018 MEDICAL IMAGING – II

Day and Date: Tuesday, 15-5-2018

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

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 1) Explain the working principle of magnetic resonance imaging.
- 2) Define angiography and explain the role of CT in imaging process.

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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:

 $(2 \times 6 = 12)$

- 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.

Seat	
No.	

Set P

Marks: 14

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.

Duration: 30 Minutes

- 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.

l.	Choose the correct a	nswer:			(1×14=14)
	1) Control panel of d	iagnostic X-ray ed	quipment operatin	g at	KVP.
	a) 225	b) 325	c) 25	d) 125	
	The entrance doo movement of beds		n should be	feet f	or easy
	a) 4	b) 14	c) 0.4	d) 40	
	3) Glass electrodes a	are suitable for m	easurement in the	range of pH	
	a) 0 – 110	b) 11 – 100	c) 0 - 11	d) None	
	4) The following is no	ot a classification	of maintenance.		
	 a) Corrective main 	ntenance	b) Timely main	tenance	
	c) Scheduled mai	ntenance	d) Preventive r	maintenance	
	5) With increase in p	reventive mainter	nance cost, break	down mainten	ance cost
	a) Increases		b) Decreases		
	c) Remain same		d) Any of the a	bove	

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 spect	ror	neter 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 the bed.		with free movable space around
	a) 120 sq. Feet	b)	120 feet
	c) 120 sq. meter	d)	20 sq. feet
10)	Clear free area inside operation room	ı sh	ould 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 and potassium in body.	the	measurement of lithium, sodium
	a) Spectrophotometer	b)	Colorimeter
	c) Flame photometer	d)	Centrifuge
12)	Equipment failure takes place due to	vai	ious 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 without failure, under stated condition		
	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



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:

 $(4 \times 4 = 16)$

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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 P

 $(2 \times 6 = 12)$

V. Answer any two:

- 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.	

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 guestion 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.

Dur	atio	on : 30 Minutes		Marks: 14
I.	Ch	noose 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 the bed.		with free movable space around
		a) 120 sq. Feet	b)) 120 feet
		c) 120 sq. meter	d)) 20 sq. feet
	3) Clear free area inside operation room		ı sh	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 and potassium in body.	the	e measurement of lithium, sodium
		a) Spectrophotometer	b)) Colorimeter
		c) Flame photometer	d)) Centrifuge
	5)	Equipment failure takes place due to	vai	arious 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.						
		er stated condition			3110	od of tille.	
	a) Reliability		,	Maintenance			
→ \	c) Trouble shooting		u)	Servicing			
7)	Spirometer is used to	to measure					
	a) Lung capacity		•	Lung passage)		
	c) Lung weight		,	Air			
8)	Control panel of dia	gnostic X-ray equ			at .		_ KVP.
	a) 225	b) 325	c)	25		d) 125	
9)	The entrance door movement of beds.	of the ICU room	sh	ould be		feet for	easy
	a) 4	b) 14	c)	0.4	d)	40	
10)	Glass electrodes are	e suitable for mea	su	rement in the r	an	ge of pH	
	a) 0 – 110	b) 11 – 100	c)	0 – 11	d)	None	
11)	The following is not	a classification of	m	aintenance.			
	a) Corrective maint	enance	b)	Timely mainte	na	nce	
	c) Scheduled maint	tenance	d)	Preventive ma	aint	tenance	
12)	With increase in pre	ventive maintena	nce	e cost, breakdo	wr	n maintenan	ce cost
	a) Increases		b)	Decreases			
	c) Remain same		d)	Any of the abo	ove)	
13)	pH stand for Power	of					
	a) H ⁺ ion concentra	tion	b)	OH ⁻ ion conce	enti	ration	
	c) He+ ion concentr	ation	d)	Power of Hyp	not	isis	
14)	On which of the follo	owing mass spect	ror	neter separatio	ns	?	
	a) Mass		b)	Charge			
	c) Molecular weight	t	d)	Mass to charg	ge r	ratio	



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:

 $(4 \times 4 = 16)$

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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

 $(2 \times 6 = 12)$

V. Answer any two:

- 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.	

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.

Du	ration: 30 Minutes	Marks: 14
l.	Choose the correct answer :	(1×14=14)
	1) With increase in preventive	naintenance 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 n	ss spectrometer separations ?
	a) Mass	b) Charge
	c) Molecular weight	d) Mass to charge ratio
	4) X-ray beam falls are not les	than thick brick or equivalent.
	a) 35 cm b) 23 cm	n c) 20 cm d) 11 cm
	In ICU, room should be at leather the bed.	t with free movable space around
	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. fee	et	b)	480 – 600 fee	t	
	c)	500 - 640 sq. fee	et	d)	500 - 640 sq.	feet	
7)		are red depotassium in bo	outinely used for ody.	the	measuremen	t of lithium, so	dium
	a)	Spectrophotome	ter	b)	Colorimeter		
	c)	Flame photomete	er	d)	Centrifuge		
8)	Εq	uipment failure ta	kes place due to	vai	rious reason a	re classified as	
	a)	Improper choice	of components	b)	Production de	eficiencies	
	c)	Careless storage	and transport	d)	All of the above	ve	
9)			ed as the ability of er stated conditior				ction
	a)	Reliability		b)	Maintenance		
	c)	Trouble shooting		d)	Servicing		
10)	Sp	irometer is used	to measure				
	a)	Lung capacity		b)	Lung passage	9	
	c)	Lung weight		d)	Air		
11)	Со	ntrol panel of dia	gnostic X-ray equ	ipn	nent operating	at	_KVP.
	a)	225	b) 325	c)	25	d) 125	
12)		e entrance door ovement of beds.	of the ICU room	sh	ould be	feet for	easy
	a)	4	b) 14	c)	0.4	d) 40	
13)	Gla	ass electrodes ar	e suitable for mea	เรน	rement in the r	ange of pH	
	a)	0 – 110	b) 11 – 100	c)	0 – 11	d) None	
14)	Th	e following is not	a classification of	m	aintenance.		
	a)	Corrective maint	enance	b) Timely maintenance			
	c)	Scheduled maint	enance	d)	Preventive ma	aintenance	



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:

 $(4 \times 4 = 16)$

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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

 $(2 \times 6 = 12)$

V. Answer **any two**:

- 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.

SLR-T	C	_	466	
	_	_		

Seat	
No.	

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 $(1 \times 14 = 14)$ Choose the correct answer: 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 is defined as the ability of an item to perform a required function without failure, under stated condition for a specified period of time. b) Maintenance a) Reliability c) Trouble shooting d) Servicing

5)	Spirometer is used	to measure						
	a) Lung capacity		b)	Lung passage	Э			
	c) Lung weight		d)	Air				
6)	Control panel of dia	gnostic X-ray equ	ıipn	nent operating	at _		_ KVP.	
	a) 225	b) 325	c)	25	(d) 125		
7)	The entrance door movement of beds.	of the ICU room	sh	ould be		_ feet for	easy	
	a) 4	b) 14	c)	0.4	d) 4	40		
8)	Glass electrodes ar	e suitable for mea	asu	rement in the r	ang	e of pH		
	a) 0 – 110	b) 11 – 100	c)	0 – 11	d)	None		
9)	The following is not	a classification of	f ma	aintenance.				
	a) Corrective maint	enance	b)	Timely mainte	enar	nce		
	c) Scheduled main	tenance	d)	Preventive ma	ainte	enance		
10)	With increase in pre	eventive maintena	nce	e cost, breakdo	own	maintenar	nce cost	
	a) Increases		b)	Decreases				
	c) Remain same		d)	Any of the ab	ove			
11)	pH stand for Power	of						
	a) H ⁺ ion concentra	tion	b)	OH- ion conce	entra	ation		
	c) He+ ion concentr	ration	d)	Power of Hyp	noti	sis		
12)	On which of the follo	owing mass spec	tror	neter separatio	ons	?		
	a) Mass			b) Charge				
	c) Molecular weigh	t	d)	Mass to charg	ge ra	atio		
13)	X-ray beam falls are	e not less than		thick b	rick	or equivale	ent.	
	a) 35 cm	b) 23 cm	c)	20 cm	d)	11 cm		
14)	In ICU, room should the bed.	be at least	-	with free mo	vab	le space ar	round	
	a) 120 sq. Feet		b)	120 feet				
	c) 120 sq. meter		d)	20 sq. feet				



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:

 $(4 \times 4 = 16)$

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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

 $(2 \times 6 = 12)$

V. Answer any two:

- 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.	

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.

Dur	atio	n : 30 Minutes				Marks: 14		
1.	Ch	Choose the correct answer :						
	1)	tech	nology is used fo	r micro array mar	nufacturing.			
		a) photolithograph	у	b) inkjetting				
		c) contact printing		d) all above				
	2)	Microbiosensors a						
		a) ions effect						
		b) ion sensitive fie	ld effect transisto	r				
		c) pieroelectric eff	ect					
		d) magnetic effect						
	3)	Microarrays are als	so known as					
		a) bio chips	b) DNA chips	c) gene chips	d) all of the	em		
	4)	One of the applica	tion of Bulk micro	machining is	se	ensor.		
		a) SAW sensor	b) Resonant	c) Pressure	d) Temper	ature		
	5)	is a	a material remova	Il method.				
		a) surface microm	achining	b) LIGA				
		c) micro stereo lith	nography	d) none of abou	ve			

6)	Combination of	is used to	form sharp poi	nts.
	a) dry and isotropic wet etchin	g b)	dry and an isot	tropic 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 lithograp	hy
8)	Most microproducts available t	oday are		
	a) microactuators	b)	microsensors	
	c) pumps	d)	microoptics	
9)	can be measure	d by MEM	1S.	
	a) relative humidity	b)	Barometric pre	essure
	c) aviation	d)	all above	
10)	The advantages of microneedl	es used ir	n drug delivery i	s
	a) painters			
	b) does'nt reach to nerve			
	c) eliminates vibration of the h	and		
	d) both a) and b)			
11)	MEMS devices are within the r	ange		
	a) 1 pm – 1nm	b)	1 nm – 1 μm	
	c) 1 μm – 1mm	d)	1mm – 1 cm	
12)	X-ray lithography is a process remove parts of		ectronic industr	y to selectively
	a) thick film	b)	thin film	
	c) resistive layer	d)	conductive lay	er
13)	Chemical deposition technique in which stream of source gas			
	a) reaction b) vapour	c)	gas	d) liquid
14)	The most common material for	microma	chining is	
	a) silicon b) germer	nium c)	copper	d) silicon oxide



Seat	
No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018 BIOMEDICAL MICROSYSTEM

Day and Date: Saturday, 19-5-2018

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

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.



5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 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.	Set	Q
	J I	

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.

Dur	ration : 20 Minutos		Marka : 14
Dui	ration: 30 Minutes		Marks: 14
1.	Choose the correct answer:		(14×1=14)
	1) Most microproducts available to	day are	
	a) microactuators	b) microsensors	
	c) pumps	d) microoptics	
	2) can be measured	I by MEMS.	
	a) relative humidity	b) Barometric pressure	
	c) aviation	d) all above	
	3) The advantages of microneedle	s used in drug delivery is	
	a) painters		
	b) does'nt reach to nerve		
	c) eliminates vibration of the ha	ınd	
	d) both a) and b)		
	4) MEMS devices are within the ra	inge	
	a) 1 pm – 1nm	b) 1 nm – 1 μm	
	c) 1 µm – 1mm	d) 1mm – 1 cm	

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 la	yer	
6)	Chemical deposition in which stream of					_ deposition
	a) reaction	b) vapour	c)	gas	d) liqu	uid
7)	The most common	material for micro	ma	chining is		
	a) silicon	b) germenium	c)	copper	d) sili	con oxide
8)	tech	nology is used for	mi	cro array man	ufacturi	ng.
	a) photolithography	У	b)	inkjetting		
	c) contact printing		d)	all above		
9)	Microbiosensors ar	e based on				
	a) ions effect					
	b) ion sensitive fiel	d effect transistor	•			
	c) pieroelectric effe	ect				
	d) magnetic effect					
10)	Microarrays are als	o known as				
	a) bio chips	b) DNA chips	c)	gene chips	d) all	of them
11)	One of the applicat	ion of Bulk micror	nac	hining is		_ sensor.
	a) SAW sensor	b) Resonant	c)	Pressure	d) Tei	mperature
12)						
	a) surface microma	achining	b)	LIGA		
	c) micro stereo lith	ography	d)	none of abov	е	
13)	Combination of	is use	d to	form sharp po	oints.	
	a) dry and isotropic	c wet etching	b)	dry and an is	otropic	wet etching.
	c) a) and b)		d)	none of abov	е	
14)	Focused ion beam	milling is		process.		
	a) an isotropic		b)	wet isotropic		
	c) electrochemical		d)	X-ray lithogra	ıphy	



Seat	
No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018 BIOMEDICAL MICROSYSTEM

Day and Date: Saturday, 19-5-2018

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

Marks: 56

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.



5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 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.	

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.

ur	atior	n : 30 Minutes		Marks: 14
1.	Ch	oose 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	d to form sharp points.	
		a) dry and isotropic wet etching	b) dry and an isotropic wet e	tching.
		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 a	are	
		a) microactuators	b) microsensors	
		c) pumps	d) microoptics	
	5)	can be measured by M	IEMS.	
		a) relative humidity	b) Barometric pressure	
		c) aviation	d) all above	

6)	The advantages of	microneedles use	ed in drug delivery	y is
	a) painters			
	b) does'nt reach to	nerve		
	c) eliminates vibrat	ion of the hand		
	d) both a) and b)			
7)	MEMS devices are	within the range _		
	a) 1 pm – 1nm		b) 1 nm – 1 μm	1
	c) $1 \mu m - 1mm$		d) 1mm - 1 cm	
8)	X-ray lithography is remove parts of		n electronic indus	stry to selectively
	a) thick film		b) thin film	
	c) resistive layer		d) conductive la	ıyer
9)	Chemical deposition in which stream of s	•		-
	a) reaction	b) vapour	c) gas	d) liquid
10)	The most common	material for micro	machining is	
	a) silicon	b) germenium	c) copper	d) silicon oxide
11)	techn	ology is used for	micro array man	ufacturing.
	a) photolithography	,	b) inkjetting	
	c) contact printing		d) all above	
12)	Microbiosensors are	e based on		
	a) ions effect			
	b) ion sensitive field	d effect transistor		
	c) pieroelectric effe	ect		
	d) magnetic effect			
13)	Microarrays are also	o known as		
	a) bio chips	b) DNA chips	c) gene chips	d) all of them
14)	One of the application	on of Bulk micron	nachining is	sensor.
	a) SAW sensor	b) Resonant	c) Pressure	d) Temperature



Seat	
No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018 BIOMEDICAL MICROSYSTEM

Day and Date: Saturday, 19-5-2018

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

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.



5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 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.	

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.

Dur	atio	n : 30 Minutes			Marks: 14
1.	Ch	noose the correct ar	swer:		(14×1=14)
	1)	The advantages of	microneedles us	sed in drug delive	ry is
		a) painters			
		b) does'nt reach to	nerve		
		c) eliminates vibra	tion of the hand		
		d) both a) and b)			
	2)	MEMS devices are	within the range	e	
		a) 1 pm – 1nm		b) 1 nm – 1 μr	n
		c) $1 \mu m - 1mm$		d) 1mm - 1 cm	1
	3)	X-ray lithography is remove parts of	=	I in electronic indu	stry to selectively
		a) thick film		b) thin film	
		c) resistive layer		d) conductive I	ayer
	4)	Chemical deposition in which stream of	•		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)	tech	nnology is used for	mi	cro array manı	ufacturing.
	a) photolithograph	ny	b)	inkjetting	
	c) contact printing		d)	all above	
7)	Microbiosensors a	re based on			
	a) ions effect				
	b) ion sensitive fie	eld effect transistor			
	c) pieroelectric eff	ect			
	d) magnetic effect				
8)	Microarrays are als	so known as			
	a) bio chips	b) DNA chips	c)	gene chips	d) all of them
9)	One of the applica	tion of Bulk micror	nac	hining is	sensor.
	a) SAW sensor	b) Resonant	c)	Pressure	d) Temperature
10)	is a	a material removal	me	ethod.	
	a) surface microm	achining	b)	LIGA	
	c) micro stereo lith	nography	d)	none of abov	е
11)	Combination of	is use	d to	form sharp po	oints.
	a) dry and isotropi	ic wet etching	b)	dry and an ise	otropic wet etching
	c) a) and b)		d)	none of abov	е
12)	Focused ion beam	milling is		process.	
	a) an isotropic		b)	wet isotropic	
	c) electrochemica	I	d)	X-ray lithogra	phy
13)	Most microproduct	ts available today a	are		
	a) microactuators		b)	microsensors	3
	c) pumps		d)	microoptics	
14)	can	be measured by N	ΛEΝ	MS.	
	a) relative humidit	У	b)	Barometric pi	ressure
	c) aviation		d)	all above	



Seat	
No.	

B.E. (Part – II) (Biomedical Engg.) (New CGPA) Examination, 2018 BIOMEDICAL MICROSYSTEM

Day and Date: Saturday, 19-5-2018

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

Marks: 56

SECTION - I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 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:

 $(6 \times 2 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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.



5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 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.

SL	.R-	TC	_	4	6	8
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Seat	2-4	
No.	Set	P

	IISSUE ENG	INEERING
-	d Date : Tuesday, 22-5-2018 2.30 p.m. to 5.30 p.m.	Max. Marks : 70
,	minutes in Answe carries one mark. 2) Answer MCQ/Obje	er Book Page No. 3. Each question ective type questions on Page No. 3 to mention, Q.P. Set (P/Q/R/S) on Top
Duratio	MCQ/Objective T on: 30 Minutes	ype Questions Marks : 14
1. Ch	oose the correct answer :	(1×14=14)
ŕ	than their in vitro counterparts. a) Equal c) Different	b) Zero d) None of these
2)	Which of the following is a extracelluma.a) Vitronectionc) Collagen	ılar matrix proteins ? b) Laminin d) All above
3)	surfaces can be used two cell types in co-culture system. a) Nanopatterns c) Bit patterns	to control the initial interface between b) Micropatterns d) Both a) and b)
4)	Shear rate is expressed in a) cm/s/cm c) Both a) and b)	b) s ⁻¹ d) None
5)	Erythropoeitin production is related of cell a) Directly c) Zero	b) Equally d) Inversely



6)	The was the first organa donor individual to an Autologous na) Heart	n to be successfully transplanted from recipient patient. b) Brain
	c) Kidney	d) None
7)	Cartilage tissue engg. include a) Only in vivo c) Both a) and b)	b) Only in vitro d) None
8)		•
9)	are the responsible for the deposition and organization of coa) Adipocytes c) Fibroblast	the synthesis of many GAGS and for bllagen. b) Stem cells d) All above
10)	Chondrocyte is a a) Kidney cell c) Liver cell	b) Blood cell d) Cartilage cell
11)	Nerve is formed through collection of a) Neurons c) Spinal cord	f b) Nerve fibers d) Blood vessels
12)	Mature cells are continuously product a) Stem cells c) Progenitor cells	ced from b) Stromal cells d) None
13)	When skeletal muscles shortens in ration (a) A decrease in the width of the I bate) A decrease in the width of the A bate) A increase in the width of the H zad) Both b) and c)	and pand
14)	Normal human kidney forma) 200 ml c) 10 ml	of filtrate every minute. b) 100 ml d) 500 ml



Seat	
No.	

Day and Date: Tuesday, 22-5-2018

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

SECTION - I

2. Answer any four:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.

SL	.R-	TC	_	4	6	8
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No. Set Q	Seat	004	
	No.	Set	Q

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.

	or rage.			
	MCQ/Objective T	урє	e Questions	
Duratio	n : 30 Minutes		Marks: 14	ļ
1. Ch	oose the correct answer :		(1×14=14))
1)	In adults stem cells are found in dra the Concentration dra a) Cord blood, Decreases c) Peripheral blood, Increases	ma [·] b)	tically after stem cell mobilization. Cord blood, Increases	
2)	are the responsible for the deposition and organization of coa) Adipocytes c) Fibroblast	olla b)		
3)	Chondrocyte is a a) Kidney cell c) Liver cell	,	Blood cell Cartilage cell	
4)	Nerve is formed through collection of a) Neurons c) Spinal cord	b)	Nerve fibers Blood vessels	
5)	Mature cells are continuously product a) Stem cells c) Progenitor cells	b)	from Stromal cells None	



6)	When skeletal muscles shortens in real A decrease in the width of the I bab) A decrease in the width of the A bac) A increase in the width of the H zero) Both b) and c)	anc oan	l d
7)	Normal human kidney forma) 200 ml c) 10 ml	b)	of filtrate every minute. 100 ml 500 ml
8)	Tissue assembled in vitro may have _than their in vitro counterparts. a) Equal c) Different	b)	Zero None of these
9)	Which of the following is a extracellu a) Vitronection c) Collagen	b)	matrix proteins ? Laminin All above
10)	surfaces can be used to two cell types in co-culture system. a) Nanopatterns c) Bit patterns	b)	ontrol the initial interface between Micropatterns Both a) and b)
l 1)	Shear rate is expressed in a) cm/s/cm c) Both a) and b)	,	s ⁻¹ None
12)	Erythropoeitin production is related of cell a) Directly c) Zero	b)	gen delivery to the renal interstinal Equally Inversely
13)	The was the first organ a donor individual to an Autologous n a) Heart c) Kidney	reci b)	
14)	Cartilage tissue engg. include a) Only in vivo c) Both a) and b)		Only in vitro None



Seat	
No.	

Day and Date: Tuesday, 22-5-2018

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

SECTION - I

2. Answer any four:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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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Seat	0-4	
No.	Set	R

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)
Erythropoeitin production is related cell	d oxygen delivery to the renal interstinal
a) Directly	b) Equally
c) Zero	d) Inversely
2) The was the first organized a donor individual to an Autologoua) Heartc) Kidney	gan to be successfully transplanted from its recipient patient. b) Brain d) None
3) Cartilage tissue engg. includea) Only in vivoc) Both a) and b)	b) Only in vitro d) None



5)) are the responsible for the synthesis of many GAGS and for the deposition and organization of collagen.		
	a) Adipocytesc) Fibroblast	b) Stem cells d) All above	
6)	Chondrocyte is a a) Kidney cell c) Liver cell	b) Blood cell d) Cartilage cell	
7)	Nerve is formed through collection of a) Neurons c) Spinal cord	of b) Nerve fibers d) Blood vessels	
8)	Mature cells are continuously product a) Stem cells c) Progenitor cells	ced from b) Stromal cells d) None	
9)	When skeletal muscles shortens in rea) A decrease in the width of the I bab) A decrease in the width of the A bac) A increase in the width of the H zed) Both b) and c)	band band	
10)	Normal human kidney form a) 200 ml c) 10 ml	of filtrate every minute. b) 100 ml d) 500 ml	
11)	Tissue assembled in vitro may have _ than their in vitro counterparts. a) Equal c) Different	metabolic requirements b) Zero d) None of these	
12)	Which of the following is a extracellu a) Vitronection c) Collagen	ular matrix proteins ? b) Laminin d) All above	
13)	surfaces can be used t two cell types in co-culture system. a) Nanopatterns c) Bit patterns	b) Micropatterns	
14)		d) Both a) and b)	



Seat	
No.	

Day and Date: Tuesday, 22-5-2018

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

SECTION - I

2. Answer any four:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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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Seat	0.4	
No.	Set	S

B.E. (Part – II) (Biomedical Engineering) (New CGPA) Examination, 2018 TISSUF FNGINFFRING

	TISSUE E	NGINI	EERING	
Day and Date : Tu Time : 2.30 p.m.	uesday, 22-5-2018 to 5.30 p.m.		M	lax. Marks : 70
Instruction	minutes in Ans carries one mar 2) Answer MCQ/C	swer E k. Objecti	ry. It should be solved Book Page No. 3. Each we type questions on mention, Q.P. Set (P/Q/	n question Page No. 3
	MCQ/Objectiv	е Туре	e Questions	
Duration: 30 Minu	utes			Marks: 14
1. Choose the c	orrect answer :			(1×14=14)
 Chondroc Kidney Liver c Nerve is for a) 	cell ell ormed through collectio	d) n of	Blood cell Cartilage cell Nerve fibers	
c) Spinal	cord	d)	Blood vessels	
3) Mature ce a) Stem c c) Proger		b)	from Stromal cells None	
a) A decr	ease in the width of the ease in the width of the ease in the width of the	I band A ban	d	e is
5) Normal hu a) 200 ml	-		of filtrate every minute 100 ml	

d) 500 ml



6)	Tissue assembled in vitro may have _ than their in vitro counterparts.		metabolic requirements
	a) Equalc) Different	,	Zero None of these
7)	Which of the following is a extracellua) Vitronectionc) Collagen	b)	matrix proteins ? Laminin All above
8)	surfaces can be used t	•	
• ,	two cell types in co-culture system.		
	a) Nanopatternsc) Bit patterns	,	Micropatterns Both a) and b)
9)	Shear rate is expressed in		
	a) cm/s/cmc) Both a) and b)	,	s ⁻¹ None
10)	Erythropoeitin production is related of	•	
. • ,	cell	,	
	a) Directlyc) Zero	-	Equally Inversely
11)	The was the first organ	,	•
,	a donor individual to an Autologous		
	a) Heart	,	Brain
40)	c) Kidney	a)	None
12)	Cartilage tissue engg. include a) Only in vivo	b)	Only in vitro
	c) Both a) and b)	,	None
13)	In adults stem cells are found in		
	the Concentration dra a) Cord blood, Decreases		
	c) Peripheral blood, Increases	,	
14)	are the responsible for	the	synthesis of many GAGS and for
	the deposition and organization of co		_
	a) Adipocytesc) Fibroblast	,	Stem cells All above
	,	,	



Seat	
No.	

Day and Date: Tuesday, 22-5-2018

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

SECTION - I

2. Answer any four:

 $(4 \times 4 = 16)$

Marks: 56

- 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:

 $(2 \times 6 = 12)$

- 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:

 $(4 \times 4 = 16)$

- 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:

- 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.