
SLR-VB – 347

Seat No.

Set

Total Marks: 70

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 **ENGINEERING MATHEMATICS - III**

Day and Date: Thursday, 4-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

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

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1 \times 14 = 14)$

1)
$$L\{t^n.f(t)\} =$$

where $\phi(s) = L\{f(t)\}$

a)
$$(-1)\frac{d^n}{ds^n}[\phi(s)]$$

b)
$$(-1)^n \frac{d^n}{ds^n} [\phi(s)]$$

c)
$$\frac{d^n}{ds^n}[\phi(s)]$$

d) None

- 2) The conditions for existence of Laplace transform are: If f(t) is continuous and
 - a) $\lim_{t\to\infty} \{e^{-at} f(t)\}$ is finite
- b) $\lim_{t\to\infty} \{e^{-at} f(t)\}$ is infinite
- c) $\lim_{t\to\infty} \{e^{at} f(at)\}$ is finite
- d) $\lim_{t\to\infty} \{e^{-at} f(at)\}$ is finite

3)
$$L^{-1}\left\{\frac{1}{4s-5}\right\} =$$

- a) $\frac{1}{4}e^{-(\frac{5}{4})t}$ b) $\frac{1}{4}e^{(\frac{5}{4})t}$

- c) $\frac{1}{4}e^{(\frac{4}{5})^t}$ d) $\frac{1}{4}e^{-(\frac{4}{5})^t}$

4) L
$$\left\{ erf\sqrt{t}\right\} =$$

a)
$$\frac{1}{(s+1)\sqrt{s}}$$

b)
$$\frac{1}{s\sqrt{s}}$$

a)
$$\frac{1}{(s+1)\sqrt{s}}$$
 b) $\frac{1}{s\sqrt{s}}$ c) $\frac{1}{(s+1)\sqrt{s+1}}$ d) $\frac{1}{s\sqrt{s+1}}$

d)
$$\frac{1}{s\sqrt{s+1}}$$



5) Let $L\{f_1(t)\} = \phi_1(s)$ and $L\{f_2(t)\} = \phi_2(s)$ then by convolution theorem

 $L^{-1} \{ \phi_1(s), \phi_2(s) \} =$

a) $\int_{0}^{\infty} f_1(u) \cdot f_2(t-u) du$

b) $\int_{1}^{\infty} f_1(t) \cdot f_2(t) du$

c) $\int f_1(u) \cdot f_2(t-u) du$

- d) none
- 6) If $f(z) = x^2 y^2 + ikxy$ is analytic then the value of k is
- b) k = 2
- d) k=4
- 7) If f(z) = u + iv is analytic function. Then which of the following is true?
 - a) u is harmonic and v is not harmonic b) u is harmonic and v is harmonic
 - c) v is harmonic and u is not harmonic d) u and v both are not harmonic
- 8) Which of the following is the fixed point of Bilinear transformation $\omega = \frac{1+3iz}{i+z}$?
 - a) z = -i
- b) z = 2i
- c) z = i
- d) z = -2i

- 9) $\int_{|z|=1}^{|z|=1} \frac{1}{(z+2)(z-3)} dz =$ b) $2\pi i$
- c) -2πi
- d) 0

- 10) $\int_{C} \frac{z^2}{(z-1)^2(z-2)} dz$ where C: |z| = 2.5
- b) πi
- c) $3\pi i$
- d) 4πi
- 11) If f(z) and $\overline{f(z)}$ are both analytic then f(z) is
 - a) constant
- b) variable
- c) both a and b
- 12) Fourier expansion of an odd function has only _____ terms.
 - a) Sine
- b) Cosine
- c) Both a and b d) None

- 13) The half range sine series for 1 in $(0, \pi)$ is

 - a) $\frac{4}{\pi} \left\{ \sin x \frac{\sin 5x}{3} + \frac{\sin 3x}{5} \dots \right\}$ b) $\frac{2}{\pi} \left\{ \sin x + \frac{\sin 3x}{3} + \frac{\sin 5x}{5} + \dots \right\}$

 - c) $\frac{4}{\pi} \left\{ \sin x + \frac{\sin 3x}{3} + \frac{\sin 5x}{5} + \ldots \right\}$ d) $\frac{2}{\pi} \left\{ \sin x \frac{\sin 3x}{3} + \frac{\sin 5x}{5} \ldots \right\}$
- 14) If $f(x) = x^4$ in (-1, 1) then the Fourier coefficient b_n is
 - a) odd
- b) zero
- c) five
- d) none

-3-

Seat No.

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – III

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

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

2) Assume suitable data whenever necessary.

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Evaluate $\int_{0}^{\infty} \frac{\cos at \cos bt}{t} dt$.
- 2) Determine the constants a, b, c, d if $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ is analytic.
- 3) State true or false with proper justification "There does not exist an analytic function whose real part is $u = 3x^2 + \sin x + y^2 + 5y + 4$ ".
- 4) Find Laplace transform of $f(t) = \begin{cases} 1 & \text{for} \quad 0 \le t < a \\ -1 & \text{for} \quad a < t < 2z \end{cases}$ and f(t) is periodic with period 2a.
- 5) Find Laplace transform of $\int_{0}^{t} u \cdot \cosh u \cdot du$.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Find inverse Laplace transforms of ϕ (s) where ϕ (s) = $\frac{s^2 + 16s 24}{s^4 + 20s^2 + 64}$ by using partial fractions.
- 2) If f(z) = u + iv is analytic and $u + v = \frac{2 \sin 2x}{e^{2y} + e^{-2y} 2 \cos 2x}$. Then find f(z).
- 3) Solve using Laplace transform $\frac{d^2y}{dt^2} + 9y = 18t$ given that y(0) = 0 and $y(\frac{\pi}{2}) = 0$.



SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Evaluate $\int_0^{1+1} z^2 dz$ along i) the line y = x ii) the parabola $y^2 = x$. Is the line integral independent of the path? Explain.
- 2) Find half range cosine series for $\frac{f(x) = x}{0 < x < 2}$ using Parseval's identity and deduce

that
$$\frac{\pi^4}{96} = \frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \dots$$

- 3) Show that the set of functions $\{\sin x, \sin 3x, \sin 5x, ...\}$ is orthogonal over $[0, \frac{\pi}{2}]$.
- 4) Find \int_{C} logzdz where C is the unit circle in the z-Plane.
- 5) Evaluate $\int_{C} \frac{z+3}{2z^2+3z-2}$ dz where C is the circle |z-i|=2.
- 5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Find the bilinear transformation which maps the points z = 1, i, -1 onto the points w = i, 0, -i and hence find fixed points of the transformation.
- 2) Find Fourier series for f(x) in (0, 2 π) where f(x) = $\begin{cases} x & 0 < x \le \pi \\ 2\pi x & \pi \le x \le 2\pi \end{cases}$.
- 3) Find the Fourier expansion of $f(x) = 2x x^2$ $0 \le x \le 3$ whose period 3.

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1\times14=14)$

- 1) Which of the following is the fixed point of Bilinear transformation $\omega = \frac{1+3iz}{i+z}$?
 - a) z = -i
- b) z = 2i
- c) z = i
- d) z = -2i

2)
$$\int_{|z|=1} \frac{1}{(z+2)(z-3)} dz =$$

- a) 2i
- b) 2πi
- c) -2πi
- d) 0

3)
$$\int_{C} \frac{z^2}{(z-1)^2(z-2)} dz$$
 where $C: |z| = 2.5$

- a) 2πi
- b) πi
- c) $3\pi i$
- d) $4\pi i$
- 4) If f(z) and f(z) are both analytic then f(z) is
 - a) constant
- b) variable
- c) both a and b
- d) none
- 5) Fourier expansion of an odd function has only _____ ___ terms.
 - a) Sine
- b) Cosine
- c) Both a and b
- d) None

6) The half range sine series for 1 in $(0, \pi)$ is

a)
$$\frac{4}{\pi} \left\{ \sin x - \frac{\sin 5x}{3} + \frac{\sin 3x}{5} - \dots \right\}$$

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$$\frac{4}{\pi} \left\{ \sin x - \frac{\sin 5x}{3} + \frac{\sin 3x}{5} - \ldots \right\}$$
 b) $\frac{2}{\pi} \left\{ \sin x + \frac{\sin 3x}{3} + \frac{\sin 5x}{5} + \ldots \right\}$

c)
$$\frac{4}{\pi} \left\{ \sin x + \frac{\sin 3x}{3} + \frac{\sin 5x}{5} + \dots \right\}$$

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$$\frac{4}{\pi} \left\{ \sin x + \frac{\sin 3x}{3} + \frac{\sin 5x}{5} + \ldots \right\}$$
 d) $\frac{2}{\pi} \left\{ \sin x - \frac{\sin 3x}{3} + \frac{\sin 5x}{5} - \ldots \right\}$



- 7) If $f(x) = x^4$ in (-1, 1) then the Fourier coefficient b_n is
- b) zero
- d) none

8) $L\{t^n.f(t)\} =$

where $\phi(s) = L\{f(t)\}$

a) $(-1)\frac{d^{n}}{ds^{n}}[\phi(s)]$

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- d) None
- 9) The conditions for existence of Laplace transform are: If f(t) is continuous and
 - a) $\lim_{t\to\infty} \{e^{-at} f(t)\}$ is finite
- b) $\lim_{t \to \infty} \{e^{-at} f(t)\}$ is infinite
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- d) $\lim_{t \to a} \{e^{-at} f(at)\}$ is finite

- 10) $L^{-1}\left\{\frac{1}{49-5}\right\} =$
 - a) $\frac{1}{4}e^{-(\frac{5}{4})t}$ b) $\frac{1}{4}e^{(\frac{5}{4})t}$ c) $\frac{1}{4}e^{(\frac{4}{5})t}$

- 11) L $\left\{ \operatorname{erf} \sqrt{t} \right\} =$
- a) $\frac{1}{(s+1)\sqrt{s}}$ b) $\frac{1}{s\sqrt{s}}$ c) $\frac{1}{(s+1)\sqrt{s+1}}$ d) $\frac{1}{s\sqrt{s+1}}$
- 12) Let $L\{f_1(t)\} = \phi_1(s)$ and $L\{f_2(t)\} = \phi_2(s)$ then by convolution theorem

$$L^{-1} \{ \phi_1(s), \phi_2(s) \} =$$

a) $\int_{0}^{\infty} f_{1}(u) \cdot f_{2}(t-u) du$ c) $\int_{0}^{\infty} f_{1}(u) \cdot f_{2}(t-u) du$

b) $\int_{0}^{\infty} f_1(t) \cdot f_2(t) du$

- d) none
- 13) If $f(z) = x^2 y^2 + ikxy$ is analytic then the value of k is a) k = 1 b) k = 2 c) k = 3

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SECTION - II

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- 1) Evaluate $\int_0^{1+1} z^2 dz$ along i) the line y = x ii) the parabola $y^2 = x$. Is the line integral independent of the path? Explain.
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MCQ/Objective Type Questions

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1. Choose the correct answer:

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a)
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c) $\int_{0}^{\infty} f_1(u) \cdot f_2(t-u) du$

b)
$$\int_{0}^{\infty} f_{1}(t) \cdot f_{2}(t) du$$

c)
$$\int_{0}^{t} f_{1}(u) \cdot f_{2}(t-u) du$$

2) If $f(z) = x^2 - y^2 + ikxy$ is analytic then the value of k is

a)
$$k = 1$$

b)
$$k = 2$$

c)
$$k = 3$$

d)
$$k = 4$$

3) If f(z) = u + iv is analytic function. Then which of the following is true?

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a)
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c)
$$z = i$$

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$$\int_{|z|=1} \frac{1}{(z+2)(z-3)} dz =$$



- 6) $\int_{C} \frac{z^{2}}{(z-1)^{2}(z-2)} dz$ where C: |z| = 2.5
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SECTION - II

4. Attempt any four:

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 where $C: |z| = 2.5$

- a) $2\pi i$
- b) πi
- c) $3\pi i$
- d) $4\pi i$
- 2) If f(z) and $\overline{f(z)}$ are both analytic then f(z) is
 - a) constant
- b) variable
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a)
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c)
$$\frac{4}{\pi} \left\{ \sin x + \frac{\sin 3x}{3} + \frac{\sin 5x}{5} + \ldots \right\}$$

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 - a) odd
- b) zero
- c) five
- d) none

- where $\phi(s) = L\{f(t)\}$ 6) $L\{t^n.f(t)\} =$
 - a) $(-1)\frac{d^{n}}{ds^{n}}[\phi(s)]$

b) $(-1)^n \frac{d^n}{ds^n} [\phi(s)]$

c) $\frac{d^n}{ds^n}[\phi(s)]$

d) None



- 7) The conditions for existence of Laplace transform are: If f(t) is continuous and
 - a) $\lim_{t\to\infty} \{e^{-at} f(t)\}$ is finite
- b) $\lim_{t \to \infty} \{e^{-at} f(t)\}$ is infinite
- c) $Lim\{e^{at} f(at)\}$ is finite
- d) $\lim_{t\to\infty} \{e^{-at} f(at)\}$ is finite

- 8) $L^{-1}\left\{\frac{1}{49-5}\right\} =$
 - a) $\frac{1}{4}e^{-(\frac{5}{4})t}$ b) $\frac{1}{4}e^{\left(\frac{5}{4}\right)t}$ c) $\frac{1}{4}e^{\left(\frac{4}{5}\right)t}$
- d) $\frac{1}{4}e^{-\left(\frac{4}{5}\right)t}$

- 9) L $\left\{ \operatorname{erf} \sqrt{t} \right\} =$
- a) $\frac{1}{(s+1)\sqrt{s}}$ b) $\frac{1}{s\sqrt{s}}$ c) $\frac{1}{(s+1)\sqrt{s+1}}$ d) $\frac{1}{s\sqrt{s+1}}$
- 10) Let $L\{f_1(t)\} = \phi_1(s)$ and $L\{f_2(t)\} = \phi_2(s)$ then by convolution theorem

$$L^{-1} \{ \phi_1(s), \phi_2(s) \} =$$

a) $\int_{0}^{\infty} f_1(u) \cdot f_2(t-u) du$ c) $\int_{0}^{\infty} f_1(u) \cdot f_2(t-u) du$

b) $\int_{0}^{\infty} f_1(t) \cdot f_2(t) du$

- d) none
- 11) If $f(z) = x^2 y^2 + ikxy$ is analytic then the value of k is a) k = 1 b) k = 2 c) k = 3

- d) k=4
- 12) If f(z) = u + iv is analytic function. Then which of the following is true?
 - a) u is harmonic and v is not harmonic b) u is harmonic and v is harmonic
 - c) v is harmonic and u is not harmonic d) u and v both are not harmonic
- 13) Which of the following is the fixed point of Bilinear transformation $\omega = \frac{1+3iz}{i+7}$?
 - a) z = -i
- b) z = 2i
- c) z = i

- 14) $\int_{|z|=1}^{1} \frac{1}{(z+2)(z-3)} dz =$
 - a) 2i
- b) 2πi
- d) 0

-3-

Seat No.

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – III

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

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

2) Assume suitable data whenever necessary.

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Evaluate $\int_{0}^{\infty} \frac{\cos at \cos bt}{t} dt$.
- 2) Determine the constants a, b, c, d if $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ is analytic.
- 3) State true or false with proper justification "There does not exist an analytic function whose real part is $u = 3x^2 + \sin x + y^2 + 5y + 4$ ".
- 4) Find Laplace transform of $f(t) = \begin{cases} 1 & \text{for} \quad 0 \le t < a \\ -1 & \text{for} \quad a < t < 2z \end{cases}$ and f(t) is periodic with period 2a.
- 5) Find Laplace transform of $\int_{0}^{t} u \cdot \cosh u \cdot du$.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Find inverse Laplace transforms of ϕ (s) where ϕ (s) = $\frac{s^2 + 16s 24}{s^4 + 20s^2 + 64}$ by using partial fractions.
- 2) If f(z) = u + iv is analytic and $u + v = \frac{2 \sin 2x}{e^{2y} + e^{-2y} 2 \cos 2x}$. Then find f(z).
- 3) Solve using Laplace transform $\frac{d^2y}{dt^2} + 9y = 18t$ given that y(0) = 0 and $y(\frac{\pi}{2}) = 0$.



SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Evaluate $\int_0^{1+1} z^2 dz$ along i) the line y = x ii) the parabola $y^2 = x$. Is the line integral independent of the path? Explain.
- 2) Find half range cosine series for $\frac{f(x) = x}{0 < x < 2}$ using Parseval's identity and deduce

that
$$\frac{\pi^4}{96} = \frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \dots$$

- 3) Show that the set of functions $\{\sin x, \sin 3x, \sin 5x, ...\}$ is orthogonal over $[0, \frac{\pi}{2}]$.
- 4) Find \int_{C} logzdz where C is the unit circle in the z-Plane.
- 5) Evaluate $\int_{C} \frac{z+3}{2z^2+3z-2}$ dz where C is the circle |z-i|=2.
- 5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Find the bilinear transformation which maps the points z = 1, i, -1 onto the points w = i, 0, -i and hence find fixed points of the transformation.
- 2) Find Fourier series for f(x) in (0, 2 π) where f(x) = $\begin{cases} x & 0 < x \le \pi \\ 2\pi x & \pi \le x \le 2\pi \end{cases}$.
- 3) Find the Fourier expansion of $f(x) = 2x x^2$ $0 \le x \le 3$ whose period 3.

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 5-5-2017 Total Marks : 70

Time: 3.00 p.m. to 6.00 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 an	swer:			14
1)	The moist.	is the outer layer o	f the heart that keep	os the outer surface	
	a) myocardium	b) endocardium	c) pericardium	d) tricuspid	
2)	The blood is carrie having hollow tube		arts of the body th	nrough	
	a) blood vessels	b) blood plasma	c) heart pumping	d) aorta	
3)	The outer layer of a) cerebrum			d) frontal lobe	
4)	The contra a) mid brain c) spinal cord	rols subjective feel	=		
5)	is a m	naster gland of the	endocrine system.	•	
	a) adrenal	b) pituitary	c) thyroid	d) pineal	
6)	Fertilization of an oa) cervix				
7)	Male hormones are a) glans penis	•		d) prepuce	



8)	Saliva contains an	-	-	
	a) starches	b) proteins	c) fats	d) minerals
9)	the digestive tract	is called		oropel food through
	a) absorption	b) emulsion	c) peristalsis	d) regurgitation
10)	responsible for sec	creting insulin.	_	tinal system that is
	a) Adrenal gland	b) Gall bladder	c) Liver	d) Pancreas
11)	Each of the following	g is a segment of th	ne large intestine EX	CEPT the
	a) ascending color	n	,	
	c) ileum		d) sigmoid colon	
12)	Bile enters the gas	trointestinal tract a	at the	
	a) gastroesophage	eal sphincter	b) duodenum	
	c) ileocecum		d) jejunum	
13)	In the lungs, gas e	xchange occurs ir	tiny one-celled air	r sacs called
	a) alveoli	b) bronchi	c) bronchioles	d) capillaries
14)	The thoracic cage	is a structural unit	important for	
•	a) alimentation	b) menstruation	c) mentation	d) respiration



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 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) Draw and explain conduction system of heart related to ECG.
- 2) Explain functions of S.A. node and A.V. node with necessary figure.
- 3) Draw standard ECG waveform and explain Einthoven's triangle concept.
- 4) Discuss all lungs volume and capacities with neat diagram.
- 5) Define various functions of hormones in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Draw and explain circulatory system of heart.
- 2) Explain the cardiac cycle. Define stroke volume and cardiac output.
- 3) Explain the process of digestion with necessary secretions by digestive system.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain the structure of nephron.
- 2) Draw and explain structure of eye and image formation with neat figures.
- 3) Explain structure and working of neuron with neat figure.
- 4) Explain in detail the various actions carried out by androgens and Progesterone.
- 5) Differentiate between functions of four lobes of brain.



5. Attempt any 2: (6×2=12)

- 1) Explain the process of urine formation with neat figures.
- 2) Draw and explain the function of male reproductive stem in detail.
- 3) Draw and explain the structure and function of any two types of endocrine glands.

Seat No.		Set	Q
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S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 5-5-2017 Total Marks : 70

Time: 3.00 p.m. to 6.00 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

Dur	atio	n : 30 Minutes					Marks	: 14
1.	Ch	oose the correct an	swer:					14
	1)	Saliva contains an a) starches				d)	minerals	
	2)	The process where the digestive tract is	s called		_	•	•	
		a) absorption	b) emulsion	c)	peristalsis	d)	regurgitation	
	3)	is a responsible for sec	creting insulin.		_		•	
		a) Adrenal gland	b) Gall bladder	c)	Liver	d)	Pancreas	
	4)	Each of the following a) ascending cold c) ileum	•	b)	cecum	CEF	PT the	
	-\	,		,	sigmoid colon			
	5)	Bile enters the gas a) gastroesophage c) ileocecum		b)		_		
	6)	In the lungs, gas e	xchange occurs ir	า tiny	one-celled air	sac	s called	
		a) alveoli	b) bronchi	c)	bronchioles	d)	capillaries	





7)	The thoracic cage	is a structural unit	important for		
	a) alimentation	b) menstruation	c) mentation	d)	respiration
8)	The moist.	is the outer layer c	of the heart that keep	os tl	ne outer surface
	a) myocardium	b) endocardium	c) pericardium	d)	tricuspid
9)	The blood is carrie having hollow tubes	•	parts of the body th	rou	ugh
	a) blood vessels	b) blood plasma	c) heart pumping	d)	aorta
10)	The outer layer of b			۵۱	frontal labo
	•	•	c) cerebral cortex	u)	irontariobe
11)	The contra a) mid brain c) spinal cord	ols subjective feeli	_		
12)	is a m	aster gland of the	endocrine system.		
	a) adrenal	b) pituitary	c) thyroid	d)	pineal
13)	Fertilization of an o	vum by a spermato	ozoon occurs in the		
	a) cervix	b) fallopian tube	c) uterus	d)	vagina
14)	Male hormones are	produced by			
	a) glans penis	b) prostate	c) testes	d)	prepuce



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 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) Draw and explain conduction system of heart related to ECG.
- 2) Explain functions of S.A. node and A.V. node with necessary figure.
- 3) Draw standard ECG waveform and explain Einthoven's triangle concept.
- 4) Discuss all lungs volume and capacities with neat diagram.
- 5) Define various functions of hormones in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Draw and explain circulatory system of heart.
- 2) Explain the cardiac cycle. Define stroke volume and cardiac output.
- 3) Explain the process of digestion with necessary secretions by digestive system.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain the structure of nephron.
- 2) Draw and explain structure of eye and image formation with neat figures.
- 3) Explain structure and working of neuron with neat figure.
- 4) Explain in detail the various actions carried out by androgens and Progesterone.
- 5) Differentiate between functions of four lobes of brain.

5. Attempt any 2 : (6×2=12)

- 1) Explain the process of urine formation with neat figures.
- 2) Draw and explain the function of male reproductive stem in detail.
- 3) Draw and explain the structure and function of any two types of endocrine glands.

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S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 5-5-2017 Total Marks : 70

Time: 3.00 p.m. to 6.00 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

Dur	atio	n : 30 Minutes						Marks	: 14
1.	Ch	oose the correct ans	swer:						14
	1)	is a m	aster g	gland of the e	end	ocrine system.			
		a) adrenal	b) pit	uitary	c)	thyroid	d)	pineal	
	2)	Fertilization of an ora) cervix		•					
	3)	Male hormones are	produ	ced by					
		a) glans penis					d)	prepuce	
	4)	Saliva contains an	enzym	e that acts u	poi	າ			
		a) starches	b) pro	oteins	c)	fats	d)	minerals	
	5)	The process where the digestive tract i					rop	el food through	
		a) absorption	b) en	nulsion	c)	peristalsis	d)	regurgitation	
	6)	is ar responsible for sec			of	the gastrointest	ina	I system that is	
		a) Adrenal gland	b) Ga	all bladder	c)	Liver	d)	Pancreas	
	7)	Each of the following	g is a se	egment of the	e la	rge intestine EXC	EF	PT the	
		a) ascending color	า		b)	cecum			
		c) ileum			d)	sigmoid colon			

-2-



8)	blie enters the gas	stromiestinai tract a	at the	
	a) gastroesophage	eal sphincter	b) duodenum	
	c) ileocecum		d) jejunum	
9)	In the lungs, gas ex	xchange occurs in	tiny one-celled air s	sacs called
	a) alveoli	b) bronchi	c) bronchioles	d) capillaries
10)	The thoracic cage i	s a structural unit i	mportant for	
	a) alimentation	b) menstruation	c) mentation	d) respiration
11)	The moist.	is the outer layer o	of the heart that keep	os the outer surface
	a) myocardium	b) endocardium	c) pericardium	d) tricuspid
12)	The blood is carrie having hollow tubes	•	parts of the body the	nrough
	a) blood vessels	b) blood plasma	c) heart pumping	d) aorta
13)	The outer layer of b	orain is called as _		
	a) cerebrum	b) cerebellum	c) cerebral cortex	d) frontal lobe
14)	The contr a) mid brain c) spinal cord	ols subjective feeli	ngs and emotions. b) hypothalamus d) cortex	



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 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) Draw and explain conduction system of heart related to ECG.
- 2) Explain functions of S.A. node and A.V. node with necessary figure.
- 3) Draw standard ECG waveform and explain Einthoven's triangle concept.
- 4) Discuss all lungs volume and capacities with neat diagram.
- 5) Define various functions of hormones in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Draw and explain circulatory system of heart.
- 2) Explain the cardiac cycle. Define stroke volume and cardiac output.
- 3) Explain the process of digestion with necessary secretions by digestive system.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain the structure of nephron.
- 2) Draw and explain structure of eye and image formation with neat figures.
- 3) Explain structure and working of neuron with neat figure.
- 4) Explain in detail the various actions carried out by androgens and Progesterone.
- 5) Differentiate between functions of four lobes of brain.

5. Attempt any 2 : (6×2=12)

- 1) Explain the process of urine formation with neat figures.
- 2) Draw and explain the function of male reproductive stem in detail.
- 3) Draw and explain the structure and function of any two types of endocrine glands.

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Seat	
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No.	

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date : Friday, 5-5-2017 Total Marks : 70

Time: 3.00 p.m. to 6.00 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

u	ratio	n : 30 Minutes	•		Mark	ks : 14
1.	Ch	oose the correct an	swer:			14
	1)	is an responsible for sec	, ,	of the gastrointes	tinal system that	is
		a) Adrenal gland	b) Gall bladder	c) Liver	d) Pancreas	
	2)	Each of the following	g is a segment of th	e large intestine EX0	CEPT the	
		a) ascending colo	n	b) cecum		
		c) ileum		d) sigmoid colon		
	3)	Bile enters the gast	trointestinal tract at	t the	_	
		a) gastroesophage	eal sphincter	b) duodenum		
		c) ileocecum		d) jejunum		
	4)	In the lungs, gas ex	xchange occurs in	tiny one-celled air	sacs called	
		a) alveoli	b) bronchi	c) bronchioles	d) capillaries	
	5)	The thoracic cage i	is a structural unit i	mportant for	·	
		a) alimentation	b) menstruation	c) mentation	d) respiration	
	6)	The moist.	_ is the outer layer o	of the heart that kee	ps the outer surfac	ce
		a) mvocardium	b) endocardium	c) pericardium	d) tricuspid	

-2-



7)	The blood is carried to the various parts of the body throughhaving hollow tubes.					
	a) blood vessels	b) blood plasma	c) heart pumping	d)	aorta	
8)	The outer layer of brain is called as					
	a) cerebrum	b) cerebellum	c) cerebral cortex	(d)	frontal lobe	
9)	The contr a) mid brain c) spinal cord	-	ngs and emotions. b) hypothalamus d) cortex			
10)	is a m	aster gland of the	endocrine system.			
	a) adrenal	b) pituitary	c) thyroid	d)	pineal	
11)	Fertilization of an o	vum by a spermate	ozoon occurs in the			
	a) cervix	b) fallopian tube	c) uterus	d)	vagina	
12)	Male hormones are	-				
	a) glans penis	b) prostate	c) testes	d)	prepuce	
13)	Saliva contains an					
	a) starches	b) proteins	c) fats	d)	minerals	
14)	The process where the digestive tract	•	•	orop	oel food through	
	a) absorption	b) emulsion	c) peristalsis	d)	regurgitation	



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (CGPA) Examination, 2017 HUMAN ANATOMY AND PHYSIOLOGY

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 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) Draw and explain conduction system of heart related to ECG.
- 2) Explain functions of S.A. node and A.V. node with necessary figure.
- 3) Draw standard ECG waveform and explain Einthoven's triangle concept.
- 4) Discuss all lungs volume and capacities with neat diagram.
- 5) Define various functions of hormones in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Draw and explain circulatory system of heart.
- 2) Explain the cardiac cycle. Define stroke volume and cardiac output.
- 3) Explain the process of digestion with necessary secretions by digestive system.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain the structure of nephron.
- 2) Draw and explain structure of eye and image formation with neat figures.
- 3) Explain structure and working of neuron with neat figure.
- 4) Explain in detail the various actions carried out by androgens and Progesterone.
- 5) Differentiate between functions of four lobes of brain.

5. Attempt any 2 : (6×2=12)

- 1) Explain the process of urine formation with neat figures.
- 2) Draw and explain the function of male reproductive stem in detail.
- 3) Draw and explain the structure and function of any two types of endocrine glands.

a) PTFE

				SLR-VB – 349
Seat No.				Set P
S.	.E. Biomedic		(Part – I) (CGP <i>I</i> IATERIALS	A) Examination, 2017
-	d Date : Saturo 3.00 p.m. to 6.	•		Max. Marks : 70
,	Instructions :	in Answer Book 2) Answer MCQ /	Page No. <mark>3. Each</mark> o Objective type qu	e solved in first 30 minutes question carries one mark. estions on Page No. 3 only. et (P/Q/R/S) on Top of Page.
		•	ive Type Questior	
Duratio	n : 30 Minutes			Marks : 14
1. Ch	oose the corre	ect answer :		14
1)		rder of 1-1000.	_	r d) Composites
2)	, .	is the main consti		
,	a) Cellulose			d) Synthetic
3)	a) Loss of co	ffect of high temper hesive strength n hardness	b) Increase	-
4)		_are organic and in b) Titanate		d) Polymer
5)	One of the ch	aracteristic proper erature stability	ty of polymer mate b) Low hard	rial
6)	The word 'cer a) Soft mater c) Burnt mate		b) Hard mate	
7)	The monome a) Ethyl chlor c) Ethylene c		de is b) Chloroeth d) Chlorofor	
8)	mechanical fiz		tly used to fix prost	hesis due to its strong

b) Sirubber c) PHEMA d) PMMA

9)	must be added to steel in order to render it "strainless".					
	a) Chromium 12-	30%	b)	Carbon < 1.2%		
	c) Chromium Oxio	de 3 – 20%	d)	Fluoride 2%		
10)	Corrosion of metal	s involves		reaction.		
	a) Physical	b) Chemical	c)	Acidic	d) Both a) and b)	
11)	Stiffness refers to					
	a) Resistance to e	lastic deformation	b)	Degree of elasti	c deformation	
	c) Expandability o	n heating	d)	Expansion on co	ooling	
12)	What is meant by	ductility?				
	a) Metals drawn in	nto sheets				
	b) Metals undergo					
	c) Metals undergo	plastic deformation	n u	nder load		
	d) All the above					
13)	PMMA is known as					
	a) Bakelite	b) Nylon-6	c)	Teflon	d) Perspex	
14)	type	s of materials are u	sec	l as bridges betw	een human tissues	
	and metals.					
	a) Polymeric	b) Ceramic	c)	Metallic	d) Carbon	

Set P



Seat	
No.	

S.E. Biomedical Engineering (Part – I) (CGPA) Examination, 2017 BIOMATERIALS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Explain the meaning of biocompatiability of biomaterials" with an example.
- 2) Explain properties and applications of Nitinol.
- 3) Explain the classifications and application of bioceramics.
- 4) Discuss the properties and application of Titanium and its alloy.
- 5) Explain the following:
 - a) Structure and application of hydrogel.
 - b) Structure and application of bioglass.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the properties and applications of stainless steel.
- 2) State biomedical uses of alumina. List advantages and disadvantages of ceramic implant.
- 3) Explain why metals are less biocompatiable than polymers and ceramics. How we can improve surface properties of metals?



SECTION - II

 $(4 \times 4 = 16)$

4. Attempt any four questions:

- 1) Explain in detail steps of leather processing.
- 2) Discuss thermoplastic and thermosetting resin.
- 3) Which materials are used for soft tissue replacements, discuss their properties.
- 4) Explain various generations of breast implants.
- 5) Write a short note on:
 - a) Wood and binding materials.
 - b) Structure and application of silicon rubber.
- 5. Answer any two questions:

 $(6 \times 2 = 12)$

- 1) Explain contact angle method and ESCA method of surface measurement in short.
- 2) Discuss various methods of biological testing of biomaterials.
- 3) Write a short note on:
 - a) Carbon implants
 - b) Surface infrared technique of surface measurement.

Seat No.				Set	Q
S	.E. Biomedic	al Engineering (Pa BIOMA	art – Ι) (CGPA) ΓERIALS	Examination, 20	17
-	d Date : Saturo 3.00 p.m. to 6.			Max. Mar	ks : 70
	Instructions :	2) Answer MCQ/Ob	ge No. 3. Each que jective type ques t	stion carries one ma	ark. 3 only.
		MCQ/Objective	Type Questions		
Duratio	on : 30 Minutes			Mar	ks : 14
1. Ch	oose the corre	ct answer :			14
1)	mechanical fix	_ cements are mostly xation. b) Si rubber	•	_	
2)	a) Chromiumc) Chromium	_ must be added to ste 112 – 30% 1 Oxide 3 – 20%	b) Carbon < 1.2 d) Fluoride 2%		
3)	Corrosion of r	netals involves	reaction.		

a) Resistance to elastic deformation b) Degree of elastic deformation

d) Both a) and b)

- d) Expansion on cooling

c) Acidic

- 5) What is meant by ductility?
 - a) Metals drawn into sheets
 - b) Metals undergo elastic deformation under load

b) Chemical

- c) Metals undergo plastic deformation under load
- d) All the above

a) Physical

4) Stiffness refers to

6)	PMMA is known a	as			
,	a) Bakelite	b) Nylon-6	c) Teflon	d) Perspex	
7)	typ	oes of materials are	e used as bridges b	etween human tissu	ıes
	and metals.				
	a) Polymeric	b) Ceramic	c) Metallic	d) Carbon	

P.T.O.



8)	Out of all the natural rubber has the longest elongation range an					ation range and
	flexibility of order of 1-1000.					
	a) Polymer	b) PMMA	c)	Elastomer	d)	Composites
9)		is the main constituent	of ı	most natural fibe	ers.	
	a) Cellulose	b) Spandex	c)	Acrylic	d)	Synthetic
10)	a) Loss of col	fect of high temperature hesive strength n hardness	b)	Increase in stiff		
11)		are organic and inorgai	nic i	n nature.		
	a) Alumina	b) Titanate	c)	Steel	d)	Polymer
12) One of the characteristic property of polymer material						
	a) High tempo	erature stability	b)	Low hardness		
	c) High elong	ation	d)	High mechanic	al s	trength
13)	The word 'cer	amic' meant for				
	a) Soft mater	ial	b)	Hard material		
	c) Burnt mate	erial	d)	Dry material		
14)	The monomer	r of polyvinyl chloride is				
	a) Ethyl chlor	ide	b)	Chloroethane		
	c) Ethylene d	ichloride	d)	Chloroform		



Seat	
No.	

S.E. Biomedical Engineering (Part – I) (CGPA) Examination, 2017 BIOMATERIALS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Explain the meaning of biocompatiability of biomaterials" with an example.
- 2) Explain properties and applications of Nitinol.
- 3) Explain the classifications and application of bioceramics.
- 4) Discuss the properties and application of Titanium and its alloy.
- 5) Explain the following:
 - a) Structure and application of hydrogel.
 - b) Structure and application of bioglass.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the properties and applications of stainless steel.
- 2) State biomedical uses of alumina. List advantages and disadvantages of ceramic implant.
- 3) Explain why metals are less biocompatiable than polymers and ceramics. How we can improve surface properties of metals?



 $(4 \times 4 = 16)$

4. Attempt any four questions:

- 1) Explain in detail steps of leather processing.
- 2) Discuss thermoplastic and thermosetting resin.
- 3) Which materials are used for soft tissue replacements, discuss their properties.
- 4) Explain various generations of breast implants.
- 5) Write a short note on:
 - a) Wood and binding materials.
 - b) Structure and application of silicon rubber.

5. Answer any two questions:

 $(6 \times 2 = 12)$

- 1) Explain contact angle method and ESCA method of surface measurement in short.
- 2) Discuss various methods of biological testing of biomaterials.
- 3) Write a short note on:
 - a) Carbon implants
 - b) Surface infrared technique of surface measurement.

Seat No. Set	Seat No.	
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S.E. Biomedical Engineering (Part – I) (CGPA) Examination, 2017 BIOMATERIALS

	BIOMATER	IALS	
Day and Date: Saturday, 6-5-20 Time: 3.00 p.m. to 6.00 p.m.)17		Max. Marks : 70
2) Answ	werBookPageN e r MCQ/Objecti	o. 3. Each question ve type questio n	d in first 30 minutes on carries one mark. n s on Page No. 3 only. N/R/S) on Top of Page.
MCC	Q/Objective Type	e Questions	
Duration: 30 Minutes			Marks : 14
1. Choose the correct answer	:		14
1) One of the characteristi	c property of poly	ymer material	
a) High temperature sta	•		
c) High elongation	d)	High mechanica	al strength
2) The word 'ceramic' mea			
a) Soft material	•	Hard material	
c) Burnt material	ŕ	Dry material	
3) The monomer of polyvin	-	Obleve etherse	
a) Ethyl chloridec) Ethylene dichloride	•	Chloroethane Chloroform	
, •	,		due to ite etrope
4) cements mechanical fixation.	are mostly used	to fix prostriesis	due to its strong
a) PTFE b) (Si rubber c)	PHEMA	d) PMMA
5) must be a			
a) Chromium 12 – 30%		Carbon < 1.2%	
c) Chromium Oxide 3 -	-20% d)	Fluoride 2%	
6) Corrosion of metals invo	olves	reaction.	
a) Physical b) (Chemical c)	Acidic	d) Both a) and b)
7) Stiffness refers to			
a) Resistance to elastic	•	•	
c) Expandability on hea	ating d)	Expansion on c	ooling



8)	What is meant by d a) Metals drawn int b) Metals undergo c) Metals undergo d) All the above	to sheets elastic deformation			
9)	PMMA is known as				
	a) Bakelite	b) Nylon-6	c) Teflon	d)	Perspex
10)	types	of materials are u	sed as bridges betw	/eer	n human tissues
	and metals.				
	a) Polymeric	b) Ceramic	c) Metallic	d)	Carbon
11)	Out of all the	natural rubbe	er has the longest el	ong	ation range and
	flexibility of order of				
	a) Polymer	b) PMMA	c) Elastomer	d)	Composites
12)	is the	e main constituent	of most natural fibe	rs.	
	a) Cellulose	b) Spandex	c) Acrylic	d)	Synthetic
13)	What is the effect o	f high temperature	on material proper	ties	s?
	a) Loss of cohesive	e strength	b) Increase in stiff	nes	SS
	c) Increase in hard				
14)	are o	rganic and inorgar	nic in nature.		
•	a) Alumina			d)	Polymer



Seat	
No.	

S.E. Biomedical Engineering (Part – I) (CGPA) Examination, 2017 BIOMATERIALS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Explain the meaning of biocompatiability of biomaterials" with an example.
- 2) Explain properties and applications of Nitinol.
- 3) Explain the classifications and application of bioceramics.
- 4) Discuss the properties and application of Titanium and its alloy.
- 5) Explain the following:
 - a) Structure and application of hydrogel.
 - b) Structure and application of bioglass.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the properties and applications of stainless steel.
- 2) State biomedical uses of alumina. List advantages and disadvantages of ceramic implant.
- 3) Explain why metals are less biocompatiable than polymers and ceramics. How we can improve surface properties of metals?



 $(4 \times 4 = 16)$

- 4. Attempt any four questions:
 - 1) Explain in detail steps of leather processing.
 - 2) Discuss thermoplastic and thermosetting resin.
 - 3) Which materials are used for soft tissue replacements, discuss their properties.
 - 4) Explain various generations of breast implants.
 - 5) Write a short note on:
 - a) Wood and binding materials.
 - b) Structure and application of silicon rubber.
- 5. Answer any two questions:

 $(6 \times 2 = 12)$

- 1) Explain contact angle method and ESCA method of surface measurement in short.
- 2) Discuss various methods of biological testing of biomaterials.
- 3) Write a short note on:
 - a) Carbon implants
 - b) Surface infrared technique of surface measurement.

Seat No.				Set S
S	.E. Biomedic	al Engineering (Par BIOMATI	, ,	Examination, 2017
•	d Date : Saturo 3.00 p.m. to 6.0	•		Max. Marks : 70
	Instructions :	in Answer Book Pag 2) Answer MCQ/Obje	e No. 3. Each que ective type que	solved in first 30 minutes uestion carries one mark. e stions on Page No. 3 only. f (P/Q/R/S) on Top of Page.
		MCQ/Objective T	ype Questions	3
Duratio	n : 30 Minutes			Marks : 14
1. Ch	oose the corre	ct answer :		14
1)	Corrosion of na) Physical	netals involves b) Chemical	reaction. c) Acidic	d) Both a) and b)
2)	•	rs to e to elastic deformation ility on heating	b) Degree of o	
3)	b) Metals und	nt by ductility ? Iwn into sheets dergo elastic deformatic dergo plastic deformatic		

- b) Nylon-6 a) Bakelite
 - c) Teflon
- __ types of materials are used as bridges between human tissues and metals.
 - a) Polymeric

d) All the above

- b) Ceramic
- c) Metallic
- d) Carbon

d) Perspex

- 6) Out of all the _____ natural rubber has the longest elongation range and flexibility of order of 1-1000.
 - a) Polymer
- b) PMMA
- c) Elastomer
- d) Composites
- 7) _____ is the main constituent of most natural fibers. a) Cellulose
 - b) Spandex
- c) Acrylic
- d) Synthetic



8)	What is the effect of high temperat	• •		
	a) Loss of cohesive strength			
	c) Increase in hardness	d) All above		
9)	are organic and inor	ganic in nature.		
	a) Alumina b) Titanate	c) Steel d) Polymer		
10)	One of the characteristic property	of polymer material		
	a) High temperature stability	b) Low hardness		
	c) High elongation	d) High mechanical strength		
11)	The word 'ceramic' meant for			
	a) Soft material	b) Hard material		
	c) Burnt material	d) Dry material		
12)	The monomer of polyvinyl chloride	eis		
	a) Ethyl chloride	b) Chloroethane		
	c) Ethylene dichloride	d) Chloroform		
13)	cements are mostly	used to fix prosthesis due to its strong		
	mechanical fixation.			
	a) PTFE b) Si rubber	c) PHEMA d) PMMA		
14)	must be added to st	eel in order to render it "strainless".		
	a) Chromium 12 – 30%	b) Carbon < 1.2%		
	c) Chromium Oxide 3 – 20%	d) Fluoride 2%		

Set S



Seat	
No.	

S.E. Biomedical Engineering (Part – I) (CGPA) Examination, 2017 BIOMATERIALS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Explain the meaning of biocompatiability of biomaterials" with an example.
- 2) Explain properties and applications of Nitinol.
- 3) Explain the classifications and application of bioceramics.
- 4) Discuss the properties and application of Titanium and its alloy.
- 5) Explain the following:
 - a) Structure and application of hydrogel.
 - b) Structure and application of bioglass.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the properties and applications of stainless steel.
- 2) State biomedical uses of alumina. List advantages and disadvantages of ceramic implant.
- 3) Explain why metals are less biocompatiable than polymers and ceramics. How we can improve surface properties of metals?



 $(4 \times 4 = 16)$

4. Attempt any four questions:

- 1) Explain in detail steps of leather processing.
- 2) Discuss thermoplastic and thermosetting resin.
- 3) Which materials are used for soft tissue replacements, discuss their properties.
- 4) Explain various generations of breast implants.
- 5) Write a short note on:
 - a) Wood and binding materials.
 - b) Structure and application of silicon rubber.

5. Answer any two questions:

 $(6 \times 2 = 12)$

- 1) Explain contact angle method and ESCA method of surface measurement in short.
- 2) Discuss various methods of biological testing of biomaterials.
- 3) Write a short note on:
 - a) Carbon implants
 - b) Surface infrared technique of surface measurement.

						S	SLK-VB –	3	50
Seat No.							Set		P
S.E.	(Part – I) (E ELECTRO		cal Engine RCUITS AI		• .	-		17	
•	Date : Monda .00 p.m. to 6.0	•	7				Max. Mar	ks	: 70
li	nstructions :	minute one ma 2) Answe	e s in Answer ark. e r MCQ/Obje	Boo ectiv	k Page No. : e type ques	3. Each tions o	olved in first of question carries of Page No. 3 of Page No. 3 of Page No. 3 of Page No. 3 of Page No. 4 of Page N	es only	<i>y.</i>
Duration	: 30 Minutes	MCG	/Objective 1	Гуре	Questions	•	Mar	ks	: 14
1. Cho	ose correct an	iswer:							14
,	If transistor is I a) Amplifier	b) F	Rectifier	c)	Switch	d)	s as Relay		
ا (ک	In cut off chara a) < 0.7	b) >	0.7	v _{BE} c)	= 0.7	_ voits. d)	< 0.9		
. 1	Gain transistor. a) Bandwidth	•			_	-	cy response Frequency	of	
4)	DC current gai	in (β) of t	ransistor is g	givei	າ by				
	a) I _B /I _C	` '				d)	None		
,	stab operating poin a) Voltage	t against v		emp	•		naintain a fixe Bias	d	
;	signal. a) Rectificatio	n	s of linearly i	b)	Filteration		e of an electric	al	
(c) Amplification	n		d)	None of the	above			

b) Voltage d) Energy

7) BJT is a _____ controlled device.

a) Currentc) Power

8)	JFET has	_input impedance.			
	a) Low	b) High	c)	Medium	d) Zero
9)	is the vol	•	ion	region which ha	s been wider touch
	a) Pinch off		c)	Cut off	d) Active
10)	are used a) Power FET c) Power regulation		b)	power electronic Power BJT Power JFET	c converters.
11)	Triac is a type of the	yristors that can co	onc	luct in	direction.
	a) One	b) Both	c)	Upper	d) Down
12)	Diac is made up of	two dioc	des	connected back	k to back.
	a) pnp	b) npn	c)	FET	d) Zener
13)	Astable multivibrate	or using IC 555, giv	es/	S	table level.
	a) One	b) Dual	c)	Mono	d) Zero
14)	A silicon controlled	rectifier is a		_ layer solid sta	te device.
	a) 3	b) 2	c)	5	d) 4



Seat	
No.	

S.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date: Monday, 8-5-2017 Marks: 56

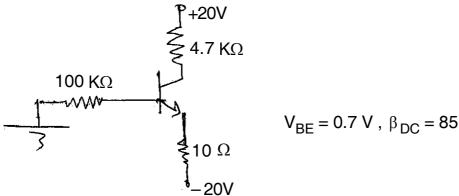
Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain how transistor works as a switch.
- 2) Explain how transistor works as a amplifier with necessary diagram.
- 3) Discuss thermal runway's importance in BJT amplifier but not so in FET amplifier.
- 4) Determine operating point (I_{CO}, V_{CEO}) for following circuit.

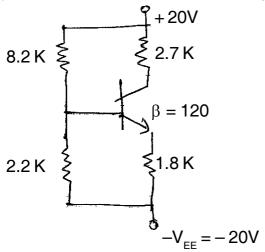


5) Differentiate between clipper and clapper circuit using diodes.

3. Attempt any two:

 $(6 \times 2 = 12)$

1) Determine the co-ordinates of Q point for following circuit.





- 2) Explain working of series voltage regulator and shunt regulator with neat diagram.
- 3) Draw and explain basic configuration of BJT.

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain JFET characteristics.
- 2) For the following circuit find I_D , V_{GS} and V_{DS} .

$$V_{DD} = 5V$$

$$V_{TN} = 0.80$$

$$K_{N} = 0.05 \text{ mA/V}^{2}$$

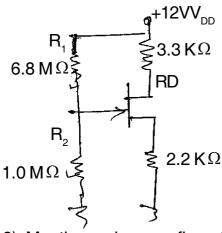
$$\stackrel{>}{\geq} 10 \text{ K}\Omega$$

- 3) Explain working of TRIAC with neat diagram.
- 4) Draw and explain working of a stable multivibrator using IC 555. Mention its application.
- 5) Explain how JFET can work as an amplifier.

5. Attempt any two:

 $(6 \times 2 = 12)$

1) For shown figure determine I_D and V_{GS} for JFET. (given $V_D\cong 7v$)



- 2) Mention various configuratious of MOSFET and explain any one in detail.
- 3) Explain working for following:
 - a) SCR
- b) IGBT structure

Set P

	8 8 8 8 1888 8 8 88 188			SLR-VD - 330			
Seat No.				Set Q			
S.E	•	Biomedical Engine	• • •	Examination, 2017 DESIGN – I			
-	d Date : Monda 3.00 p.m. to 6.	-		Max. 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 Questions	Marks : 14			
1. Ch	oose correct a	nswer:		14			
1)	JFET has	input impedanc	e.				
-,	a) Low		c) Medium	d) Zero			
2)	is together from		etion region whic	h has been wider touch			
	a) Pinch off	b) Saturation	c) Cut off	d) Active			
3)	a) Power FETc) Power reg		es in power elect b) Power BJT d) Power JFE				
4)		of thyristors that can b) Both					
5)	Diac is made a) pnp	up of two di b) npn		back to back. d) Zener			
6)	Astable multiva) One	vibrator using IC 555, g b) Dual	gives c) Mono				
7)	A silicon cont a) 3	rolled rectifier is a b) 2					
8)	If transistor is a) Amplifier	biased into saturation b) Rectifier	or cut off region	it works as d) Relay			

9) In cut off characteristic of transistor $V_{BE} = \underline{\hspace{1cm}}$ volts. a) < 0.7 b) > 0.7 c) 0.7 d)

d) < 0.9



10)	Gain transistor.	product tells us ab	out the high freq	uency response of
	a) Bandwidth	b) Wavelength	c) Amplifier	d) Frequency
11)	DC current gain	(eta) of transistor is gi	iven by	
	a) I _B /I _C	b) I _C /I _B	c) I _E /I _C	d) None
12)	stabiliz	zation refers to the a	bility of bias circui	t to maintain a fixed
·		gainst variations in te	-	
	a) Voltage	b) Current	c) Power	d) Bias
13)	is the	process of linearly in	creasing the ampl	itude of an electrical
	signal.			
	a) Rectification		b) Filteration	
	c) Amplification		d) None of the ab	oove
14)	BJT is a	_ controlled device.		
	a) Current		b) Voltage	
	c) Power		d) Energy	



Seat	
No.	

S.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date: Monday, 8-5-2017 Marks: 56

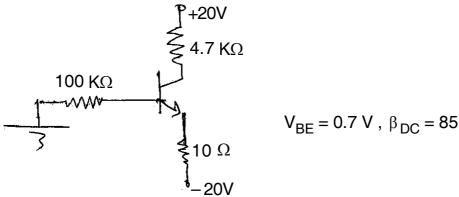
Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain how transistor works as a switch.
- 2) Explain how transistor works as a amplifier with necessary diagram.
- 3) Discuss thermal runway's importance in BJT amplifier but not so in FET amplifier.
- 4) Determine operating point (I_{CO}, V_{CEO}) for following circuit.

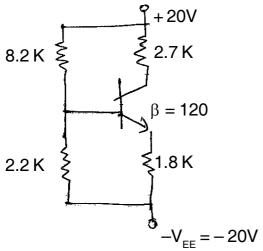


5) Differentiate between clipper and clapper circuit using diodes.

3. Attempt any two:

 $(6 \times 2 = 12)$

1) Determine the co-ordinates of Q point for following circuit.





- 2) Explain working of series voltage regulator and shunt regulator with neat diagram.
- 3) Draw and explain basic configuration of BJT.

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain JFET characteristics.
- 2) For the following circuit find I_D , V_{GS} and V_{DS} .

$$V_{DD} = 5V$$

$$V_{TN} = 0.80$$

$$K_{N} = 0.05 \text{ mA/V}^{2}$$

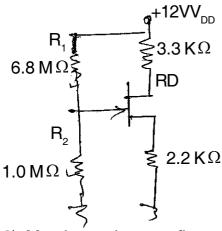
$$\stackrel{>}{\leq} 10 \text{ K}\Omega$$

- 3) Explain working of TRIAC with neat diagram.
- 4) Draw and explain working of a stable multivibrator using IC 555. Mention its application.
- 5) Explain how JFET can work as an amplifier.

5. Attempt any two:

 $(6 \times 2 = 12)$

1) For shown figure determine I_D and V_{GS} for JFET. (given $V_D\cong 7v$)



- 2) Mention various configuratious of MOSFET and explain any one in detail.
- 3) Explain working for following:
 - a) SCR
- b) IGBT structure

Set Q

a) Power FET

a) One

c) Power regulation

				SLR-VB –	350
Seat No.				Set	R
S.E		Biomedical Engin	• · · · ·) Examination, 20 DESIGN – I	17
-	d Date : Monda 3.00 p.m. to 6.0	-		Max. Mar	ks : 70
	Instructions :	minutes in Answe one mark. 2) Answer MCQ/Ob	er Book Page No. 3	d be solved in first in the solved in the sol	es only.
Duratio	on : 30 Minutes	MCQ/Objective	e Type Questions		ks : 14
1. Ch	oose correct a	nswer:			14
1)		bilization refers to the against variations in b) Current	-	cuit to maintain a fixe d) Bias	d
2)	signal. a) Rectification c) Amplification	on	increasing the and b) Filteration d) None of the	nplitude of an electric above	al
3)	BJT is a a) Current c) Power	controlled devic	ce. b) Voltage d) Energy		
4)	JFET has a) Low	input impedan b) High		d) Zero	
5)	is together from a) Pinch off	eitherside.	oletion region which	h has been wider toud d) Active	ch
6)	•	used as static switch	•	•	

b) Power BJT

c) Upper

7) Triac is a type of thyristors that can conduct in _____ direction.

b) Both

d) Power JFET

d) Down

8)	Diac is made up of					
	a) pnp	b) npn	c) FET	d) ∠ener		
9)	Astable multivibrate	•				
	a) One	b) Dual	c) Mono	d) Zero		
10)	A silicon controlled					
	a) 3	b) 2	c) 5	d) 4		
11)	If transistor is biase		•			
	a) Amplifier	b) Rectifier	c) Switch	d) Relay		
12)	In cut off characteri	istic of transistor \	/ _{BF} = vo	olts.		
	a) < 0.7					
13)	Gain pr transistor.	roduct tells us at	pout the high fred	uency response of		
	a) Bandwidth	b) Wavelength	c) Amplifier	d) Frequency		
14)) DC current gain (β) of transistor is given by					
	a) I _B /I _C	b) I_C/I_B	c) I _E /I _C	d) None		



04	
Seat	
NI -	
No.	

S.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date: Monday, 8-5-2017 Marks: 56

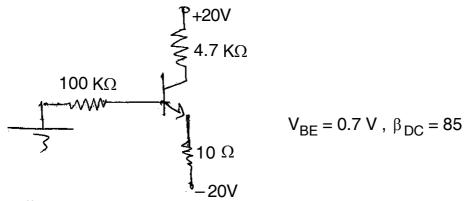
Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain how transistor works as a switch.
- 2) Explain how transistor works as a amplifier with necessary diagram.
- 3) Discuss thermal runway's importance in BJT amplifier but not so in FET amplifier.
- 4) Determine operating point (I_{CO} , V_{CEO}) for following circuit.

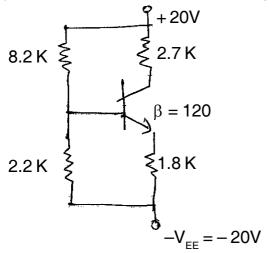


5) Differentiate between clipper and clapper circuit using diodes.

3. Attempt any two:

 $(6 \times 2 = 12)$

1) Determine the co-ordinates of Q point for following circuit.





- 2) Explain working of series voltage regulator and shunt regulator with neat diagram.
- 3) Draw and explain basic configuration of BJT.

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain JFET characteristics.
- 2) For the following circuit find I_D , V_{GS} and V_{DS} .

$$V_{DD} = 5V$$

$$V_{TN} = 0.80$$

$$K_{N} = 0.05 \text{ mA/V}^{2}$$

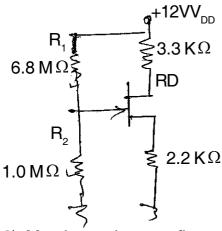
$$\stackrel{>}{\leq} 10 \text{ K}\Omega$$

- 3) Explain working of TRIAC with neat diagram.
- 4) Draw and explain working of a stable multivibrator using IC 555. Mention its application.
- 5) Explain how JFET can work as an amplifier.

5. Attempt any two:

 $(6 \times 2 = 12)$

1) For shown figure determine I_D and V_{GS} for JFET. (given $V_D\cong 7v$)



- 2) Mention various configuratious of MOSFET and explain any one in detail.
- 3) Explain working for following:
 - a) SCR
- b) IGBT structure

Seat No.	Set	S

S.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date: Monday, 8-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 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.

		_	on tronger to mer	, Q OC. (1 / C		orrage.
Dur	atio	n : 30 Minutes	MCQ/Objective T	ype Questions		Marks: 14
1.	Ch	oose correct answe	er:			14
	1)	are use a) Power FET c) Power regulation		b) Power BJT	ic converters	
	2)	Triac is a type of tha) One	-	conduct in c) Upper		
	3)	Diac is made up of a) pnp		odes connected bac c) FET		
	4)	Astable multivibrata) One		vess		
	5)	A silicon controlled a) 3	d rectifier is a b) 2	layer solid st c) 5	ate device. d) 4	
	6)	If transistor is bias a) Amplifier		or cut off region it v		
	7)	In cut off characte a) < 0.7		$V_{BE} = $ vo		
	8)	Gain p transistor. a) Bandwidth c) Amplifier	oroduct tells us at	b) Wavelength d) Frequency	uency respo	onse of

9)	DC current gain (3) of transistor is g	iver	າ by		
	a) I _B /I _C	b) I _C /I _B	c)	I _E /I _C	d)	None
10)		ation refers to the a ainst variations in te		•	to n	naintain a fixed
		b) Current	•		d)	Bias
11)	•	rocess of linearly in	cre	asing the amplit	ude	of an electrical
	signal. a) Rectification c) Amplification		,	Filteration None of the abo	ve	
12)	BJT is a	_controlled device.				
	a) Current		,	Voltage		
	c) Power		,	Energy		
13)		input impedance.				_
	a) Low	b) High	c)	Medium	d)	Zero
14)	is the vo	oltage where deplet erside	tion	region which ha	s b	een wider touch
	•	b) Saturation	c)	Cut off	d)	Active



Seat	
No.	

S.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – I

Day and Date: Monday, 8-5-2017 Marks: 56

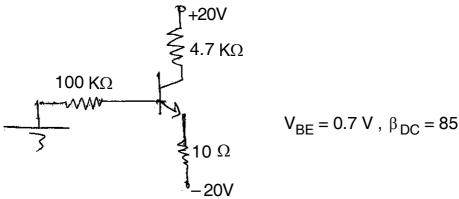
Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain how transistor works as a switch.
- 2) Explain how transistor works as a amplifier with necessary diagram.
- 3) Discuss thermal runway's importance in BJT amplifier but not so in FET amplifier.
- 4) Determine operating point (I_{CO} , V_{CEO}) for following circuit.

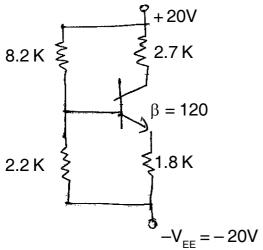


5) Differentiate between clipper and clapper circuit using diodes.

3. Attempt any two:

 $(6 \times 2 = 12)$

1) Determine the co-ordinates of Q point for following circuit.





- 2) Explain working of series voltage regulator and shunt regulator with neat diagram.
- 3) Draw and explain basic configuration of BJT.

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain JFET characteristics.
- 2) For the following circuit find I_D , V_{GS} and V_{DS} .

$$V_{DD} = 5V$$

$$V_{TN} = 0.80$$

$$K_{N} = 0.05 \text{ mA/V}^{2}$$

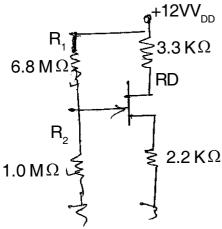
$$\stackrel{>}{\geq} 10 \text{ K}\Omega$$

- 3) Explain working of TRIAC with neat diagram.
- 4) Draw and explain working of a stable multivibrator using IC 555. Mention its application.
- 5) Explain how JFET can work as an amplifier.

5. Attempt any two:

 $(6 \times 2 = 12)$

1) For shown figure determine I_D and V_{GS} for JFET. (given $V_D\cong 7v$)



- 2) Mention various configuratious of MOSFET and explain any one in detail.
- 3) Explain working for following:
 - a) SCR
- b) IGBT structure

Set S

a) 12

				SLR-VB -	- 351
Seat No.				Se	t P
S.	E. (Part – I)	Biomedical Engin LINEAR CIRC	eering (CGPA) E UITS ANALYSIS	xamination, 20	17
•	nd Date : Tuesd 3.00 p.m. to 6.0			Max. Ma	rks : 70
	Instructions :	one mark. 2) Answer MCQ/Ob	er Book Page No. 3 . I	Each question cari ns on Page No. 3	ries only.
Duratio	on : 30 Minutes	MCQ/Objective	e Type Questions	Ma	rks : 14
1. Cł	noose correct a	Iternatives :		(1×	(14=14)
1)	The time take is called as a) Transient pc) Shifting	n to change from an i period	nitial steady state to b) Transfer func d) Transient fund	tion	ate
2)	,	sition theorem is esse	,		
	a) Duality	b) Linearity	c) Reciprocity	d) Non-linearity	y
3)	The power fac a) Zero	ctor of a purely resisti b) Unity			
4)	will be a) Leading	rcuit, the phase of the	b) Same		
E)	c) Lagging	industive soil is giver	,	n the value of L and	a C
5)	a) R/z	inductive coil is given b) 2 π fr/R	c) 2π fL/R	d) r/L	
6)	•	ue of sinusoidal 100 \	,	volt.	
	a) $100/\sqrt{2}$	b) $50/\sqrt{2}$	c) 50	d) 100	

7) The input of an ac circuit having power factor of 0.8 lagging is 20 KVA.

c) 16

d) 8

The power drawn by the circuit is _____ KW.

b) 20

8)	analysis is based o	n Kirchhoff's law.	
	a) Nodal	b) Mesh	
	c) Star delta	d) None of the al	oove
9)	Inductance is the property of a coil	that opposes any ch	ange in the amount
	offlowing through	it.	
	a) Voltage b) Current	c) Power	d) Energy
10)	If excitation and response are mea	sured at same ports,	the network function
	is known as point fu	unction.	
	a) Transfer b) Fourier	c) Laplace	d) Driving
11)	When a unit impulse voltage is app	olied to an inductor o	f 1H, the energy
	supplied by the source is		
	a) ∞ b) 1J	c) ½J	d) 0
12)	The transfer function of a low pass	RC network is	
	a) (RCs) (1 + RCs)	b) $\frac{1}{1 + RCs}$	
	c) $\frac{RCs}{1+RCs}$	d) $\frac{S}{1 + RCs}$	
13)	At the poles of a network shift awa	ly from the X-axis, th	ne response
	a) Remains constant c) More oscillating	b) Becomes lessd) Variable	s oscillating
14)	For a 2 port network to be reciproca a) $Z_{11} = Z_{22}$ b) $Y_{12} = Y_{21}$	c) $h_{21} = -h_{12}$	d) AB = BC



Seat	
No.	

S.E. (Part – I) Biomedical Engineering (CGPA) Examination, 2017 LINEAR CIRCUITS ANALYSIS

Day and Date: Tuesday, 9-5-2017 Marks: 56

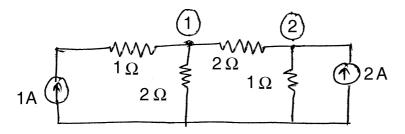
Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

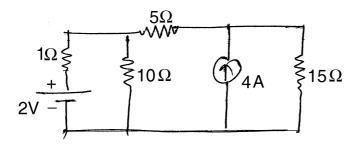
2. Attempt any 4: (4×4=16)

1) State and express Thevenin's theorem.

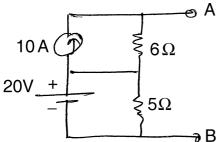
2) Find voltage at node 1 and 2:



3) Applying mesh analysis find the current through 10 Ω resistor :



- 4) Define resonance and Q factor of resonance in detail.
- 5) Replace the given network with single current source and a resistor :

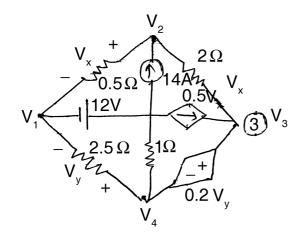




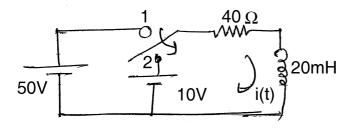
3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) State and differentiate between superposition and Norton's theorem.
- 2) Find the nodal voltage in given circuit:



3) The network shown is under steady state with switch at the position 1. At t = 0, switch is moved to position 2. Find i (t):

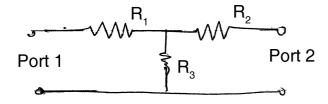


SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

1) Design an asymmetrical T-network shown below having Z $_0$ C $_1$ = 1000 Ω , Zoc $_2$ = 1200 Ω and Zsc $_1$ = 700 Ω :

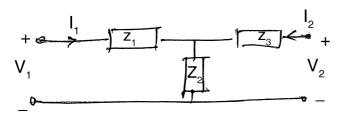




2) A network function is given below. Obtain the pole-zero diagram:

$$p(s) = {2s \over (s+2)(s^2+2s+2)}$$
.

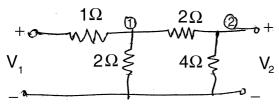
- 3) Prove the condition of reciprocity for transmission parameter.
- 4) Find the Z parameter for network shown:



- 5) Draw and explain working of low pass and high pass filter circuit.
- 5. Attempt any 2:

 $(6 \times 2 = 12)$

1) Determine Y parameter for network shown:



- 2) Draw and explain working of notch filters using RC and RL circuits.
- 3) Design a T type symmetrical attenuator which offers 40 dB attenuation with a load of 400 Ω .

Set P

Seat No.	Set	Q
110.		

S.E. (Part – I) Biomedical Engineering (CGPA) Examination, 2017 LINEAR CIRCUITS ANALYSIS

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70 Time: 3.00 p.m. to 6.00 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 correct alternatives: $(1\times14=14)$ 1) _____ analysis is based on Kirchhoff's law. a) Nodal b) Mesh d) None of the above c) Star delta 2) Inductance is the property of a coil that opposes any change in the amount

	e., 1 5 9 5	.,	-,	s, =g,	
3)	If excitation and res	ponse are meas	ured at same po	rts, the network functio	n
	is known as	point fui	nction.		

a) Transfer

a) Voltage

b) Fourier

b) Current

of _____ flowing through it.

c) Laplace d) Driving

c) Power d) Energy

- 4) When a unit impulse voltage is applied to an inductor of 1H, the energy supplied by the source is
 - a) ∞
- b) 1J
- c) $\frac{1}{2}J$ d) 0
- 5) The transfer function of a low pass RC network is _____
 - a) (RCs)(1 + RCs)

b) $\frac{1}{1 + BCs}$

c)
$$\frac{RCs}{1+RCs}$$

d)
$$\frac{S}{1 + RCs}$$

6)	At the poles of a network shift away from the X-axis, the response								
	a) Remains constant c) More oscillating		b) Becomes less oscillating						
			d) Variable						
7)	For a 2 port network	k to be reciprocal _							
	a) $Z_{11} = Z_{22}$	b) $Y_{12} = Y_{21}$	c)	$h_{21} = -h_{12}$	d)	AB = E	3C		
8)	The time taken to change from an initial steady state to the final steady state is called as								
				b) Transfer function					
	c) Shifting		d) Transient function						
9)	The superposition t	based on the co	onc	ept of					
	a) Duality	b) Linearity	c)	Reciprocity	d)	Non-lir	nearity		
10)	The power factor of a purely resistive circuit is a) Zero b) Unity c) Lagging d) Leading								
	a) Zero	b) Unity	c)	Lagging	d)	Leadin	g		
11)	In an R-L-C circuit, the phase of the current with respect to the circuit voltage will be								
	a) Leading		b)	Same					
	c) Lagging		d)	Depends upon	the	value o	fLandC		
12)	Q factor of an inductive coil is given by a) R/z b) 2 π fr/R c) 2 π fL/R d) r/L								
	a) R/z	b) 2 π fr/R	c)	2π fL/R	d)	r/L			
13)	The r.m.s. value of sinusoidal 100 V peak to peak is volt.								
	a) $100/\sqrt{2}$	b) $50/\sqrt{2}$	c)	50	d)	100			
14)	The input of an ac of The power drawn b			er factor of 0.8 lagging is 20 KVAKW.					
	a) 12	b) 20		16	d)	8			



Seat	
No.	

S.E. (Part – I) Biomedical Engineering (CGPA) Examination, 2017 LINEAR CIRCUITS ANALYSIS

Day and Date: Tuesday, 9-5-2017 Marks: 56

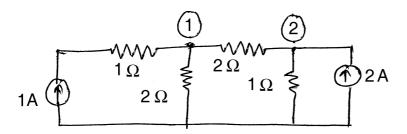
Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

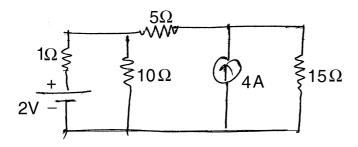
2. Attempt any 4: (4×4=16)

1) State and express Thevenin's theorem.

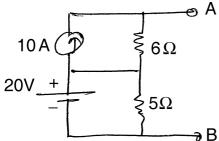
2) Find voltage at node 1 and 2:



3) Applying mesh analysis find the current through 10 Ω resistor :



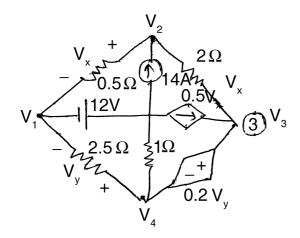
- 4) Define resonance and Q factor of resonance in detail.
- 5) Replace the given network with single current source and a resistor :



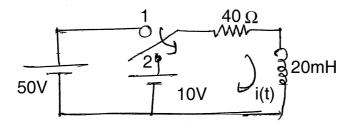


 $(6 \times 2 = 12)$

- 1) State and differentiate between superposition and Norton's theorem.
- 2) Find the nodal voltage in given circuit:



3) The network shown is under steady state with switch at the position 1. At t = 0, switch is moved to position 2. Find i (t):

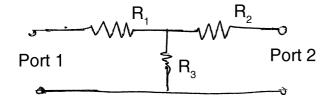


SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

1) Design an asymmetrical T-network shown below having Z $_{0}$ C $_{1}$ = 1000 Ω , Zoc $_{2}$ = 1200 Ω and Zsc $_{1}$ = 700 Ω :



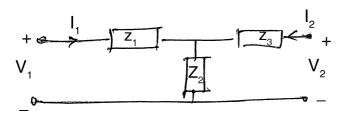
 $(6 \times 2 = 12)$



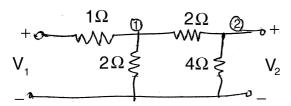
2) A network function is given below. Obtain the pole-zero diagram:

$$p(s) = {2s \over (s+2)(s^2+2s+2)}$$
.

- 3) Prove the condition of reciprocity for transmission parameter.
- 4) Find the Z parameter for network shown:



- 5) Draw and explain working of low pass and high pass filter circuit.
- 5. Attempt any 2:
 - 1) Determine Y parameter for network shown:



- 2) Draw and explain working of notch filters using RC and RL circuits.
- 3) Design a T type symmetrical attenuator which offers 40 dB attenuation with a load of 400 Ω .

				SLR-VB -	- 351
Seat No.				Se	t R
5	S.E. (Part – I)	Biomedical Engine	• , ,	•	17
-	and Date : Tuesd : 3.00 p.m. to 6.	-		Max. Ma	rks : 70
	Instructions :	one mark. 2) Answer MCQ/Obj	er Book Page No. siective type ques	3. Each question car	ries only.
Durat	ion : 30 Minutes	<u>-</u>	Type Questions		rks : 14
	Choose correct a				×14=14)
		inductive coil is given	by c) 2π fL/R		
2	2) The r.m.s. val	ue of sinusoidal 100 \		•	
	a) $100/\sqrt{2}$	b) $50/\sqrt{2}$	c) 50	d) 100	
3	· ·	n ac circuit having po awn by the circuit is b) 20	KW		
2	•	analysis is based o	,	d) d	
		analysis is based of		e above	
Ę	•	the property of a coil		change in the amou	ınt
	a) Voltage	b) Current	c) Power	d) Energy	
6		nd response are meas point fu		ts, the network funct	ion
	a) Transfer	b) Fourier	c) Laplace	d) Driving	
7	7) When a unit ii	mpulse voltage is app	lied to an inducto	r of 1H, the energy	

b) 1J c) $\frac{1}{2}$ J

supplied by the source is _____

a) ∞

d) 0



8)	The transfer function of	of a low pass RC	C ne	etwork is	
	a) (RCs) (1 + RCs)		b)	$\frac{1}{1 + RCs}$	
	c) $\frac{RCs}{1+RCs}$		d)	S 1+RCs	
9)	At the poles of a netw	ork shift away f	rom	the X-axis , the	response
	a) Remains constant c) More oscillating		,	Becomes less o	oscillating
10)	For a 2 port network to a) $Z_{11} = Z_{22}$ b)	be reciprocal_			
	a) $Z_{11} = Z_{22}$ b)	$Y_{12} = Y_{21}$	c)	$h_{21} = -h_{12}$	d) $AB = BC$
	The time taken to cha is called as	nge from an init			
	a) Transient period		•	Transfer function	
	c) Shifting		d)	Transient functi	on
12)	The superposition the	orem is essenti	ally	based on the co	oncept of
	a) Duality b)	Linearity	c)	Reciprocity	d) Non-linearity
13)	The power factor of a a) Zero b)	purely resistive	circ	cuit is	
	a) Zero b)	Unity	c)	Lagging	d) Leading
14)	In an R-L-C circuit, the will be	e phase of the cu	urre	nt with respect to	o the circuit voltage
	a) Leading		,	Same	
	c) Lagging		d)	Depends upon t	the value of L and C



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S.E. (Part – I) Biomedical Engineering (CGPA) Examination, 2017 LINEAR CIRCUITS ANALYSIS

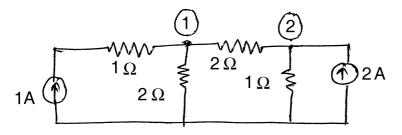
Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

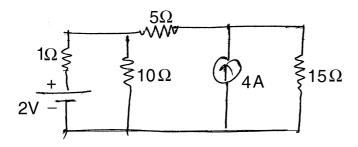
SECTION - I

2. Attempt any 4: (4×4=16)

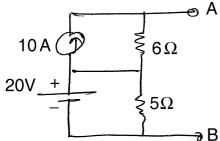
- 1) State and express Thevenin's theorem.
- 2) Find voltage at node 1 and 2:



3) Applying mesh analysis find the current through 10 Ω resistor :



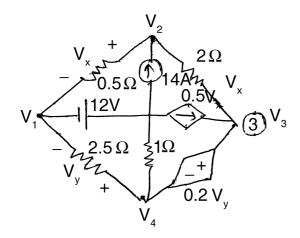
- 4) Define resonance and Q factor of resonance in detail.
- 5) Replace the given network with single current source and a resistor :



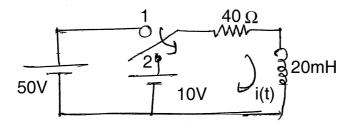


 $(6 \times 2 = 12)$

- 1) State and differentiate between superposition and Norton's theorem.
- 2) Find the nodal voltage in given circuit:



3) The network shown is under steady state with switch at the position 1. At t = 0, switch is moved to position 2. Find i (t):

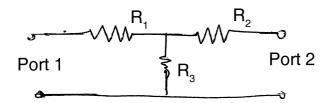


SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

1) Design an asymmetrical T-network shown below having $\rm Z_oC_1=1000~\Omega$, $\rm Zoc_2=1200~\Omega$ and $\rm Zsc_1=700~\Omega$:

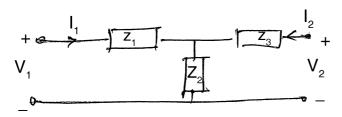




2) A network function is given below. Obtain the pole-zero diagram:

$$p(s) = {2s \over (s+2)(s^2+2s+2)}$$
.

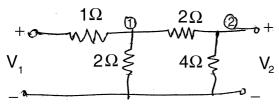
- 3) Prove the condition of reciprocity for transmission parameter.
- 4) Find the Z parameter for network shown:



- 5) Draw and explain working of low pass and high pass filter circuit.
- 5. Attempt any 2:

 $(6 \times 2 = 12)$

1) Determine Y parameter for network shown:



- 2) Draw and explain working of notch filters using RC and RL circuits.
- 3) Design a T type symmetrical attenuator which offers 40 dB attenuation with a load of 400 Ω .

Set R

Seat	
No.	

S.E. (Part - I) Biomedical Engineering (CGPA) Examination, 2017

LINEAR CIRCU	ITS ANALYS	SIS
Day and Date : Tuesday, 9-5-2017 Time : 3.00 p.m. to 6.00 p.m.		Max. Marks : 70
one mark. 2) Answer MCQ/Obje	Book Page No	ald be solved in first 30 .3. Each question carries stions on Page No. 3 only. (P/Q/R/S) on Top of Page.
MCQ/Objective T	Type Question	
Duration: 30 Minutes		Marks: 14
Choose correct alternatives :		(1×14=14)
If excitation and response are measured is known as point function.	ction.	
a) Transfer b) Fourier	c) Laplace	d) Driving
When a unit impulse voltage is applied by the source is	ed to an induct	or of 1H, the energy
a) ∞ b) 1J	c) $\frac{1}{2}J$	d) 0
3) The transfer function of a low pass R	C network is _	
a) (RCs) (1 + RCs)	b) $\frac{1}{1 + RCs}$	
c) $\frac{RCs}{1+RCs}$	d) $\frac{S}{1 + RCs}$	
4) At the poles of a network shift away	from the X-axis	s , the response
a) Remains constantc) More oscillating	b) Becomesd) Variable	less oscillating
5) For a 2 port network to be reciprocal		_
a) $Z_{11} = Z_{22}$ b) $Y_{12} = Y_{21}$	c) $h_{21} = -h_1$	d) $AB = BC$

-2-



6)	The time taken to c is called as	_	ials	steady state to th	e fi	nal steady state
	a) Transient period			Transfer function		
	c) Shifting		d)	Transient funct	ion	
7)	The superposition	theorem is essenti	ially	based on the co	onc	ept of
	a) Duality	b) Linearity	c)	Reciprocity	d)	Non-linearity
8)	The power factor o					
	a) Zero	b) Unity	c)	Lagging	d)	Leading
9)	In an R-L-C circuit, will be		urre	ent with respect t	o th	e circuit voltage
	a) Leading		,	Same		
	c) Lagging		d)	Depends upon	the	value of L and C
10)	Q factor of an indu					
	a) R/z	b) 2 π fr/R	c)	2π fL/R	d)	r/L
11)	The r.m.s. value of	sinusoidal 100 V p	oea	k to peak is		volt.
	a) $100/\sqrt{2}$	b) $50/\sqrt{2}$	c)	50	d)	100
12)	The input of an ac The power drawn b				ing	is 20 KVA.
	a) 12	b) 20	c)	16	d)	8
13)	ana	alysis is based on I	Kirc	hhoff's law.		
	a) Nodal		b)	Mesh		
	c) Star delta		d)	None of the abo	ove	
14)	Inductance is the p	roperty of a coil th	at o	pposes any cha	nge	e in the amount
	of	flowing through it.				
	a) Voltage	b) Current	c)	Power	d)	Energy

Marks: 56



Seat	
No.	

S.E. (Part - I) Biomedical Engineering (CGPA) Examination, 2017 LINEAR CIRCUITS ANALYSIS

-3-

Day and Date: Tuesday, 9-5-2017

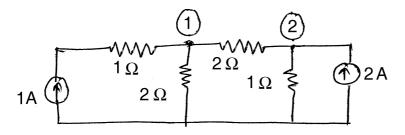
Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

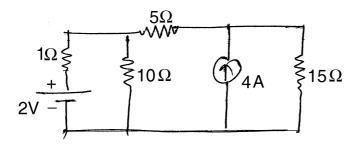
2. Attempt any 4: $(4 \times 4 = 16)$

1) State and express Thevenin's theorem.

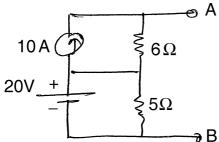
2) Find voltage at node 1 and 2:



3) Applying mesh analysis find the current through 10 Ω resistor :



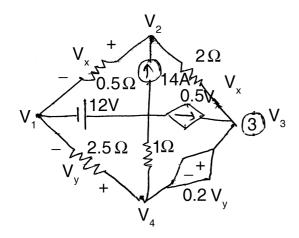
- 4) Define resonance and Q factor of resonance in detail.
- 5) Replace the given network with single current source and a resistor:



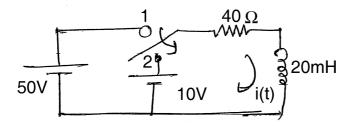


 $(6 \times 2 = 12)$

- 1) State and differentiate between superposition and Norton's theorem.
- 2) Find the nodal voltage in given circuit:



3) The network shown is under steady state with switch at the position 1. At t = 0, switch is moved to position 2. Find i (t):

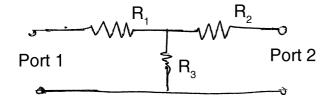


SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

1) Design an asymmetrical T-network shown below having Z $_{0}$ C $_{1}$ = 1000 Ω , Zoc $_{2}$ = 1200 Ω and Zsc $_{1}$ = 700 Ω :

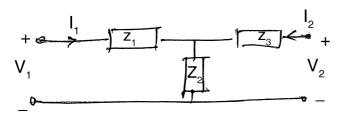




2) A network function is given below. Obtain the pole-zero diagram:

$$p(s) = {2s \over (s+2)(s^2+2s+2)}$$
.

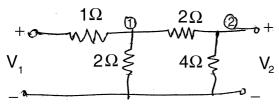
- 3) Prove the condition of reciprocity for transmission parameter.
- 4) Find the Z parameter for network shown:



- 5) Draw and explain working of low pass and high pass filter circuit.
- 5. Attempt any 2:

 $(6 \times 2 = 12)$

1) Determine Y parameter for network shown:



- 2) Draw and explain working of notch filters using RC and RL circuits.
- 3) Design a T type symmetrical attenuator which offers 40 dB attenuation with a load of 400 Ω .

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Seat	Cod	D
No.	Set	

S.E. (Biomedical Engg.) (Part – I) (Old) Examination, 2017

	•	•••	IALYSIS AND S		•
	d Date : Monday, 15 10.00 a.m. to 1.00 p				Max. Marks : 100
	2) A	Answer Book Pag nswer MCQ/Objec	ory. It should be solve te No. 3. Each quest tive type question: tion, Q.P. Set (P/Q/	tion s o l	n carries one mark. In Page No. 3 only.
		MCQ/Objective T	ype Questions		
Duratio	n : 30 Minutes				Marks : 20
1. Ch	oose the correct ans	swer:			(20×1=20)
1)	If all elements in a p would hold, when the a) DC only	ne excitation is	•		oosition theorem animpulse
2)	Nodal analysis is ap a) Planer	oplied for	networks.	Í	None of above
3)	Mesh analysis is an a) Planer	-		d)	None of above
4)	Super position theoa) Current calculatec) Power calculation	ion	ble for b) Voltage calcula d) rms calculation		n
5)	To apply reciprocity a) Ohm	y theorem respons b) Mho			Either a or b
6)	In series R, L circu a) R/Z	it power factor can b) P/S		d)	All of above
7)	In RLC series circu across inductor, the a) lagging	~			ter than voltage zero
8)	For ideal tank, circle a) -∞	,	,	s	none of above
9)	In steady state con a) short circuit		cts as c) voltage source	d)	current source



10)	In RC series circuit is	$R = 2\Omega C = 2\mu f$ a	nd	10 V dc is applie	ed. ∖	Value of current
	a) 0A	b) 2A	c)	5A	d)	10A
11)	Time constant of R a) L/R		c)	2 L/R	d)	RC
12)	Given network is ha		Вk	oranches, then n	um	ber of twigs are
13)	Reciprocity condition				u)	
	a) $h_{12} = h_{21}$	•	b)	$h_{12} - h_{21}$		
	c) $h_{11}h_{22} - h_{21}h_{12}$	= 0	d)	None of these		
14)	According to duality a) Series L	•		• •	_	
15)	In a series resonan a) Minimum	t circuit impedanc	e is	;	,	None of these
16)	In foster I form first	element is	,		,	
\	a) Capacitor					None
17)	In two port network					
	a) unilateral	b) bilateral	c)	linear	d)	nonlinear
18)	An electrical circuit equations.	with 10 branches	ar	nd 7 nodes will h	ave	eloop
	a) 10	b) 7	c)	3	d)	4
19)	Poles and zeros ar network is	•	ativ	ely on imaginary	/ ax	kis, then type of
	a) LC		c)	RL	d)	Any of above
20)	Advantage of active	e filter is				
	a) do not offer gain	l	b)	easy to tune		
	c) both of above		d)	derive high impe	eda	nce load



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (Old) Examination, 2017 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date: Monday, 15-5-2017 Marks: 80

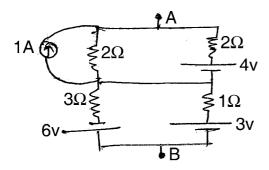
Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

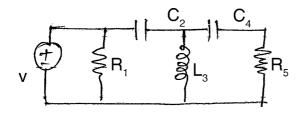
2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) State and explain Kirchoff's current and voltage law.
- 2) Reduce network shown into single source and a single resistor between terminals A and B.



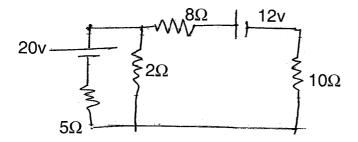
- 3) A non sinusoidal voltage is having a form factor of 1.2 and peak factor of 1.5. If the average value of the voltage is 10 V, calculate:
 - i) rms valve
- ii) maximum value
- 4) Two voltages having rms values roof 50 v and 75 v have a phase difference of 60°. Fnd the resultant sum of these 2 voltages.
- 5) Draw the dual network for given network.



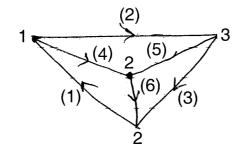


 $(10 \times 2 = 20)$

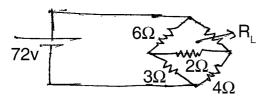
1) State Norton's theorem and find the current through 10Ω resister for given network.



- 2) For given graph of a network shown find:
 - i) incidence matrix
 - ii) f-cutset matrix
 - iii) f-circuit matrix



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



SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Derive condition for reciprocity for z parameter.
- 2) Explain various properties of positive real function.
- 3) Derive Y parameters in term of Z and ABCD parameter.
- 4) Explain signification and function of T-type and pi-type attenuation.
- 5) Define and differentiate between band pass and band reject filters.

Set P



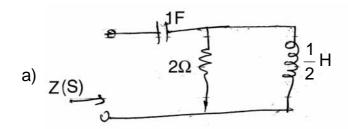


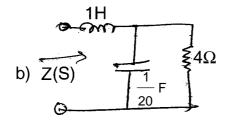
 $(10 \times 2 = 20)$

1) The z parameters of a 2 port network are z_{11} = 20 Ω , z_{22} = 30 Ω , z_{12} = z_{21} = 10 Ω . Find Y and ABCD parameter.

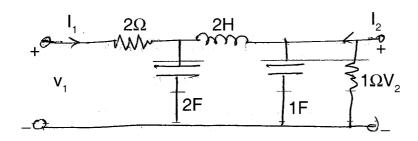
-5-

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





3) Determine ABCD parameters for given ladder network.



c) Power calculation

SLR-VB - 352

Seat No.	Set	Q
	<u>1</u>	

S.E. (Biomedical Engg.) (Part – I) (Old) Examination, 2017 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

	ELECTRICAL	NETWORK AN	IAL	YSIS AND S	ΥN	THESIS
•	d Date : Monday, 15 10.00 a.m. to 1.00 p.					Max. Marks : 100
1	2) A l	Answer Book Pag nswer MCQ/Objec	e \ ctiv	lo. 3. Each ques e type question	tion s o i	in first 30 minutes carries one mark. n Page No. 3 only. S) on Top of Page.
		MCQ/Objective T	уре	Questions		
Duratio	n : 30 Minutes					Marks : 20
1. Ch	oose the correct ans	swer:				(20×1=20)
1)	In foster I form first					
	a) Capacitor	b) Inductor	c)	Both	d)	None
2)	In two port network	$Z_{12} = Z_{21}$ indicate	s_	property	у.	
	a) unilateral	b) bilateral	c)	linear	d)	nonlinear
3)	An electrical circuit equations.	with 10 branches	ar	nd 7 nodes will h	nave	e loop
	a) 10	b) 7	c)	3	d)	4
4)	Poles and zeros ar network is	~	ativ	ely on imaginar	y ax	kis, then type of
	a) LC	b) RC	c)	RL	d)	Any of above
5)	Advantage of active a) do not offer gain c) both of above		,	easy to tune derive high imp	eda	ınce load
6)	If all elements in a pa would hold, when the a) DC only					oosition theorem animpulse
7)	,	•			u)	ariimpuise
7)	Nodal analysis is ap a) Planer	b) Non planer			d)	None of above
8)	Mesh analysis is ap a) Planer	pplied for b) Non planer			d)	None of above
9)	Super position theo a) Current calculate			for Voltage calcula	ition	l

d) rms calculation

10)	To apply reciprocity					Cithor o or b
4.4	•	b) Mho	•		u)	Either a or b
11)	In series R, L circui a) R/Z	-			d)	All of above
12)	In RLC series circu	,	,		,	
12)	across inductor, the	_			ıca	ici iliali voltage
	a) lagging	b) leading			d)	zero
13)	For ideal tank, circu	uit, the value of dv	nar	nic admittance is	S	
-,	a) -∞	•		both		none of above
14)	In steady state con	dition capacitor ac	ts a	as		
	a) short circuit	b) open circuit	c)	voltage source	d)	current source
15)	In RC series circuit	$R = 2\Omega C = 2\mu f$ a	nd	10 V dc is applie	ed. '	Value of current
	is					
	a) 0A	b) 2A	c)	5A	d)	10A
16)	Time constant of R	C series circuit is				
	a) L/R	b) 2 RC	c)	2 L/R	d)	RC
17)	Given network is ha	aving N nodes and	Вk	oranches, then n	um	ber of twigs are
	a) N	b) N – 1	c)	B – N+1	d)	B-N-1
18)	Reciprocity condition	on for 'h' paramete	r is			
	a) $h_{12} = h_{21}$		b)	$h_{12} - h_{21}$		
	c) $h_{11}h_{22} - h_{21}h_{12}$	= 0	d)	None of these		
19)	According to duality	y principle a series	inc	ductor (L) can be	e re	presented as
	a) Series L	b) Parallel L	c)	Series C	d)	Parallel C
20)	In a series resonan	-				
	a) Minimum	b) Maximum	c)	Zero	d)	None of these



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (Old) Examination, 2017 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date: Monday, 15-5-2017 Marks: 80

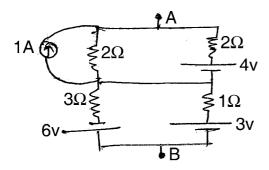
Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

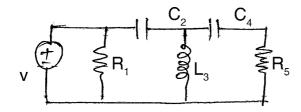
2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) State and explain Kirchoff's current and voltage law.
- 2) Reduce network shown into single source and a single resistor between terminals A and B.



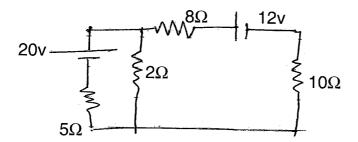
- 3) A non sinusoidal voltage is having a form factor of 1.2 and peak factor of 1.5. If the average value of the voltage is 10 V, calculate:
 - i) rms valve
- ii) maximum value
- 4) Two voltages having rms values roof 50 v and 75 v have a phase difference of 60°. Fnd the resultant sum of these 2 voltages.
- 5) Draw the dual network for given network.



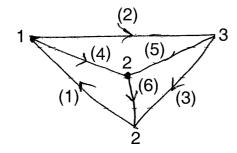


 $(10 \times 2 = 20)$

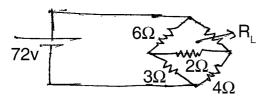
1) State Norton's theorem and find the current through 10Ω resister for given network.



- 2) For given graph of a network shown find:
 - i) incidence matrix
 - ii) f-cutset matrix
 - iii) f-circuit matrix



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



SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Derive condition for reciprocity for z parameter.
- 2) Explain various properties of positive real function.
- 3) Derive Y parameters interm of Z and ABCD parameter.
- 4) Explain signification and function of T-type and pi-type attenuation.
- 5) Define and differentiate between band pass and band reject filters.

Set Q



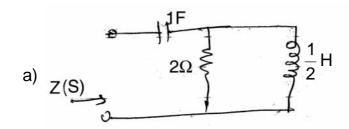


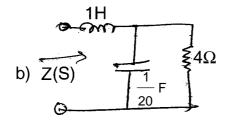
 $(10 \times 2 = 20)$

1) The z parameters of a 2 port network are z_{11} = 20 Ω , z_{22} = 30 Ω , z_{12} = z_{21} = 10 Ω . Find Y and ABCD parameter.

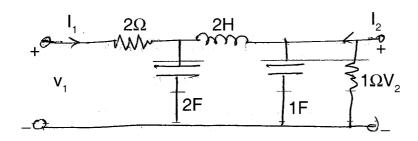
-5-

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





3) Determine ABCD parameters for given ladder network.



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Seat No.	Set R	
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	•	• • • • • • • • • • • • • • • • • • • •	- I) (OIG) Examir ALYSIS AND S	-	
•	d Date : Monday, 15 10.00 a.m. to 1.00 p.			Max.	Marks : 100
1	2) A I	Answer Book Pag nswer MCQ/Objec	ory. It should be solve to No. 3. Each quest tive type questions tion, Q.P. Set (P/Q/	tion carries c s on Page N	one mark. lo. 3 only.
		MCQ/Objective Ty	ype Questions		
Duratio	n : 30 Minutes				Marks : 20
1. Ch	oose the correct ans	swer:			(20×1=20)
1)	Time constant of R a) L/R		c) 2 L/R	d) RC	
2)	Given network is ha a) N	_	B branches, then n c) B-N+1		-
3)	Reciprocity condition	on for 'h' paramete	ris		
	a) $h_{12} = h_{21}$		b) $h_{12} - h_{21}$		
	c) $h_{11}h_{22} - h_{21}h_{12}$	= 0	d) None of these		
4)	According to duality a) Series L	/ principle a series b) Parallel L	, .	-	
5)	In a series resonan a) Minimum	t circuit impedance b) Maximum		d) None of	these
6)	In foster I form first a) Capacitor		c) Both	d) None	
7)	In two port network			/.	
	a) unilateral		c) linear		ar
8)	An electrical circuit equations.	with 10 branches	and 7 nodes will h	nave	loop
	a) 10	b) 7	c) 3	d) 4	
9)	Poles and zeros ar network is	•	atively on imaginary	y axis, then	type of
	a) LC	b) RC	c) RL	d) Any of a	lbove

-2-



10)	Advantage of activa) do not offer gain		b) easy to tune	1	
11)	c) both of above If all elements in a p	articular network a	d) derive high imp re linear then the sur		
,	would hold, when the			7011	
	a) DC only	b) AC only	c) AC or DC	d)	animpulse
12)	Nodal analysis is ap a) Planer			d)	None of above
13)	Mesh analysis is ap	oplied for	_ networks.		
	a) Planer	b) Non planer	c) Both a & b	d)	None of above
14)	Super position theo	orem is not applica	ble for		
	a) Current calculat				1
	c) Power calculation		d) rms calculation		
15)	To apply reciprocity				
	a) Ohm	b) Mho	c) No unit	d)	Either a or b
16)	In series R, L circu				
	a) R/Z	b) P/S	c) Vr/V	d)	All of above
17)	In RLC series circu across inductor, the			rea	ter than voltage
	a) lagging	b) leading	c) onunity	d)	zero
18)	For ideal tank, circu				
	a) -∞	b) 0	c) both	d)	none of above
19)	In steady state con				
	a) short circuit	b) open circuit	c) voltage source	d)	current source
20)	In RC series circuit is	$R = 2\Omega C = 2\mu f$ a	and 10 V dc is applie	ed. `	Value of current
	a) 0A	b) 2A	c) 5A	d)	10A

Set R



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (Old) Examination, 2017 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date: Monday, 15-5-2017 Marks: 80

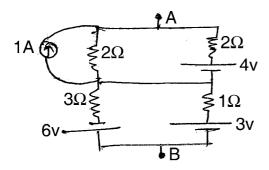
Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

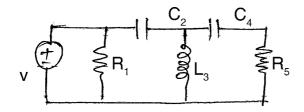
2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) State and explain Kirchoff's current and voltage law.
- 2) Reduce network shown into single source and a single resistor between terminals A and B.



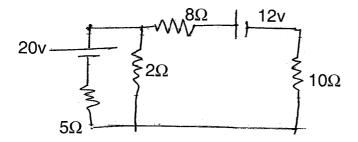
- 3) A non sinusoidal voltage is having a form factor of 1.2 and peak factor of 1.5. If the average value of the voltage is 10 V, calculate:
 - i) rms valve
- ii) maximum value
- 4) Two voltages having rms values roof 50 v and 75 v have a phase difference of 60°. Fnd the resultant sum of these 2 voltages.
- 5) Draw the dual network for given network.



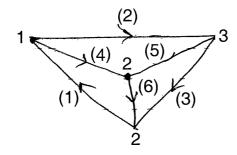


 $(10 \times 2 = 20)$

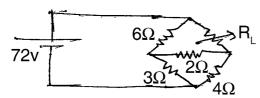
1) State Norton's theorem and find the current through 10Ω resister for given network.



- 2) For given graph of a network shown find:
 - i) incidence matrix
 - ii) f-cutset matrix
 - iii) f-circuit matrix



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



SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

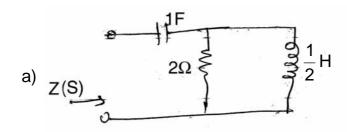
- 1) Derive condition for reciprocity for z parameter.
- 2) Explain various properties of positive real function.
- 3) Derive Y parameters interm of Z and ABCD parameter.
- 4) Explain signification and function of T-type and pi-type attenuation.
- 5) Define and differentiate between band pass and band reject filters.

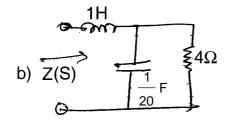
Set R



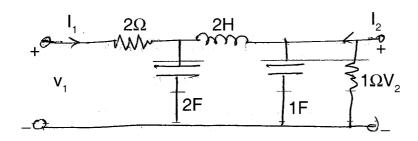
 $(10 \times 2 = 20)$

- 1) The z parameters of a 2 port network are z_{11} = 20 Ω , z_{22} = 30 Ω , z_{12} = z_{21} = 10 Ω . Find Y and ABCD parameter.
- 2) Find poles and zeros of the impedance of following networks and plot them on S-plane.





3) Determine ABCD parameters for given ladder network.



	_	
Seat No.	Set	S

LL					<u> </u>
	-		– I) (Old) Examiı IALYSIS AND S		
•	d Date : Monday, 15 10.00 a.m. to 1.00 p			Max. Ma	rks : 100
,	2) A	Answer Book Pag nswer MCQ/Objec	ory. It should be solve e No. 3. Each quest ctive type question tion, Q.P. Set (P/Q/	tion carries one s on Page No. .	e mark. 3 only.
		MCQ/Objective Ty	ype Questions		
Duratio	n : 30 Minutes			M	arks : 20
1. Ch	oose the correct ans	swer:		(2	20×1=20)
1)	In series R, L circui a) R/Z	it power factor can b) P/S	be defined as c) Vr/V	d) All of abov	e
2)	In RLC series circu across inductor, the a) lagging			reater than vol d) zero	tage
3)	For ideal tank, circua) -∞	,	namic admittance is c) both	s d) none of ab	ove
4)	In steady state con a) short circuit		ets as c) voltage source	d) current sou	urce
5)	In RC series circuit is	$R = 2\Omega C = 2\mu f$ a	ınd 10 V dc is applie	ed. Value of cu	rrent
	a) 0A	b) 2A	c) 5A	d) 10A	
6)	Time constant of R a) L/R		c) 2 L/R	d) RC	
7)	Given network is ha a) N	_	B branches, then r c) $B - N+1$	_	are
8)	Reciprocity condition	on for 'h' paramete	eris		
	a) $h_{12} = h_{21}$	_	b) h ₁₂ – h ₂₁		
~ `	c) $h_{11}h_{22} - h_{21}h_{12}$		d) None of these		
9)	According to duality a) Series L	y principle a series b) Parallel L	inductor (L) can be c) Series C	e represented a d) Parallel C	as



10)	In a series resonan a) Minimum	•		d) None of these
11)	In foster I form first a) Capacitor		c) Both	d) None
12)	In two port network	$Z_{12} = Z_{21}$ indicate	sproperty	y.
	a) unilateral	b) bilateral	c) linear	d) nonlinear
13)	An electrical circuit equations.	with 10 branches	and 7 nodes will h	naveloop
	a) 10	b) 7	c) 3	d) 4
14)	Poles and zeros ar network is	_	atively on imaginar	y axis, then type of
	a) LC	b) RC	c) RL	d) Any of above
15)	Advantage of active a) do not offer gain c) both of above		b) easy to tuned) derive high imp	edance load
16)	If all elements in a pa would hold, when the a) DC only	ne excitation is		•
17)	Nodal analysis is ap			a) armipaloo
'',	a) Planer			d) None of above
18)	Mesh analysis is ap a) Planer			d) None of above
19)	Super position theo a) Current calculat c) Power calculation	ion		
20)	To apply reciprocity a) Ohm	•	e to excitation ration c) No unit	



Seat	
No.	

S.E. (Biomedical Engg.) (Part – I) (Old) Examination, 2017 ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Day and Date: Monday, 15-5-2017 Marks: 80

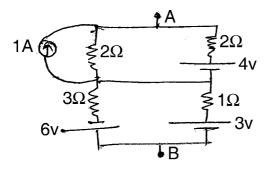
Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

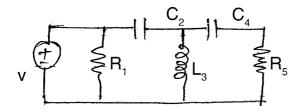
2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) State and explain Kirchoff's current and voltage law.
- 2) Reduce network shown into single source and a single resistor between terminals A and B.



- 3) A non sinusoidal voltage is having a form factor of 1.2 and peak factor of 1.5. If the average value of the voltage is 10 V, calculate:
 - i) rms valve
- ii) maximum value
- 4) Two voltages having rms values roof 50 v and 75 v have a phase difference of 60°. Fnd the resultant sum of these 2 voltages.
- 5) Draw the dual network for given network.

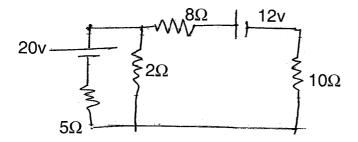




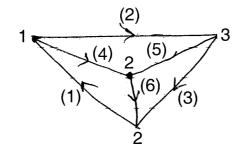
3. Attempt any two:

 $(10 \times 2 = 20)$

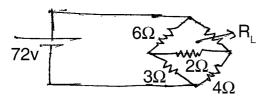
1) State Norton's theorem and find the current through 10Ω resister for given network.



- 2) For given graph of a network shown find:
 - i) incidence matrix
 - ii) f-cutset matrix
 - iii) f-circuit matrix



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



SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Derive condition for reciprocity for z parameter.
- 2) Explain various properties of positive real function.
- 3) Derive Y parameters in term of Z and ABCD parameter.
- 4) Explain signification and function of T-type and pi-type attenuation.
- 5) Define and differentiate between band pass and band reject filters.

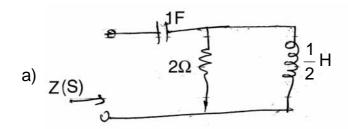
Set S

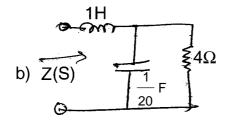


5. Attempt any two:

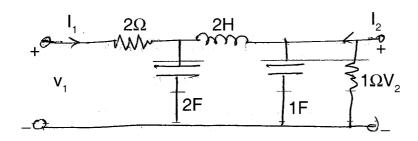
 $(10 \times 2 = 20)$

- 1) The z parameters of a 2 port network are z_{11} = 20 Ω , z_{22} = 30 Ω , z_{12} = z_{21} = 10 Ω . Find Y and ABCD parameter.
- 2) Find poles and zeros of the impedance of following networks and plot them on S-plane.





3) Determine ABCD parameters for given ladder network.



Seat No.	Set	Р
	1	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date: Tuesday, 16-5-2017 Max. Marks: 70

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.
- 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)	instrument will res	spond.			
_,	a) Precision	,	•	ion d)	Error
2)	Accuracy is expre a) relative accura c) error	су			
3)	Strain gauge is an	example of a		transduce	r.
	a) passive	b) active	c) thermal	d)	conductive
4)	The resistance of a) humidity	_			
5)	The metal mostly a) copper			n d)	silver
6)	Motion artefact is real skin				
7)	The micro electro conventional elect a) low	rodes used for red	cording phys	siological s	ignals.

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-2-



8)	Optical fibers are in a) electromagnetic c) d.c.		b) a.c. d) noise	erence.	
9)	The biosensor relie of glucose.	s upon	_ that reco	gnize and ca	atalyze reactions
	a) blood	b) gas	c) CSF	d)	enzymes
10)	Optical fiber senso	rs are	proper	ties.	
	a) electrical	b) mechanical	c) non e	lectrical d)	active
11)	Percutaneous elec	trodes are used to	detect _		within the body.
	a) blood		b) CSF		
	c) blood pressure		d) biopot	tential	
12)	Thermal sensors a	bsorbs radiation a	nd transfo	orms it into _	
	a) power	b) potential	c) heat	d)	energy
13)	Fluoroptic tempera	iture sensors are ι	ıseful dev	ice used for	
	temperature meas				
	a) tissue	b) light	c) radiat	ion d)	retina
14)	Photo electric trans	sducer converts _	e	nergy into e	lectrical energy.
	a) light	b) radiation	c) heat	d)	photon



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date: Tuesday, 16-5-2017

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 four questions :

 $(4 \times 4 = 16)$

Marks: 56

- 1) What is thermistor? How thermistors are classified on the basis of temperature resistance characteristics?
- 2) What is motion artefact? How it is minimized?
- 3) Draw and explain electrode skin interface.
- 4) Explain working of bonded strain gauges with neat diagram.
- 5) Differentiate between active and passive transducer.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the construction and working of LVDT.
- 2) Mention types of biopotential electrodes. Explain any 2 biopotential electrodes.
- 3) Which are the different laws that govern the working of a thermocouple?

SECTION - II

4. Attempt any four questions :

 $(4 \times 4 = 16)$

- 1) Differentiate between amperometric and potentiometric sensors.
- 2) What is pH of a solution? Classify the solution on basis of pH values.
- 3) What are the applications of ISFET in medicine?
- 4) Define biosensor and immunosensor with example.
- 5) Mention any 4 applications of radiation sensor.

5. Attempt any two questions:

 $(2\times6=12)$

- 1) Explain working of enzyme sensor with neat figure.
- 2) Explain working of fiber optics along with its one application
- 3) Explain the construction and working of PO₂ electrode in detail.

Set P

No.	Seat No.		Set	Q
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S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 16-5-2017 Max. Marks : 70

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.
- 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 T	ype Questions	
Duratio	n : 30 Minutes	-		Marks: 14
1. Ch	oose the correct ans	swer:		(14×1=14)
1)	Optical fibers are in a) electromagnetic c) d.c.	;		
2)	The biosensor relies of glucose.	•	_	•
	a) blood	b) gas	c) CSF	d) enzymes
3)	Optical fiber sensor	rs are	_ properties.	
	a) electrical	b) mechanical	c) non electrical	d) active
4)	Percutaneous elec	trodes are used to	detect	within the body.
	a) blood		b) CSF	
	c) blood pressure		d) biopotential	
5)	Thermal sensors al	osorbs radiation ar	nd transforms it into	
	a) power	b) potential	c) heat	d) energy
6)	Fluoroptic tempera temperature measu		seful device used fo	or
	a) tissue	b) light	c) radiation	d) retina
7)	Photo electric trans	ducer converts	energy into	electrical energy.
	a) light	b) radiation	c) heat	d) photon

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-2-



8)	is the smallest change in the measured variable to which as						
	instrument will resp	ond.					
	a) Precision	b) Accuracy	c)	Resolution	d)	Error	
9)	Accuracy is expres	sed as		_			
	a) relative accurac	cy .	b)	% accuracy			
	c) error		d)	% error			
10)	Strain gauge is an e	example of a		transduce	er.		
	a) passive					conductive	
11)	The resistance of a	conductor change	s w	hen its		_ is changed.	
•	a) humidity	-				-	
12)	The metal mostly u	sed in RTD is					
•	a) copper	b) iron	c)	platinum	d)	silver	
13)	Motion artefact is re	duced to a negligib	le n	nagnitude by		abrasion.	
	a) skin	b) electrode	c)	read	d)	wire	
14)	4) The micro electrodes have very impedance as compared to						
	conventional electr	rodes used for rec	ord	ing physiologica	al s	ignals.	
	a) low	b) moderate	c)	high	d)	stable	



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date: Tuesday, 16-5-2017

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 four questions :

 $(4 \times 4 = 16)$

Marks: 56

- 1) What is thermistor? How thermistors are classified on the basis of temperature resistance characteristics?
- 2) What is motion artefact? How it is minimized?
- 3) Draw and explain electrode skin interface.
- 4) Explain working of bonded strain gauges with neat diagram.
- 5) Differentiate between active and passive transducer.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the construction and working of LVDT.
- 2) Mention types of biopotential electrodes. Explain any 2 biopotential electrodes.
- 3) Which are the different laws that govern the working of a thermocouple?

SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Differentiate between amperometric and potentiometric sensors.
- 2) What is pH of a solution? Classify the solution on basis of pH values.
- 3) What are the applications of ISFET in medicine?
- 4) Define biosensor and immunosensor with example.
- 5) Mention any 4 applications of radiation sensor.

5. Attempt any two questions:

 $(2 \times 6 = 12)$

- 1) Explain working of enzyme sensor with neat figure.
- 2) Explain working of fiber optics along with its one application
- 3) Explain the construction and working of PO₂ electrode in detail.

Set Q

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No.	Seat No.		Set	R
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S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date : Tuesday, 16-5-2017 Max. Marks : 70

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.
- 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 an	swer:		(14×1=14)
1)	The metal mostly ua) copper		c) platinum	d) silver
2)			ole magnitude by c) read	abrasion. d) wire
3)		rodes used for re	impedanc cording physiologic c) high	
4)	Optical fibers are in a) electromagnetic) d.c.			
5)	of glucose.	•	_	d catalyze reactions
6)	a) bloodOptical fiber sensoa) electrical	rs are	c) CSFproperties. c) non electrical	, ,
7)	Percutaneous elec a) blood c) blood pressure	trodes are used to	b) CSF d) biopotential	_ within the body.



8)	Thermal sensors at	osorbs radiation ar	nd t	ransforms it into		
	a) power	b) potential	c)	heat	d)	energy
9)	Fluoroptic tempera	ture sensors are us	sef	ul device used fo	r	
	temperature measu	urement.				
	a) tissue	b) light	c)	radiation	d)	retina
10)	Photo electric trans	ducer converts		energy into	ele	ectrical energy.
	a) light	b) radiation	c)	heat	d)	photon
11)	is th	ne smallest change	e in	the measured v	aria	able to which as
	instrument will resp	ond.				
	a) Precision	b) Accuracy	c)	Resolution	d)	Error
12)	Accuracy is express	sed as		_		
	a) relative accurac	У	b)	% accuracy		
	c) error		d)	% error		
13)	Strain gauge is an e	example of a		transduce	er.	
	a) passive	b) active	c)	thermal	d)	conductive
14)	The resistance of a	conductor change	s w	hen its		_ is changed.
	a) humidity	b) linearity	c)	conductivity	d)	temperature



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date: Tuesday, 16-5-2017

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 four questions :

 $(4 \times 4 = 16)$

Marks: 56

- 1) What is thermistor? How thermistors are classified on the basis of temperature resistance characteristics?
- 2) What is motion artefact? How it is minimized?
- 3) Draw and explain electrode skin interface.
- 4) Explain working of bonded strain gauges with neat diagram.
- 5) Differentiate between active and passive transducer.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the construction and working of LVDT.
- 2) Mention types of biopotential electrodes. Explain any 2 biopotential electrodes.
- 3) Which are the different laws that govern the working of a thermocouple?

SECTION - II

4. Attempt any four questions :

 $(4 \times 4 = 16)$

- 1) Differentiate between amperometric and potentiometric sensors.
- 2) What is pH of a solution? Classify the solution on basis of pH values.
- 3) What are the applications of ISFET in medicine?
- 4) Define biosensor and immunosensor with example.
- 5) Mention any 4 applications of radiation sensor.

5. Attempt any two questions:

 $(2 \times 6 = 12)$

- 1) Explain working of enzyme sensor with neat figure.
- 2) Explain working of fiber optics along with its one application
- 3) Explain the construction and working of PO₂ electrode in detail.

Set R

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Seat	Set	9
No.	Jet	7

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date: Tuesday, 16-5-2017 Max. Marks: 70

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.
- 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	ype Questions	
Dur	atio	n : 30 Minutes	•		Marks: 14
1.	Ch	oose the correct an	swer:		(14×1=14)
	1)	Optical fiber senso a) electrical		properties. c) non electrical	d) active
	2)	Percutaneous electa) blood c) blood pressure	trodes are used to	b) CSF d) biopotential	_ within the body.
	3)	Thermal sensors a a) power		nd transforms it into c) heat	
	4)	Fluoroptic temperatemperature measura) tissue	urement.	useful device used f c) radiation	
	5)			energy int c) heat	to electrical energy. d) photon
	6)	instrument will resp	oond.	ge in the measured c) Resolution	variable to which as d) Error
	7)	Accuracy is expres a) relative accuracy c) error		b) % accuracy d) % error	

8)	Strain gauge is an e	example of a	transduc	er.	
	a) passive	b) active	c) thermal	d) conductive	
9)	The resistance of a	conductor change	es when its	is changed.	
	a) humidity	b) linearity	c) conductivity	d) temperature	
10)	The metal mostly u				
	a) copper	b) iron	c) platinum	d) silver	
11)	Motion artefact is re	duced to a negligib	ole magnitude by	abrasion.	
	a) skin	b) electrode	c) read	d) wire	
12)	2) The micro electrodes have very impedance as compared				
	conventional electr	odes used for red	cording physiologic	al signals.	
	a) low	b) moderate	c) high	d) stable	
13)	Optical fibers are in	nmune to	interference.		
	a) electromagnetic	C	b) a.c.		
	c) d.c.		d) noise		
14)	The biosensor relies	s upon	_ that recognize an	d catalyze reactions	
	of glucose.				
	a) blood	b) gas	c) CSF	d) enzymes	



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 TRANSDUCERS IN BIOMEDICAL INSTRUMENTATION

Day and Date: Tuesday, 16-5-2017

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 four questions :

 $(4 \times 4 = 16)$

Marks: 56

- 1) What is thermistor? How thermistors are classified on the basis of temperature resistance characteristics?
- 2) What is motion artefact? How it is minimized?
- 3) Draw and explain electrode skin interface.
- 4) Explain working of bonded strain gauges with neat diagram.
- 5) Differentiate between active and passive transducer.

3. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain the construction and working of LVDT.
- 2) Mention types of biopotential electrodes. Explain any 2 biopotential electrodes.
- 3) Which are the different laws that govern the working of a thermocouple?

SECTION - II

4. Attempt any four questions :

 $(4 \times 4 = 16)$

- 1) Differentiate between amperometric and potentiometric sensors.
- 2) What is pH of a solution? Classify the solution on basis of pH values.
- 3) What are the applications of ISFET in medicine?
- 4) Define biosensor and immunosensor with example.
- 5) Mention any 4 applications of radiation sensor.

5. Attempt any two questions:

 $(2 \times 6 = 12)$

- 1) Explain working of enzyme sensor with neat figure.
- 2) Explain working of fiber optics along with its one application
- 3) Explain the construction and working of PO₂ electrode in detail.

Set S

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c) Both a) and b)

SLR-VB - 354

	1	
Seat	Set	P
No.		

S.E. (Biomedical Enga.) (Part – II) (CGPA) Examination, 2017.

`	OSTHETIC AND ORTHOTICS
Day and Date: Thursday, 18-5-2017	Total Marks: 70
Time: 10.00 a.m. to 1.00 p.m.	
in Answer E 2) Answer MC	compulsory. It should be solved in first 30 minutes Book Page No. 3. Each question carries one mark. CQ/Objective type questions on Page No. 3 only. Et to mention, Q.P. Set (P/Q/R/S) on Top of Page.
	jective Type Questions
Duration: 30 Minutes	Marks : 14
I. Choose the correct answer:	(14×1=14)
1) Which type of lever is most e	effective in sport movements?
a) Third class	b) Second class
c) First class	d) None of the above
2) Bending forward of the trunk	is an example of movement in the
a) Frontal plane	b) Transverse plane
c) Sagittal plane	d) Longitudinal axis
3) In which type of lever, the we	eight is in between force and fulcrum?
a) Type I b) Type	II c) Type III d) All the above
4) Which of the following is respond of the following is respond to the following is responded to the following is responde	ponsible for limiting the range of movements of
a) Tendons	b) Ligaments
c) Both a) and b)	d) Muscle fibers
5) Which of the following is a ba	all and socket joint ?
a) Hip joint	b) Shoulder joint
c) Both a) and b)	d) None of the above
6) Flexion at elbow in brought a	bout by
a) Biceps	b) Triceps

d) None of the above

7)	At touch down in walking, the knee is normally							
	a)	fully extended			b)	slightly flexed		
	c)	fully flexed			d)	slightly extende	ed	
8)	The center-of-gravity of a limb segn				nt			
	a)	is always locate	d a	t the mid-point	of t	he segment		
	b)	is the point at wl	nich	n the mass of th	ne s	egment is equa	lly c	distributed
	c)	at one end of the	se	gment				
	d)	remains constar	nt fr	om segment to	se	gment		
9)	Ch	ange in velocity/	cha	ange in time is				
	a)	Speed	b)	Acceleration	c)	Momentum	d)	Inertia
10)	Un	it of strain is						
	a)	Newton	b)	Kg	c)	Nm	d)	Unit less
11)	A	clot formation in I	olo	od vessels is al	so	called		
	a)	Diffusion	b)	Drift	c)	Coagulation	d)	Hydrolysis
12)	Ne	ewton's second la	lW i	s also known a	S			
	a)	Momentum			b)	Inertia		
	c)	Law of gravitation	n		d)	Friction		
13)	In (eccentric contrac	ctio	n of muscles				
	a)	muscle length sl	nor	tens	b)	muscle length in	ncre	eases
	c)	muscle length re	ema	ains same	d)	none		
14)	Fo	rces lying on the	saı	me plane are				
	a)	Coplanar			b)	Non-coplanar		
	c)	Concurrent			d)	Non-concurrent	İ	



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date: Thursday, 18-5-2017 Marks: 56

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

SECTION-I

II. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain working of foot switches.
- 2) Explain the working and application of VICON.
- 3) Classify the force system with appropriate examples.
- 4) Explain SACH foot.
- 5) What do you understand by double stance in Gait cycle?

III. Attempt any two:

 $(2\times6=12)$

- 1) Explain three point pressure system and its application for the design of different orthosis.
- 2) Explain normal gait cycle with neat diagram. Explain each stage with its fictional application.
- 3) Explain elbow joint. Give any example in detail.

SECTION - II

IV. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is single axis foot?
- 2) What do you mean by spinal orthosis?
- 3) Write a short note on stress strain curve.
- 4) Draw and explain synovial joint in detail and list the different types of synovial joints.
- 5) Explain shoulder prosthesis using suitable diagram.



V. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the biomechanical properties of bone under various loading effect:
 - i) Compression
 - ii) Tension
 - iii) Shear
 - iv) Torsion
 - v) Combined loading.
- 2) Explain patient rehabilitation concept and how it helps the patient.
- 3) Explain the lever system in detain with neat diagram and examples.

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Seat	Set	Q
No.		

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 **BIOMEDICAL PROSTHETIC AND ORTHOTICS**

Day and Date: Thursday, 18-5-2017 Total Marks: 70

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

a) muscle length shortens

c) muscle length remains same

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 only

b) muscle length increases

d) none

	,	-	• • •	R/S) on Top of Page.
Duroti	on : 30 Minutes	MCQ/Objective T	ype Questions	Marks : 14
	noose the correct ans			(14×1=14)
1)	The center-of-grav	rity of a limb segme	ent	
	a) is always locate	ed at the mid-point	of the segment	
	b) is the point at w	hich the mass of t	he segment is equa	ally distributed
	c) at one end of the	e segment		
	d) remains consta	nt from segment to	segment	
2)	Change in velocity/	/change in time is		
	a) Speed	b) Acceleration	c) Momentum	d) Inertia
3)	Unit of strain is			
	a) Newton	b) Kg	c) Nm	d) Unit less
4)	A clot formation in	blood vessels is a	lso called	
	a) Diffusion	b) Drift	c) Coagulation	d) Hydrolysis
5)	Newton's second la	aw is also known a	as	
	a) Momentum		b) Inertia	
	c) Law of gravitation	on	d) Friction	
6)	In eccentric contra	ction of muscles		



7)	Forces lying on the same plane are						
	a) Coplanar			b) Non-coplanar			
	c) Concurrent		d)	Non-concurrent	İ		
8)	Which type of leve	r is most effective i	in s	port movements	s ?		
	a) Third class		b)	Second class			
	c) First class		d)	None of the abo	ove		
9)	Bending forward of	the trunk is an exa	amp	ole of movement	in the		
	a) Frontal plane		b)	Transverse plai	ne		
	c) Sagittal plane		d)	Longitudinal ax	is		
10)	In which type of lev	ver, the weight is in	be	tween force and	l fulcrum 🤅	?	
	a) Type I	b) Type II	c)	Type III	d) All the	above	
11)	Which of the follow joint?	ring is responsible	for	limiting the rang	e of move	ements of	
	a) Tendons		b)	Ligaments			
	c) Both a) and b)		d)	Muscle fibers			
12)	Which of the follow	ing is a ball and so	ock	et joint?			
	a) Hip joint		b)	Shoulder joint			
	c) Both a) and b)		d)	None of the abo	ove		
13)	Flexion at elbow in	brought about by					
	a) Biceps		b)	Triceps			
	c) Both a) and b)		d)	None of the abo	ove		
14)	At touch down in w	alking, the knee is	no	rmally			
	a) fully extended		b)	slightly flexed			
	c) fully flexed		d)	slightly extende	ed		



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date: Thursday, 18-5-2017 Marks: 56

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

SECTION-I

II. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain working of foot switches.
- 2) Explain the working and application of VICON.
- 3) Classify the force system with appropriate examples.
- 4) Explain SACH foot.
- 5) What do you understand by double stance in Gait cycle?

III. Attempt any two:

 $(2\times6=12)$

- 1) Explain three point pressure system and its application for the design of different orthosis.
- 2) Explain normal gait cycle with neat diagram. Explain each stage with its fictional application.
- 3) Explain elbow joint. Give any example in detail.

SECTION - II

IV. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is single axis foot?
- 2) What do you mean by spinal orthosis?
- 3) Write a short note on stress strain curve.
- 4) Draw and explain synovial joint in detail and list the different types of synovial joints.
- 5) Explain shoulder prosthesis using suitable diagram.



V. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the biomechanical properties of bone under various loading effect:
 - i) Compression
 - ii) Tension
 - iii) Shear
 - iv) Torsion
 - v) Combined loading.
- 2) Explain patient rehabilitation concept and how it helps the patient.
- 3) Explain the lever system in detain with neat diagram and examples.

Seat No.	Set	R
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S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 **BIOMEDICAL PROSTHETIC AND ORTHOTICS**

Day and Date: Thursday, 18-5-2017 Total Marks: 70

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

2) Answer MCQ/C	oulsory. It should be solved in fir Page No. 3. Each question can Objective type questions on Pa mention, Q.P. Set (P/Q/R/S) on	ries one mark. ge No. 3 only.
MCQ/Object	ive Type Questions	
Duration : 30 Minutes		Marks: 14
I. Choose the correct answer:		(14×1=14)
1) Which of the following is a ball a	nd socket joint ?	
a) Hip joint	b) Shoulder joint	
c) Both a) and b)	d) None of the above	
2) Flexion at elbow in brought abou	t by	
a) Biceps	b) Triceps	
c) Both a) and b)	d) None of the above	
3) At touch down in walking, the known	ee is normally	
a) fully extended	b) slightly flexed	
c) fully flexed	d) slightly extended	
4) The center-of-gravity of a limb se	egment	
a) is always located at the mid-r	onint of the seament	

- a) is always located at the mid-point of the segment
- b) is the point at which the mass of the segment is equally distributed
- c) at one end of the segment
- d) remains constant from segment to segment
- 5) Change in velocity/change in time is
 - a) Speed b) Acceleration c) Momentum d) Inertia



6)	Unit of strain is					
	a) Newton	b) Kg	c)	Nm	d)	Unit less
7)	A clot formation in	blood vessels is al	so	called		
	a) Diffusion	b) Drift	c)	Coagulation	d)	Hydrolysis
8)	Newton's second la	aw is also known a	s			
	a) Momentum		b)	Inertia		
	c) Law of gravitation	on	d)	Friction		
9)	In eccentric contra	ction of muscles				
	a) muscle length s	hortens	b)	muscle length in	ncre	eases
	c) muscle length re	emains same	d)	none		
10)	Forces lying on the	same plane are				
	a) Coplanar		b)	Non-coplanar		
	c) Concurrent		d)	Non-concurrent		
11)	Which type of leve	r is most effective	in s	port movements	3?	
	a) Third class		b)	Second class		
	c) First class		d)	None of the abo	ve	
12)	Bending forward of	the trunk is an exa	amp	ole of movement	int	the
	a) Frontal plane		b)	Transverse plan	ne	
	c) Sagittal plane		d)	Longitudinal axi	S	
13)	In which type of lev	er, the weight is in	be	tween force and	lful	crum?
	a) Type I	b) Type II	c)	Type III	d)	All the above
14)	Which of the follow joint?	ring is responsible	for	limiting the rang	e o	f movements of
	a) Tendons		b)	Ligaments		
	c) Both a) and b)		d)	Muscle fibers		



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date: Thursday, 18-5-2017 Marks: 56

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

SECTION - I

II. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain working of foot switches.
- 2) Explain the working and application of VICON.
- 3) Classify the force system with appropriate examples.
- 4) Explain SACH foot.
- 5) What do you understand by double stance in Gait cycle?

III. Attempt any two:

 $(2\times6=12)$

- 1) Explain three point pressure system and its application for the design of different orthosis.
- 2) Explain normal gait cycle with neat diagram. Explain each stage with its fictional application.
- 3) Explain elbow joint. Give any example in detail.

SECTION - II

IV. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is single axis foot?
- 2) What do you mean by spinal orthosis?
- 3) Write a short note on stress strain curve.
- 4) Draw and explain synovial joint in detail and list the different types of synovial joints.
- 5) Explain shoulder prosthesis using suitable diagram.



V. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the biomechanical properties of bone under various loading effect:
 - i) Compression
 - ii) Tension
 - iii) Shear
 - iv) Torsion
 - v) Combined loading.
- 2) Explain patient rehabilitation concept and how it helps the patient.
- 3) Explain the lever system in detain with neat diagram and examples.

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c) First class

S.E. (Biomedical Enga.) (Part – II) (CGPA) Examination, 2017.

BIOMEDICAL PROSTH	, , ,	
Day and Date : Thursday, 18-5-2017 Time : 10.00 a.m. to 1.00 p.m.		Total Marks : 70
Instructions: 1) Q. No. 1 is compute in Answer Book Pa 2) Answer MCQ/Obje	age No. 3. Each que ective type questi d	olved in first 30 minutes estion carries one mark. ons on Page No. 3 only. (Q/R/S) on Top of Page.
MCQ/Objective Duration: 30 Minutes	Type Questions	Marks : 14
I. Choose the correct answer :1) Unit of strain is		(14×1=14)
a) Newton b) Kg	c) Nm	d) Unit less
2) A clot formation in blood vessels is	also called	
a) Diffusion b) Drift	c) Coagulation	d) Hydrolysis
3) Newton's second law is also known	n as	
a) Momentum	b) Inertia	
c) Law of gravitation	d) Friction	
4) In eccentric contraction of muscles	i	
a) muscle length shortens	b) muscle lenç	gth increases
c) muscle length remains same	d) none	
5) Forces lying on the same plane are	•	
a) Coplanar	b) Non-coplan	ar
c) Concurrent	d) Non-concur	rent
6) Which type of lever is most effective	e in sport movem	ents?
a) Third class	b) Second clas	SS

d) None of the above

-2-



7)	Bending forward of the trunk is an example of movement in the					
	a) Frontal plane		b)	Transverse plai	ne	
	c) Sagittal plane		d)	Longitudinal ax	is	
8)	In which type of lev	er, the weight is in	be	tween force and	l ful	crum ?
	a) Type I	b) Type II	c)	Type III	d)	All the above
9)	Which of the following joint?	ng is responsible	for	limiting the rang	ie o	f movements of
	a) Tendons		b)	Ligaments		
	c) Both a) and b)		d)	Muscle fibers		
10)	Which of the follow	ng is a ball and so	ck	et joint?		
	a) Hip joint		b)	Shoulder joint		
	c) Both a) and b)		d)	None of the abo	ove	
11)	Flexion at elbow in I	orought about by				
	a) Biceps		,	Triceps		
	c) Both a) and b)		d)	None of the abo	ove	
12)	At touch down in wa	alking, the knee is	noı	mally		
	a) fully extended		b)	slightly flexed		
	c) fully flexed		d)	slightly extende) d	
13)	The center-of-gravi	ty of a limb segme	nt			
	a) is always located	d at the mid-point	of t	ne segment		
	b) is the point at wh	nich the mass of th	ie s	egment is equa	lly c	distributed
	c) at one end of the	esegment				
	d) remains constar	nt from segment to	se	gment		
14)	Change in velocity/	change in time is				
	a) Speed	b) Acceleration	c)	Momentum	d)	Inertia



Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 BIOMEDICAL PROSTHETIC AND ORTHOTICS

Day and Date: Thursday, 18-5-2017 Marks: 56

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

SECTION-I

II. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Draw and explain working of foot switches.
- 2) Explain the working and application of VICON.
- 3) Classify the force system with appropriate examples.
- 4) Explain SACH foot.
- 5) What do you understand by double stance in Gait cycle?

III. Attempt any two:

 $(2\times6=12)$

- 1) Explain three point pressure system and its application for the design of different orthosis.
- 2) Explain normal gait cycle with neat diagram. Explain each stage with its fictional application.
- 3) Explain elbow joint. Give any example in detail.

SECTION - II

IV. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is single axis foot?
- 2) What do you mean by spinal orthosis?
- 3) Write a short note on stress strain curve.
- 4) Draw and explain synovial joint in detail and list the different types of synovial joints.
- 5) Explain shoulder prosthesis using suitable diagram.



V. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the biomechanical properties of bone under various loading effect:
 - i) Compression
 - ii) Tension
 - iii) Shear
 - iv) Torsion
 - v) Combined loading.
- 2) Explain patient rehabilitation concept and how it helps the patient.
- 3) Explain the lever system in detain with neat diagram and examples.

Seat	Set	D
No.	361	•

S.E. (CGPA) (Biomedical Engg.) (Part — II) Examination, 2017 ELECTRONIC INSTRUMENTATION

Day and Date: Saturday, 20-5-2017 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

		WOW/ODJCCHVC I	ypc	, Questions		
Duratio	n : 30 Minutes				Marks:	14
1. Ch	oose the correct an	swer:			(1×14=1	4)
1)	is th changes in the mea		lay	in the response	e of an instrument to	
	a) Lag	b) Error	c)	Fidelity	d) Density	
2)	Precision is defined a) Repeatability c) Accuracy	d as	b)	Uncertainty Reliability		
3)	Complex waveform a) peak responding c) FET		b)	easured with ar average rms	nvoltmeter.	
4)	The input impedance a) low				as possible. d) stable	
5)	The DVM displays a) continuous	_				
6)	Digital phase mete a) 4	-		-	d) 5	

7)	Gross errors occurs due to		_
	a) human error	b)	instrumental error
	c) environmental error	d)	random error
8)	The amplitude read on CRO set of 1V value of amplitude in V is		
	a) 1.5 V b) 5 V	c)	1 V d) 0.15 V
9)	A dual beam CRO uses		
	a) electronic switch	b)	two electron guns
	c) one electron gun	d)	digital switch
10)	A function generator produces differen	nt w	vaveforms of adjustable
	a) wavelength	b)	resistors
	c) frequency	d)	density
11)	The signal generator is called		
	a) Oscillator	b)	Amplifier
	c) Comparator	d)	Diode shaping circuit
12)	The multichannel DAS has a single A/I) co	onverter preceded by a
	a) demultiplexer	b)	amplifier
	c) multiplexer	d)	filter
13)	Post deflection acceleration is used to		
	a) enhance the intensity of the beam		
	b) focus the beam		
	c) repel the electron beam		
	d) increase the velocity of electron be	ean	n
14)	is the comparison of	sp	ecific values of the input and output
	of an instrument with a corresponding	ref	ference standard.
	a) Reliability	b)	Calibration
	c) Span	d)	Accuracy



Seat	
No.	

S.E. (CGPA) (Biomedical Engg.) (Part — II) Examination, 2017 ELECTRONIC INSTRUMENTATION

Day and Date: Saturday, 20-5-2017 Marks: 56

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

SECTION - I

2. Attempt any four of the following:

 $(4 \times 4 = 16)$

- 1) Explain working of FET voltmeter with necessary diagram.
- 2) State the necessary specifications of standard digital voltmeter.
- 3) Explain response of system for following inputs:
 - a) Ramp input
- b) Step input.
- 4) Draw and explain function of generalized measurement system.
- 5) Define various dynamic characterisation of an instrument.

3. Attempt any two question:

 $(6 \times 2 = 12)$

- 1) Define sensitivity of a multimeter and explain operation of simple multimeter.
- 2) Explain working of successive approximation type digital voltmeter.
- 3) Explain working of peak reading and rms reading of electronic voltmeter.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain working of LCD display system.
- 2) Mention the requirement of laboratory type signal generation.
- 3) Explain working of data acquisition system.
- 4) State the function of an attenuator in CRO.
- 5) Explain working of digital storage oscilloscope.

5. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the following terms related to CRO:
 - a) Focus and intensity control
- b) Alt and chop mode.
- 2) Draw and explain function of function generation.
- 3) Explain Lissajous patterns and their applications.

Set P

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S.E. (CGPA) (Biomedical Engg. ELECTRONIC INS	
Day and Date : Saturday, 20-5-2017 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks : 70
in Answer Book Pa 2) Answer MCQ/Obje	sory. It should be solved in first 30 minutes ge No. 3. Each question carries one mark. ective type questions on Page No. 3 only. Intion, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective	Type Questions
Duration: 30 Minutes	Marks: 14
1. Choose the correct answer:	(1×14=14)
1) The amplitude read on CRO set of 1 The value of amplitude in V is a) 1.5 V b) 5 V 2) A death are CRO and a set of 1	
2) A dual beam CRO usesa) electronic switchc) one electron gun	b) two electron gunsd) digital switch
3) A function generator produces different a) wavelength c) frequency 4) The signal generator is called.	b) resistors d) density
4) The signal generator is calleda) Oscillatorc) Comparator	b) Amplifier d) Diode shaping circuit
5) The multichannel DAS has a single Aa) demultiplexerc) multiplexer	/D converter preceded by a b) amplifier d) filter

6)			eleration is used to ensity of the beam					
	•	b) focus the beam						
	•	c) repel the electron beam						
	d)	increase the vel	ocity of electron be	ean	n			
7)		is	the comparison of	sp	ecific values of t	he i	nput and output	
	of a	an instrument wit	th a corresponding	ref	erence standar	d.		
	a)	Reliability		b)	Calibration			
	c)	Span		d)	Accuracy			
8)		is the	e retardation or de	lay	in the response	of a	an instrument to	
	ch	anges in the mea	sured variable.					
	a)	Lag	b) Error	c)	Fidelity	d)	Density	
9)	Pre	ecision is defined	as					
	a)	Repeatability		b)	Uncertainty			
	c)	Accuracy		d)	Reliability			
10)	Со	mplex waveform	are most accuratel	y m	easured with an		voltmeter.	
	a)	peak responding	J	b)	average			
	c)	FET		d)	rms			
11)	Th	e input impedanc	e of the voltmeter s	hοι	ıld be as		as possible.	
·		low	b) medium				-	
12)	Th	e DVM displays a	ac and dc voltages	as		nur	nbers.	
	a)	continuous	b) discrete	c)	logical	d)	digit	
13)	Diç	gital phase meter	employs		flip flops.			
	a)	4	b) 2	c)	1	d)	5	
14)	Gr	oss errors occurs	s due to					
	a)	human error		b)	instrumental er	ror		
	c)	environmental e	rror	d)	random error			



Seat	
No.	

S.E. (CGPA) (Biomedical Engg.) (Part — II) Examination, 2017 ELECTRONIC INSTRUMENTATION

Day and Date: Saturday, 20-5-2017 Marks: 56

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

SECTION - I

2. Attempt any four of the following:

 $(4 \times 4 = 16)$

- 1) Explain working of FET voltmeter with necessary diagram.
- 2) State the necessary specifications of standard digital voltmeter.
- 3) Explain response of system for following inputs:
 - a) Ramp input
- b) Step input.
- 4) Draw and explain function of generalized measurement system.
- 5) Define various dynamic characterisation of an instrument.

3. Attempt any two question:

 $(6 \times 2 = 12)$

- 1) Define sensitivity of a multimeter and explain operation of simple multimeter.
- 2) Explain working of successive approximation type digital voltmeter.
- 3) Explain working of peak reading and rms reading of electronic voltmeter.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain working of LCD display system.
- 2) Mention the requirement of laboratory type signal generation.
- 3) Explain working of data acquisition system.
- 4) State the function of an attenuator in CRO.
- 5) Explain working of digital storage oscilloscope.

5. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the following terms related to CRO:
 - a) Focus and intensity control
- b) Alt and chop mode.
- 2) Draw and explain function of function generation.
- 3) Explain Lissajous patterns and their applications.

Set Q

Seat		D
ì	Set	R
No.		

	S.E. (CGPA) (Bio EL	omedical Engg. ECTRONIC INS		-		ation, 2	2017
•	Day and Date : Saturday, 20-5-2017 Max. Marks : 70 Time : 10.00 a.m. to 1.00 p.m.						
	2) A	Q. No. 1 is compuls n Answer Book Pa Answer MCQ/Obje Don't forget to me	ge \ ectiv	lo. 3. Each ques e type questio l	stion 1 s o i	n carries o n Page N	one mark. lo. 3 only.
		MCQ/Objective	Туре	Questions			
Duration	on : 30 Minutes						Marks: 14
Choose the correct answer :					(1×14=14)		
1)	The DVM displays	ac and dc voltage	s as		nur	nbers.	
·	a) continuous	b) discrete				digit	
2)	Digital phase mete	er employs		flip flops.			
·	a) 4	b) 2			d)	5	
3)	Gross errors occui	rs due to					
	a) human error		b)	instrumental e	rror		
	c) environmental	error	d)	random error			
4)	The amplitude rea		V/di	v is 1.5 cm on t	he v	ertical ax	ris. The
	a) 1.5 V	b) 5 V	c)	1 V	d)	0.15 V	
5)	A dual beam CRO	uses					
	a) electronic switch	ch	b)	two electron g	uns		
	c) one electron gu	n	d)	digital switch			
6)	A function generat	or produces differe	ent v	vaveforms of ad	ljusta	able	
	a) wavelength		b)	resistors			
	c) frequency		d)	density			

-2-



a) demultiplexer b) amplifier c) multiplexer d) filter 9) Post deflection acceleration is used to	
c) multiplexer d) filter 9) Post deflection acceleration is used to a) enhance the intensity of the beam b) focus the beam c) repel the electron beam d) increase the velocity of electron beam 10) is the comparison of specific values of the input an of an instrument with a corresponding reference standard. a) Reliability b) Calibration c) Span d) Accuracy 11) is the retardation or delay in the response of an instruction changes in the measured variable. a) Lag b) Error c) Fidelity d) Density 12) Precision is defined as a) Repeatability b) Uncertainty c) Accuracy d) Reliability	Loutnut
9) Post deflection acceleration is used to a) enhance the intensity of the beam b) focus the beam c) repel the electron beam d) increase the velocity of electron beam 10) is the comparison of specific values of the input an of an instrument with a corresponding reference standard. a) Reliability b) Calibration c) Span d) Accuracy 11) is the retardation or delay in the response of an instruction changes in the measured variable. a) Lag b) Error c) Fidelity d) Density 12) Precision is defined as a) Repeatability b) Uncertainty c) Accuracy d) Reliability	Loutnut
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c) Span d) Accuracy 11) is the retardation or delay in the response of an instruction of the measured variable. a) Lag b) Error c) Fidelity d) Density 12) Precision is defined as a) Repeatability b) Uncertainty c) Accuracy d) Reliability	
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a) Lag b) Error c) Fidelity d) Density 12) Precision is defined as a) Repeatability b) Uncertainty c) Accuracy d) Reliability	ment to
a) Repeatability b) Uncertainty c) Accuracy d) Reliability	
a) Repeatability b) Uncertainty c) Accuracy d) Reliability	
c) Accuracy d) Reliability	
13) Complex waveform are most accurately measured with an	
· · · · · · · · · · · · · · · · · · ·	
a) peak responding b) average	ltmeter.
c) FET d) rms	ltmeter.
14) The input impedance of the voltmeter should be as as ¡	ltmeter.
a) low b) medium c) high d) stable	



Seat	
No.	

S.E. (CGPA) (Biomedical Engg.) (Part — II) Examination, 2017 ELECTRONIC INSTRUMENTATION

Day and Date: Saturday, 20-5-2017 Marks: 56

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

SECTION - I

2. Attempt any four of the following:

 $(4 \times 4 = 16)$

- 1) Explain working of FET voltmeter with necessary diagram.
- 2) State the necessary specifications of standard digital voltmeter.
- 3) Explain response of system for following inputs:
 - a) Ramp input
- b) Step input.
- 4) Draw and explain function of generalized measurement system.
- 5) Define various dynamic characterisation of an instrument.

3. Attempt any two question:

 $(6 \times 2 = 12)$

- 1) Define sensitivity of a multimeter and explain operation of simple multimeter.
- 2) Explain working of successive approximation type digital voltmeter.
- 3) Explain working of peak reading and rms reading of electronic voltmeter.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain working of LCD display system.
- 2) Mention the requirement of laboratory type signal generation.
- 3) Explain working of data acquisition system.
- 4) State the function of an attenuator in CRO.
- 5) Explain working of digital storage oscilloscope.

5. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the following terms related to CRO:
 - a) Focus and intensity control
- b) Alt and chop mode.
- 2) Draw and explain function of function generation.
- 3) Explain Lissajous patterns and their applications.

Set R

11			

Seat	Set	S
No.	Set	3

S.E. (CGPA) (Biomedical Engg.) (Part — II) Examination, 2017 ELECTRONIC INSTRUMENTATION

Day and Date: Saturday, 20-5-2017 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

Durati	on : 30 Minutes			Marks : 14
1. C	hoose the correct answer :			(1×14=14)
1) A function generator produces	different w	aveforms of adjustable	e
	a) wavelength	b)	resistors	
	c) frequency	d)	density	
2) The signal generator is called		_	
	a) Oscillator	b)	Amplifier	
	c) Comparator	d)	Diode shaping circuit	
3) The multichannel DAS has a si	ngle A/D co	onverter preceded by a	
	a) demultiplexer	b)	amplifier	
	c) multiplexer	d)	filter	
4) Post deflection acceleration is	used to		
	a) enhance the intensity of the	e beam		
	b) focus the beam			
	c) repel the electron beam			
	d) increase the velocity of ele	ctron bean	1	

5)	is	the comparison of	sp	ecific values of t	he i	nput and output
	of an instrument with a corresponding reference standard.					
	a) Reliability		b)	Calibration		
	c) Span		d)	Accuracy		
6)	is the	e retardation or de	lay	in the response	of a	an instrument to
	changes in the mea	sured variable.				
	a) Lag	b) Error	c)	Fidelity	d)	Density
7)	Precision is defined	as				
	a) Repeatability			Uncertainty		
	c) Accuracy		d)	Reliability		
8)	Complex waveform	are most accuratel	y m	easured with an		voltmeter.
	a) peak responding	J	b)	average		
	c) FET		d)	rms		
9)	The input impedanc	e of the voltmeter sl	hou	ıld be as		as possible.
	a) low	b) medium	c)	high	d)	stable
10)	The DVM displays	ac and dc voltages	as		nur	nbers.
	a) continuous	b) discrete	c)	logical	d)	digit
11)	Digital phase meter	employs		flip flops.		
	a) 4	b) 2	c)	1	d)	5
12)	Gross errors occurs	s due to				
	a) human error		b)	instrumental er	ror	
	c) environmental e	rror	d)	random error		
13)	The amplitude read	on CRO set of 1V	//di	v is 1.5 cm on th	e v	ertical axis. The
	value of amplitude i	n V is				
	a) 1.5 V	b) 5 V	c)	1 V	d)	0.15 V
14)	A dual beam CRO u	ıses				
	a) electronic switch	า	b)	two electron gu	ns	
	c) one electron gur	1	d)	digital switch		
				· · · · · ·		



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S.E. (CGPA) (Biomedical Engg.) (Part — II) Examination, 2017 ELECTRONIC INSTRUMENTATION

Day and Date: Saturday, 20-5-2017 Marks: 56

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

SECTION - I

2. Attempt any four of the following:

 $(4 \times 4 = 16)$

- 1) Explain working of FET voltmeter with necessary diagram.
- 2) State the necessary specifications of standard digital voltmeter.
- 3) Explain response of system for following inputs:
 - a) Ramp input
- b) Step input.
- 4) Draw and explain function of generalized measurement system.
- 5) Define various dynamic characterisation of an instrument.

3. Attempt any two question:

 $(6 \times 2 = 12)$

- 1) Define sensitivity of a multimeter and explain operation of simple multimeter.
- 2) Explain working of successive approximation type digital voltmeter.
- 3) Explain working of peak reading and rms reading of electronic voltmeter.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain working of LCD display system.
- 2) Mention the requirement of laboratory type signal generation.
- 3) Explain working of data acquisition system.
- 4) State the function of an attenuator in CRO.
- 5) Explain working of digital storage oscilloscope.

5. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the following terms related to CRO:
 - a) Focus and intensity control
- b) Alt and chop mode.
- 2) Draw and explain function of function generation.
- 3) Explain Lissajous patterns and their applications.

Set S

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S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 DIGITAL DESIGNS

Day and Date : Tuesday, 23-5-2017 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

Duratio	on : 30 Minutes	1	Marks : 14
1. Ch	oose the correct answers	:	(14×1=14)
1)	De Morgan's second theo	rem says that NAND gate is replaced by a bu	ıbbled
	a) NOT c) AND	b) OR d) EX-OR	
2)	The AND gate has a high a) High c) Active high	output only when all i/ps are b) Low d) Active low	
3)	The is a visual sum of products solution.	display of the fundamental products needed	d for a
	a) Multiplexerc) Karnaugh map	b) TTL gated) Demultiplexer	
4)	a) Select lines c) Bubble	r is called an active low signal. b) Control lines d) Strobe	
5)	The exclusive OR gate ha	s a high output only when an odd number of i	inputs
	a) High	b) Low	

6)	A flip-flop is a electronic	c circuit that has two stable states.
	a) monostable	b) astable
	c) triggered	d) bistable
7)	A is a group of flip-flops	that can be used to store a binary number.
	a) Register	b) Counter
	c) Multiplexer	d) K-map
8)	The modulus of a	is the total number of status through which
	the counter can progress.	
	a) register	b) flip-flop
	c) counter	d) bits
9)	A read only memory device is used	d to store information.
	a) Permanent	b) Random
	c) Temporary	d) 8 bit
10)	In code, each decimal of	ligit is coded into a 4 bit binary code.
	a) Hexadecimal	b) Octal
	c) Excess-3	d) Binary
11)	A code in which only one bit chang	es between successive numbers is called
	ascode.	
	a) Excess-3	b) ASCII
	c) Parity	d) Gray
12)	Multiplication of 1001 by 1101 =	?
	a) 1110101	b) 1111000
	c) 0111001	d) 1101100
13)	BCD code is code.	
	a) Weighted	b) Unweighted
	c) Parity	d) Random
14)	Equivalent binary number of (736) ₈	₃ =
	a) (110 011 110) ₂	b) (111 011 110) ₂
	c) (101 011 110) ₂	d) (111 111 101) ₂
		

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 DIGITAL DESIGNS

-3-

Day and Date: Tuesday, 23-5-2017 Marks: 56

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

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State and explain De Morgan's theorems.
- 2) Convert the following:
 - a) $(23.6)_{10} = (?)_2$
 - b) $(65535)_{10} = (?)_{16}$
- 3) Explain Hamming code of data correction with an example.
- 4) List various types of shift register and explain any one.
- 5) Draw and explain function of TTL NAND gate.

3. Attempt any two:

- 1) Draw and explain basic logic gates using universal NAND gate.
- 2) List applications of shift registers and explain working of any one of it with necessary diagram.
- 3) Define following characteristics of digital IC's:
 - a) Figure of merit
 - b) Fanout
 - c) Speed of operation.



4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) List technical specification of digital to analog converter and explain any 2 in detail.
- 2) Draw and explain working of half adder and full adder using logic gates.
- 3) Define and differentiate between synchronous and asynchronous counter.
- 4) Explain the working of ALU in detail.
- 5) Perform following operations using 2's complement method:
 - a) 23 48

b) -48-23.

5. Attempt any 2:

- 1) Design divide by -5 ripple counter using flip-flops.
- 2) Draw and explain working of successive approximation A to D converter.
- 3) Explain the working of basic bipolar RAM storage cell with necessary diagram.

No.

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 DIGITAL DESIGNS

Day and Date: Tuesday, 23-5-2017 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

Duratio	on : 30 Minutes	M	arks : 14
1. Ch	oose the correct answers :	(1	4×1=14)
1)	The modulus of a the counter can progress. a) register c) counter	is the total number of status through w b) flip-flop d) bits	hich'
2)	A read only memory device is use a) Permanent c) Temporary	ed to store information. b) Random d) 8 bit	
3)	In code, each decimal a) Hexadecimal c) Excess-3	digit is coded into a 4 bit binary code. b) Octal d) Binary	
4)	A code in which only one bit changes as code. a) Excess-3 c) Parity	ges between successive numbers is ca b) ASCII d) Gray	alled
5)	Multiplication of 1001 by 1101 = a) 1110101 c) 0111001	? b) 1111000 d) 1101100	



6)	BCD code is code.				
	a) Weighted	b) Unweighted			
	c) Parity	d) Random			
7)	Equivalent binary number of $(736)_8 = $?			
	a) (110 011 110) ₂	b) (111 011 110) ₂			
	c) (101 011 110) ₂	d) (111 111 101) ₂			
8)	De Morgan's second theorem says that NAND gate is replaced by a bubblgate.				
	a) NOT	b) OR			
	c) AND	d) EX-OR			
9)	The AND gate has a high output only	when all i/ps are			
	a) High	b) Low			
	c) Active high	d) Active low			
10)	The is a visual display of the fundamental products needed for sum of products solution.				
	a) Multiplexer	b) TTL gate			
	c) Karnaugh map	d) Demultiplexer			
11)	of a multiplexer is called ar	n active low signal.			
	a) Select lines	b) Control lines			
	c) Bubble	d) Strobe			
12)	The exclusive OR gate has a high out is	out only when an odd number of inputs			
	a) High	b) Low			
	c) Zero	d) One			
13)	A flip-flop is a electronic cir	rcuit that has two stable states.			
	a) monostable	b) astable			
	c) triggered	d) bistable			
14)	A is a group of flip-flops that	t can be used to store a binary number.			
	a) Register	b) Counter			
	c) Multiplexer	d) K-map			

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 DIGITAL DESIGNS

Day and Date: Tuesday, 23-5-2017 Marks: 56

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

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State and explain De Morgan's theorems.
- 2) Convert the following:
 - a) $(23.6)_{10} = (?)_2$
 - b) $(65535)_{10} = (?)_{16}$
- 3) Explain Hamming code of data correction with an example.
- 4) List various types of shift register and explain any one.
- 5) Draw and explain function of TTL NAND gate.

3. Attempt any two:

- 1) Draw and explain basic logic gates using universal NAND gate.
- 2) List applications of shift registers and explain working of any one of it with necessary diagram.
- 3) Define following characteristics of digital IC's:
 - a) Figure of merit
 - b) Fanout
 - c) Speed of operation.



4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) List technical specification of digital to analog converter and explain any 2 in detail.
- 2) Draw and explain working of half adder and full adder using logic gates.
- 3) Define and differentiate between synchronous and asynchronous counter.
- 4) Explain the working of ALU in detail.
- 5) Perform following operations using 2's complement method:
 - a) 23 48

b) -48-23.

5. Attempt any 2:

 $(2 \times 6 = 12)$

- 1) Design divide by -5 ripple counter using flip-flops.
- 2) Draw and explain working of successive approximation A to D converter.
- 3) Explain the working of basic bipolar RAM storage cell with necessary diagram.

Seat No.	Set	R
	1	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 DIGITAL DESIGNS

Day and Date: Tuesday, 23-5-2017 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.

		, , ,	
	МС	Q/Objective Type Questions	
Duratio	n : 30 Minutes		Marks : 14
1. Ch	oose the correct answe	rs:	(14×1=14)
1)	is	has a high output only when an odd numbe	er of inputs
	a) Highc) Zero	b) Low d) One	
2)	A flip-flop is aa) monostable c) triggered	_ electronic circuit that has two stable state b) astable d) bistable	es.
3)	A is a groupa) Registerc) Multiplexer	of flip-flops that can be used to store a binar b) Counter d) K-map	y number.
4)	The modulus of a the counter can progre a) register c) counter	is the total number of status thro ss. b) flip-flop d) bits	ugh which
5)	A read only memory de a) Permanent c) Temporary	evice is used to store information b) Random d) 8 bit	l.



6)	In code, each decimal digit	is	coded into a 4 bit binary code.
	a) Hexadecimal	b)	Octal
	c) Excess-3	d)	Binary
7)	A code in which only one bit changes I	oet	ween successive numbers is called
	ascode.		
	a) Excess-3	b)	ASCII
	c) Parity	d)	Gray
8)	Multiplication of 1001 by 1101 =	?	
	a) 1110101	b)	1111000
	c) 0111001	d)	1101100
9)	BCD code is code.		
	a) Weighted	b)	Unweighted
	c) Parity	d)	Random
10)	Equivalent binary number of $(736)_8 = $?
	a) (110 011 110) ₂		(111 011 110) ₂
	c) (101 011 110) ₂	d)	$(111\ 111\ 101)_{2}^{-}$
11)	De Morgan's second theorem says tha	at N	IAND gate is replaced by a bubbled
	a) NOT	h)	OR
	c) AND	,	EX-OR
12)	The AND gate has a high output only	,	
12)	a) High		Low
	c) Active high	•	Active low
13)	The is a visual display of the sum of products solution.	ne f	undamental products needed for a
	a) Multiplexer	b)	TTL gate
	c) Karnaugh map	d)	Demultiplexer
14)	of a multiplexer is called ar	ac	tive low signal.
	a) Select lines	•	Control lines
	c) Bubble	d)	Strobe
			

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 DIGITAL DESIGNS

Day and Date: Tuesday, 23-5-2017 Marks: 56

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

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State and explain De Morgan's theorems.
- 2) Convert the following:
 - a) $(23.6)_{10} = (?)_2$
 - b) $(65535)_{10} = (?)_{16}$
- 3) Explain Hamming code of data correction with an example.
- 4) List various types of shift register and explain any one.
- 5) Draw and explain function of TTL NAND gate.

3. Attempt any two:

- 1) Draw and explain basic logic gates using universal NAND gate.
- 2) List applications of shift registers and explain working of any one of it with necessary diagram.
- 3) Define following characteristics of digital IC's:
 - a) Figure of merit
 - b) Fanout
 - c) Speed of operation.



4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) List technical specification of digital to analog converter and explain any 2 in detail.
- 2) Draw and explain working of half adder and full adder using logic gates.
- 3) Define and differentiate between synchronous and asynchronous counter.
- 4) Explain the working of ALU in detail.
- 5) Perform following operations using 2's complement method:
 - a) 23 48

b) -48-23.

5. Attempt any 2:

- 1) Design divide by -5 ripple counter using flip-flops.
- 2) Draw and explain working of successive approximation A to D converter.
- 3) Explain the working of basic bipolar RAM storage cell with necessary diagram.



Seat No.	Set	S
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S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 **DIGITAL DESIGNS**

Day and Date: Tuesday, 23-5-2017 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 MCO/Objective type questions on Page No. 2 only

, , , , , , , , , , , , , , , , , , ,	ntion, Q.P. Set (P/Q/R/S) on Top	•
MCQ/Objective T	ype Questions	
Duration: 30 Minutes		Marks: 14
1. Choose the correct answers :		(14×1=14)
1) In code, each decimal digi	t is coded into a 4 bit binary cod	le.
a) Hexadecimal	b) Octal	
c) Excess-3	d) Binary	
A code in which only one bit changes as code.	between successive numbers i	s called
a) Excess-3	b) ASCII	
c) Parity	d) Gray	
3) Multiplication of 1001 by 1101 =	?	
a) 1110101	b) 1111000	
c) 0111001	d) 1101100	
4) BCD code is code.		
a) Weighted	b) Unweighted	
c) Parity	d) Random	
5) Equivalent binary number of $(736)_8 = 1$?	
a) (110 011 110) ₂	b) (111 011 110) ₂	
c) (101 011 110) ₂	d) (111 111 101) ₂	
=	-	



6)	De Morgan's second theorem says that NAND gate is replaced by a but gate.			
	a) NOT	b) OR		
	c) AND	d) EX-OR		
7)	The AND gate has a high output only	when all i/ps are		
	a) High	b) Low		
	c) Active high	d) Active low		
8)	The is a visual display of the sum of products solution.	ne fundamental products needed for a		
	a) Multiplexer	b) TTL gate		
	c) Karnaugh map	d) Demultiplexer		
9)	of a multiplexer is called ar	n active low signal.		
	a) Select lines	b) Control lines		
	c) Bubble	d) Strobe		
10)	The exclusive OR gate has a high out is	out only when an odd number of inputs		
	a) High	b) Low		
	c) Zero	d) One		
11)	A flip-flop is a electronic cir	rcuit that has two stable states.		
	a) monostable	b) astable		
	c) triggered	d) bistable		
12)	A is a group of flip-flops that	t can be used to store a binary number.		
	a) Register	b) Counter		
	c) Multiplexer	d) K-map		
13)	The modulus of a is the	ne total number of status through which		
	the counter can progress.			
	a) register	b) flip-flop		
	c) counter	d) bits		
14)	A read only memory device is used to	store information.		
	a) Permanent	b) Random		
	c) Temporary	d) 8 bit		

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 DIGITAL DESIGNS

Day and Date: Tuesday, 23-5-2017 Marks: 56

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

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State and explain De Morgan's theorems.
- 2) Convert the following:
 - a) $(23.6)_{10} = (?)_2$
 - b) $(65535)_{10} = (?)_{16}$
- 3) Explain Hamming code of data correction with an example.
- 4) List various types of shift register and explain any one.
- 5) Draw and explain function of TTL NAND gate.

3. Attempt any two:

- 1) Draw and explain basic logic gates using universal NAND gate.
- 2) List applications of shift registers and explain working of any one of it with necessary diagram.
- 3) Define following characteristics of digital IC's:
 - a) Figure of merit
 - b) Fanout
 - c) Speed of operation.



4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) List technical specification of digital to analog converter and explain any 2 in detail.
- 2) Draw and explain working of half adder and full adder using logic gates.
- 3) Define and differentiate between synchronous and asynchronous counter.
- 4) Explain the working of ALU in detail.
- 5) Perform following operations using 2's complement method:
 - a) 23 48

b) -48-23.

5. Attempt any 2:

- 1) Design divide by -5 ripple counter using flip-flops.
- 2) Draw and explain working of successive approximation A to D converter.
- 3) Explain the working of basic bipolar RAM storage cell with necessary diagram.

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S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – II

Day and Date: Thursday, 25-5-2017 Total Marks: 70

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

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

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

MCQ/Objective Type Questions							
Duration: 30 Minutes Marks: 14							
I. Cł	noose the correct an	swer:		(14×1=14)			
1)	Current mirror is us	sed to th	e cross over distorti	on.			
	a) eliminate	b) filter	c) oscillate	d) none			
2)	2) The feed back in an amplifier reduces the voltage gain.						
	a) positive		b) negative				
	c) partial		d) both a and b				
3)	3) Working of two class amplifier together is push pull.						
	a) A	b) AB	c) C	d) B			
4)	4) The common mode gain of op-amp is						
	a) very high		b) very low				
	c) unity		d) none				
5)	5) An is said to suffer from distortion when its output is different from its input.						
	a) amplifier	b) filter	c) oscillator	d) none			
6)	6) If 2 stages of a cascaded amplifier have decibel gains of 60 and then over all gain is						
	a) 120	b) 1800	c) 2	d) 0.5			



7)	Wein bridge oscilla	tor uses1	feed back.			
	a) negative	b) positive	c) both	d) none		
8)	The average rate temperature is called		ut offset voltage p	per unit change in		
	a) thermal voltage drift		b) slew rate			
	c) noise		d) thermal current	t drift		
9)	First order low pass Butterworth filter uses as RC network for					
	a) Filtering	b) Amplifying	c) Oscillating	d) None		
10)	Square wave generator using op-amp is also called as multivibrato					
	a) Monostable	b) Bistable	c) Astable	d) None		
11)	The op-amp can amplify					
	a) a.c. signals		b) d.c. signals			
	c) both a.c. and d.c. signals		d) neither a.c. nor d.c.			
12)	The output impedance of an ideal op-amp is					
	a) zero	b) 50Ω	c) 100Ω	d) ∞		
13)	If ADM = 3500 and ACM = 0.35, the CMRR is					
	a) 1225	b) 10,000	c) 80 dB	d) both a and c		
14)	Op-amps used as configuration.	p-amps used as high and low pass filters circuit employ				
	a) non inverting		b) comparator			
	c) open loop		d) inverting			

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – II

Day and Date: Thursday, 25-5-2017 Marks: 56

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

SECTION - I

2. Attempt any 4 questions.

 $(4 \times 4 = 16)$

- 1) Differentiate between class A, B, AB amplifier.
- 2) State various advantages and disadvantages of negative feedback on performance of amplifier.
- 3) State and prove Barkhunson's criteria for sustained oscillation.
- 4) Calculate the efficiency of a class B amplifier for a supply voltage of Vcc = 24 V with peak voltage output of

a)
$$V_{L(p)} = 22 V$$

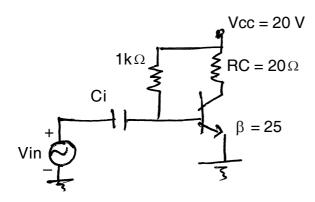
b)
$$V_{L(p)} = 6 \text{ V}$$

5) Explain working of cascade amplifier with necessary diagram.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) Calculate input power, output power and efficiency of the amplifier circuit shown below



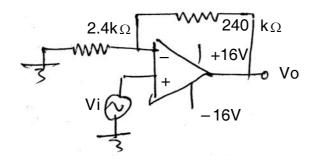


- 2) Write a short note on:
 - a) Series shunt configuration
 - b) Shunt shunt configuration.
- 3) Draw and explain working of wein bridge oscillator and derive expression for frequency of oscillation.

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Differentiate between designing of instrumentation amplifier for ECG and EEG.
- 2) Define and explain virtual ground concept of op-amp.
- 3) Calculate the output voltage for given circuit for an input of 120 μ v.



- 4) Define following terms of op-amp:
 - a) slew rate

b) CMRR

c) input offset current

- d) output offset voltage.
- 5) Draw block diagram of operational amplifier and explain each block in short.
- 5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Derive an expression for summing and averaging amplifier in case of inverting and non inverting amplifier.
- 2) Explain working of integrator and differentiator with necessary circuit and waveform diagram.
- 3) With the help of diagram differentiate between first order low pass and first order high pass Butterworth filter using op-amp.

SLR-VB - 357

Seat	t							Set Q
	,	S.E. (Biomedic ELECTROI			-	(CGPA) Exa (SIS AND D		
-		d Date : Thursday 10.00 a.m. to 1.00						Total Marks : 70
	1	2)	in An: Ans v	swer Book Pa v er MCQ/Obj e	ge No ective	o. 3 . Each ques type question	tion c s on l	first 30 minutes earries one mark. Page No. 3 only. on Top of Page.
Dura	atio	n : 30 Minutes	MC	Q/Objective	Туре	Questions		Marks : 14
1.	Ch	oose the correct a	ınswe	er:				(14×1=14)
	1)	The average rat		•	nput (offset voltage	per	unit change in
		a) thermal voltag	ge drif	t	b)	slew rate		
		c) noise			d)	thermal curre	nt dri	ft
	2)	First order low pa	ass B	utterworth filte	er us	es as RC netw	ork f	or
		a) Filtering	b)	Amplifying	c)	Oscillating	d)	None
	3)	Square wave gen	erato	r using op-am	ıp is a	lso called as _	·	multivibrator.
		a) Monostable	b)	Bistable	c)	Astable	d)	None
	4)	The op-amp can	ampli	fy				
		a) a.c. signals			b)	d.c. signals		
		c) both a.c. and	d.c. s	ignals	d)	neither a.c. no	or d.c).

c) 100Ω

c) 80 dB

d) ∞

d) both a and c

5) The output impedance of an ideal op-amp is

6) If ADM = 3500 and ACM = 0.35, the CMRR is

b) 50Ω

b) 10,000

a) zero

a) 1225



7)	Op-amps used as high and low pass filters circuit employ configuration.					
	a) non inverting		b) comparator			
	c) open loop		d) inverting			
8)	Current mirror is us	sed to the	e cross over distorti	on.		
	a) eliminate	b) filter	c) oscillate	d) none		
9)	Thefeed	d back in an amplifi	ier reduces the volta	age gain.		
	a) positive		b) negative			
	c) partial		d) both a and b			
10)	Working of two class	ss amp	olifier together is pu	sh pull.		
	a) A	b) AB	c) C	d) B		
11)	The common mode	e gain of op-amp is				
	a) very high		b) very low			
	c) unity		d) none			
12)	An is sai its input.	d to suffer from dis	stortion when its out	put is different from		
	a) amplifier	b) filter	c) oscillator	d) none		
13)	If 2 stages of a case gain is	caded amplifier hav	ve decibel gains of (60 and then over all		
	a) 120	b) 1800	c) 2	d) 0.5		
14)	Wein bridge oscilla	tor uses1	feed back.			
	a) negative	b) positive	c) both	d) none		

Seat No.

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – II

Day and Date: Thursday, 25-5-2017 Marks: 56

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

SECTION - I

2. Attempt any 4 questions.

 $(4 \times 4 = 16)$

- 1) Differentiate between class A, B, AB amplifier.
- 2) State various advantages and disadvantages of negative feedback on performance of amplifier.
- 3) State and prove Barkhunson's criteria for sustained oscillation.
- 4) Calculate the efficiency of a class B amplifier for a supply voltage of Vcc = 24 V with peak voltage output of

a)
$$V_{L(p)} = 22 V$$

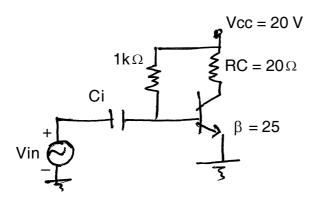
b)
$$V_{L(p)} = 6 \text{ V}$$

5) Explain working of cascade amplifier with necessary diagram.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) Calculate input power, output power and efficiency of the amplifier circuit shown below





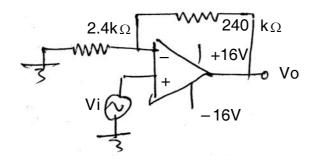
- 2) Write a short note on:
 - a) Series shunt configuration
 - b) Shunt shunt configuration.
- 3) Draw and explain working of wein bridge oscillator and derive expression for frequency of oscillation.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Differentiate between designing of instrumentation amplifier for ECG and EEG.
- 2) Define and explain virtual ground concept of op-amp.
- 3) Calculate the output voltage for given circuit for an input of 120 μ v.



- 4) Define following terms of op-amp:
 - a) slew rate

b) CMRR

c) input offset current

- d) output offset voltage.
- 5) Draw block diagram of operational amplifier and explain each block in short.
- 5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Derive an expression for summing and averaging amplifier in case of inverting and non inverting amplifier.
- 2) Explain working of integrator and differentiator with necessary circuit and waveform diagram.
- 3) With the help of diagram differentiate between first order low pass and first order high pass Butterworth filter using op-amp.

a) Monostable

SLR-VB - 357

Seat	Set	R
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S.E. (Biomedical Enga.) (Part – II) (CGPA) Examination, 2017.

•	NONIC CIRCUIT A	, ,	•
Day and Date : Thurso Time : 10.00 a.m. to 1	•		Total Marks : 70
	in Answer Book Pa 2) Answer MCQ/Obj	age No. 3. Each que l ective type questio l	lved in first 30 minutes stion carries one mark. ns on Page No. 3 only. N/R/S) on Top of Page.
Duration : 30 Minutes	MCQ/Objective	e Type Questions	Marks : 14
I. Choose the corre	ct answer :		(14×1=14)
1) An its input.	is said to suffer from	distortion when its o	output is different from
a) amplifier	b) filter	c) oscillator	d) none
2) If 2 stages of a gain is	a cascaded amplifier l	nave decibel gains o	of 60 and then over all
a) 120	b) 1800	c) 2	d) 0.5
3) Wein bridge o	scillator uses	_feed back.	
a) negative	b) positive	c) both	d) none
 The average temperature is 	•	nput offset voltage	e per unit change in
a) thermal vo	ltage drift	b) slew rate	
c) noise		d) thermal curre	ent drift
5) First order low	v pass Butterworth fil	ter uses as RC net	work for
a) Filtering	b) Amplifying	c) Oscillating	d) None

6) Square wave generator using op-amp is also called as _____ multivibrator.

d) None b) Bistable c) Astable

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SLR-VB - 357

-2-



7)	The op-amp can amplify				
	a) a.c. signals	b) d.c. signals	b) d.c. signals		
	c) both a.c. and d.c. signals	d) neither a.c. no	or d.c.		
8)	The output impedance of an ideal	op-amp is			
	a) zero b) 50Ω	c) 100Ω	d) ∞		
9)	If $ADM = 3500$ and $ACM = 0.35$, t	he CMRR is			
	a) 1225 b) 10,000	c) 80 dB	d) both a and c		
10)	Op-amps used as high and lo configuration.	ow pass filters circu	it employ		
	a) non inverting	b) comparator			
	c) open loop	d) inverting			
11)	Current mirror is used to	the cross over distor	tion.		
	a) eliminate b) filter	c) oscillate	d) none		
12)	The feed back in an am	nplifier reduces the vo	Itage gain.		
	a) positive	b) negative			
	c) partial	d) both a and b			
13)	Working of two class	amplifier together is p	ush pull.		
	a) A b) AB	c) C	d) B		
14)	The common mode gain of op-am	np is			
	a) very high	b) very low			
	c) unity	d) none			

Seat No.

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – II

Day and Date: Thursday, 25-5-2017 Marks: 56

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

SECTION - I

2. Attempt any 4 questions.

 $(4 \times 4 = 16)$

- 1) Differentiate between class A, B, AB amplifier.
- 2) State various advantages and disadvantages of negative feedback on performance of amplifier.
- 3) State and prove Barkhunson's criteria for sustained oscillation.
- 4) Calculate the efficiency of a class B amplifier for a supply voltage of Vcc = 24 V with peak voltage output of

a)
$$V_{L(p)} = 22 V$$

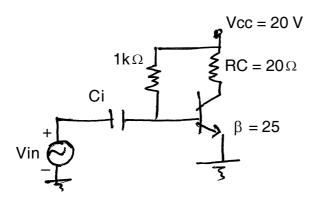
b)
$$V_{L(p)} = 6 \text{ V}$$

5) Explain working of cascade amplifier with necessary diagram.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) Calculate input power, output power and efficiency of the amplifier circuit shown below





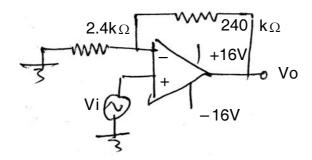
- 2) Write a short note on:
 - a) Series shunt configuration
 - b) Shunt shunt configuration.
- 3) Draw and explain working of wein bridge oscillator and derive expression for frequency of oscillation.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Differentiate between designing of instrumentation amplifier for ECG and EEG.
- 2) Define and explain virtual ground concept of op-amp.
- 3) Calculate the output voltage for given circuit for an input of 120 μ v.



- 4) Define following terms of op-amp:
 - a) slew rate

b) CMRR

c) input offset current

- d) output offset voltage.
- 5) Draw block diagram of operational amplifier and explain each block in short.
- 5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Derive an expression for summing and averaging amplifier in case of inverting and non inverting amplifier.
- 2) Explain working of integrator and differentiator with necessary circuit and waveform diagram.
- 3) With the help of diagram differentiate between first order low pass and first order high pass Butterworth filter using op-amp.

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SLR-VB - 357

Seat	Set	S
No.		

•	ONIC CIRCUIT A	, ,	•	
Day and Date : Thursd Time : 10.00 a.m. to 1			Total Mark	s : 70
	in Answer Book P 2) Answer MCQ/Ob	age No. 3. Each que jective type questic	olved in first 30 minute estion carries one mark ons on Page No. 3 only Q/R/S) on Top of Page	ζ. /.
	MCQ/Objective	e Type Questions		
Duration: 30 Minutes			Marks	s : 14
I. Choose the correct	ct answer :		(14×1	l=14)
1) Square wave g	generator using op-a	mp is also called as	multivibrator	' .
a) Monostable	b) Bistable	c) Astable	d) None	
2) The op-amp ca	an amplify			
a) a.c. signals	3	b) d.c. signals		
c) both a.c. ar	nd d.c. signals	d) neither a.c.	nor d.c.	
The output imp	pedance of an ideal o	op-amp is		
a) zero	b) 50Ω	c) 100Ω	d) ∞	
4) If ADM = 3500	and $ACM = 0.35$, th	ie CMRR is		
a) 1225	b) 10,000	c) 80 dB	d) both a and c	
Op-amps use configuration.	ed as high and lov	w pass filters circ	uit employ	_
a) non invertir	ng	b) comparator		
c) open loop		d) inverting		
6) Current mirror	is used to	the cross over dist	ortion.	

c) oscillate d) none

b) filter

a) eliminate

7)	Thefeed	d back in an amplifi	er reduces the volta	age gain.
	a) positive		b) negative	
	c) partial		d) both a and b	
8)	Working of two class	ssamp	olifier together is pu	sh pull.
	a) A	b) AB	c) C	d) B
9)	The common mode	e gain of op-amp is		
	a) very high		b) very low	
	c) unity		d) none	
10)	An is sai its input.	d to suffer from dis	tortion when its out	tput is different from
	a) amplifier	b) filter	c) oscillator	d) none
11)	If 2 stages of a case gain is	caded amplifier ha	ve decibel gains of	60 and then over all
	a) 120	b) 1800	c) 2	d) 0.5
12)	Wein bridge oscilla	tor usest	feed back.	
	a) negative	b) positive	c) both	d) none
13)	The average rate temperature is called		ut offset voltage	per unit change in
	a) thermal voltage	drift	b) slew rate	
	c) noise		d) thermal curren	t drift
14)	First order low pas	s Butterworth filter	uses as RC netwo	ork for
	a) Filtering	b) Amplifying	c) Oscillating	d) None

Seat	
No.	

S.E. (Biomedical Engg.) (Part – II) (CGPA) Examination, 2017 ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – II

-3-

Day and Date: Thursday, 25-5-2017 Marks: 56

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

SECTION - I

2. Attempt any 4 questions.

 $(4 \times 4 = 16)$

- 1) Differentiate between class A, B, AB amplifier.
- 2) State various advantages and disadvantages of negative feedback on performance of amplifier.
- 3) State and prove Barkhunson's criteria for sustained oscillation.
- 4) Calculate the efficiency of a class B amplifier for a supply voltage of Vcc = 24 V with peak voltage output of

a)
$$V_{L(p)} = 22 \text{ V}$$

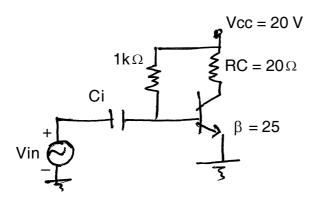
b)
$$V_{L(p)} = 6 \text{ V}$$

5) Explain working of cascade amplifier with necessary diagram.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

1) Calculate input power, output power and efficiency of the amplifier circuit shown below





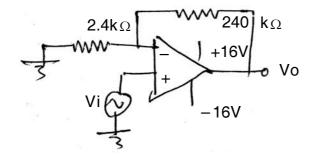
- 2) Write a short note on:
 - a) Series shunt configuration
 - b) Shunt shunt configuration.
- 3) Draw and explain working of wein bridge oscillator and derive expression for frequency of oscillation.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Differentiate between designing of instrumentation amplifier for ECG and EEG.
- 2) Define and explain virtual ground concept of op-amp.
- 3) Calculate the output voltage for given circuit for an input of 120 μ v.



- 4) Define following terms of op-amp:
 - a) slew rate

b) CMRR

c) input offset current

- d) output offset voltage.
- 5) Draw block diagram of operational amplifier and explain each block in short.
- 5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Derive an expression for summing and averaging amplifier in case of inverting and non inverting amplifier.
- 2) Explain working of integrator and differentiator with necessary circuit and waveform diagram.
- 3) With the help of diagram differentiate between first order low pass and first order high pass Butterworth filter using op-amp.

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SLR-VB - 358

Seat No.	Set P

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 **BIOMEDICAL INSTRUMENTATION - I** Day and Date: Thursday, 4-5-2017 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 alternatives: $(14 \times 1 = 14)$ 1) _____ are devices that utilizes prism as diffraction grating. a) Lens b) Monochromatous c) Filter d) Quartz 2) The inert gas is the _____ phase of the chromatograph. a) Mobile b) Real c) Stationary d) Continuous 3) _____ is defined as the movement of a solid phase with respect to a liquid. a) Diffusion b) Drift c) Osmosis d) Electrophoresis 4) The electromagnetic flow meter measures instantaneous flow of blood. a) pulsatile b) pulsed

5) The peak to peak volume changes during a quiet breath is called as

a) absolute volume

b) tidal volume

d) real

c) vital capacity

c) continuous

d) closing of valves



6)	The relationship between log PCO ₂ armmHg. a) 100-900 c) 10-90	b) 50-500 d) 100-150
7)	Dry gas supplied by anaesthesia mac a) saliva c) mucus	hine may cause clinically desiccation of b) bilirubin d) blood
8)	Nebulizers are used to supply moistu a) droplets c) water	ire in the form of b) vapour d) gas
9)	The provides a positive anaesthesia gas into apneic patient.	e force for transporting respiratory and
	a) spirometer	b) oxygenerator
	c) audiometer	d) ventilator
10)	pressure ventilators ope	rate either in mandatory or spontaneous
	a) Negative	b) Positive
	c) Both a) and b)	d) Air
11)	Lung is the ability of the inspiration.	e alveoli and lung tissue to expand on
	a) volume	b) capacity
	c) discharge	d) compliance
12)	volume is the depth of bre respiratory cycle.	athing inspired or expired during each
	a) Tidal	b) Minute
	c) Sigh	d) Lung
13)	An audiometer is a equipment which a) evoked potential	is used for the identification of b) masking
	c) bone conduction	d) hearing loss
14)	,	Il frequencies in audible spectrum at
	a) different	b) same
	c) equal	d) approximate



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – I

Day and Date: Thursday, 4-5-2017 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 schematic diagram and working of calorimeter.
- 2) Draw and explain working of any one type of blood cell counter.
- 3) List various blood flow measurement techniques and explain electromagnetic blood flow meter.
- 4) Define electrophoresis process and discuss its applications in medicine.
- 5) Explain the optical ray diagram of spectrometer and its significance in clinical application.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of complete blood gas analyzer.
- 2) Define pH. Explain in detail the process and application of pH measurement.
- 3) Draw and explain working of impedance plethysmograph in detail.

SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

- 1) Discuss the concept and significance of masking in audiometry.
- 2) Explain the principle of pulse oximeter with necessary diagram.
- 3) Discuss various modes of ventilator in detail.
- 4) Explain the function of spirometer and mention its application.
- 5) Define and differentiate between pure tone and speech audiometry.

5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain working of evoked response audiometry with necessary diagram.
- 2) Explain working of anesthesia machine in detail.
- 3) List various parts of heart lung machine and explain any two of it.

Set P

respiratory cycle.

a) Tidal

c) Sigh

				SLR-VB - 358
Seat No.				Set
T.E			Part – I) (CGPA) E TRUMENTATION	
-	nd Date : Thursday 10.00 a.m. to 1.0			Max. Marks : 70
	·	30 minutes in A carries one mark Answer MCQ/Ob	jective type questior	
Duratio	on : 30 Minutes	MCQ/Objectiv	e Type Questions	Marks : 14
1. Ch	noose the correct	alternatives :		(14×1=14)
1)	Nebulizers are u a) droplets c) water	sed to supply moi	sture in the form of b) vapour d) gas	
2)		provides a pos into apneic patier	tive force for transpor t. b) oxygenerator d) ventilator	ting respiratory and
3)	mode. a) Negative c) Both a) and b		perate either in manda b) Positive d) Air	atory or spontaneous
4)	Lung inspiration. a) volume c) discharge	is the ability of	the alveoli and lung t b) capacity d) compliance	tissue to expand on
5)	volun	na is the denth of I	oreathing inspired or a	expired during each

b) Minute

d) Lung

P.T.O.



6)	An audiometer is a equipment which		
	a) evoked potential	,	masking
	c) bone conduction	u)	hearing loss
7)	White noise is a noise containing aintensities.	ll fr	equencies in audible spectrum at
	a) different	b)	same
	c) equal	d)	approximate
8)	are devices that utilizes	s pr	ism as diffraction grating.
	a) Lens	b)	Monochromatous
	c) Filter	d)	Quartz
9)	The inert gas is the phas	e o	f the chromatograph.
	a) Mobile	b)	Real
	c) Stationary	d)	Continuous
10)	is defined as the move	me	nt of a solid phase with respect to a
	liquid.		
	a) Diffusion	b)	Drift
	c) Osmosis	d)	Electrophoresis
11)	The electromagnetic flow meter meas blood.	ure	s instantaneous flow of
11)	_		s instantaneous flow of pulsed
11)	blood.	b)	
	blood. a) pulsatile	b) d)	pulsed real
12)	blood. a) pulsatile c) continuous	b) d) ırinç	pulsed real g a quiet breath is called as
12)	blood. a) pulsatile c) continuous The peak to peak volume changes du	b) d) irin(b)	pulsed real g a quiet breath is called as
12)	blood. a) pulsatile c) continuous The peak to peak volume changes du a) absolute volume c) vital capacity The relationship between log PCO ₂ are	b) d) ring b) d)	pulsed real g a quiet breath is called as tidal volume closing of valves
12)	blood. a) pulsatile c) continuous The peak to peak volume changes du a) absolute volume c) vital capacity	b) d) rin(b) d) id p	pulsed real g a quiet breath is called as tidal volume closing of valves
12)	blood. a) pulsatile c) continuous The peak to peak volume changes du a) absolute volume c) vital capacity The relationship between log PCO ₂ ar mmHg.	b) d) uring b) d) d) d b)	pulsed real g a quiet breath is called as tidal volume closing of valves H is linear over the range of
12)	blood. a) pulsatile c) continuous The peak to peak volume changes du a) absolute volume c) vital capacity The relationship between log PCO ₂ armmHg. a) 100-900	b) d) ring b) d b) d) nine b)	pulsed real g a quiet breath is called as tidal volume closing of valves H is linear over the range of 50-500 100-150



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – I

Day and Date: Thursday, 4-5-2017 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 schematic diagram and working of calorimeter.
- 2) Draw and explain working of any one type of blood cell counter.
- 3) List various blood flow measurement techniques and explain electromagnetic blood flow meter.
- 4) Define electrophoresis process and discuss its applications in medicine.
- 5) Explain the optical ray diagram of spectrometer and its significance in clinical application.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of complete blood gas analyzer.
- 2) Define pH. Explain in detail the process and application of pH measurement.
- 3) Draw and explain working of impedance plethysmograph in detail.

SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

- 1) Discuss the concept and significance of masking in audiometry.
- 2) Explain the principle of pulse oximeter with necessary diagram.
- 3) Discuss various modes of ventilator in detail.
- 4) Explain the function of spirometer and mention its application.
- 5) Define and differentiate between pure tone and speech audiometry.

5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain working of evoked response audiometry with necessary diagram.
- 2) Explain working of anesthesia machine in detail.
- 3) List various parts of heart lung machine and explain any two of it.

--- Set Q

		SLR-VB - 358
Seat No.		Set R
	Engineering) (Part – I) (CGP OMEDICAL INSTRUMENTATI	=
Day and Date: Thursda Time: 10.00 a.m. to 1.0	•	Max. Marks: 70
	 Q. No. 1 is compulsory. It shapped to a compulsory. It shapped to be shap	ge No. 3. Each question estions on Page No. 3 only.
	MCQ/Objective Type Question	าร
Duration: 30 Minutes		Marks : 14
1. Choose the correct	alternatives:	(14×1=14)
1) The peak to pea a) absolute volunce c) vital capacity	,	me
2) The relationship mmHg.a) 100-900c) 10-90	between log PCO ₂ and pH is linear b) 50-500 d) 100-150	over the range of
 Dry gas supplied saliva 	d by anaesthesia machine may caus b) bilirubin	se clinically desiccation of

c) mucus d) blood

4) Nebulizers are used to supply moisture in the form of

b) vapour

a) droplets

c) water

d) gas

5) The _____ provides a positive force for transporting respiratory and anaesthesia gas into apneic patient.

a) spirometer

b) oxygenerator

c) audiometer

d) ventilator

6))pressure ventilators operate either in mandatory or spontaneous		
	mode.		
	a) Negative	b) Positive	
	c) Both a) and b)	d) Air	
7)	Lung is the ability of the inspiration.	e alveoli and lung tissue to expand on	
	a) volume	b) capacity	
	c) discharge	d) compliance	
8)	volume is the depth of brea respiratory cycle.	athing inspired or expired during each	
	a) Tidal	b) Minute	
	c) Sigh	d) Lung	
9)	An audiometer is a equipment which i	s used for the identification of	
	a) evoked potential	b) masking	
	c) bone conduction	d) hearing loss	
10)	White noise is a noise containing alintensities.	I frequencies in audible spectrum at	
	a) different	b) same	
	c) equal	d) approximate	
11)	are devices that utilizes	s prism as diffraction grating.	
	a) Lens	b) Monochromatous	
	c) Filter	d) Quartz	
12)	The inert gas is the phas		
	a) Mobile	b) Real	
	c) Stationary	d) Continuous	
13)	is defined as the move	ment of a solid phase with respect to a	
	liquid.		
	a) Diffusion	b) Drift	
	c) Osmosis	d) Electrophoresis	
14)	The electromagnetic flow meter meas blood.	ures instantaneous flow of	
	a) pulsatile	b) pulsed	
	c) continuous	d) real	
		Set R	



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – I

Day and Date: Thursday, 4-5-2017 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 schematic diagram and working of calorimeter.
- 2) Draw and explain working of any one type of blood cell counter.
- 3) List various blood flow measurement techniques and explain electromagnetic blood flow meter.
- 4) Define electrophoresis process and discuss its applications in medicine.
- 5) Explain the optical ray diagram of spectrometer and its significance in clinical application.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of complete blood gas analyzer.
- 2) Define pH. Explain in detail the process and application of pH measurement.
- 3) Draw and explain working of impedance plethysmograph in detail.

SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

- 1) Discuss the concept and significance of masking in audiometry.
- 2) Explain the principle of pulse oximeter with necessary diagram.
- 3) Discuss various modes of ventilator in detail.
- 4) Explain the function of spirometer and mention its application.
- 5) Define and differentiate between pure tone and speech audiometry.

5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain working of evoked response audiometry with necessary diagram.
- 2) Explain working of anesthesia machine in detail.
- 3) List various parts of heart lung machine and explain any two of it.

Set R

SLR-VB - 358

Seat No.	Set	S	ļ
T.E. (Biomedica	l Engineering) (Part – I) (CGPA) Examination, 201	17	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – I

Max. Marks: 70 Day and Date: Thursday, 4-5-2017 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 alternatives: $(14 \times 1 = 14)$ 1) _____ pressure ventilators operate either in mandatory or spontaneous mode. a) Negative b) Positive c) Both a) and b) d) Air 2) Lung _____ is the ability of the alveoli and lung tissue to expand on inspiration. a) volume b) capacity c) discharge d) compliance 3) _____ volume is the depth of breathing inspired or expired during each respiratory cycle. a) Tidal b) Minute c) Sigh d) Lung 4) An audiometer is a equipment which is used for the identification of a) evoked potential b) masking c) bone conduction d) hearing loss 5) White noise is a noise containing all frequencies in audible spectrum at intensities. a) different b) same c) equal d) approximate P.T.O.

6)	are devices that utilizes	
	a) Lensc) Filter	b) Monochromatousd) Quartz
٦\	,	,
7)	The inert gas is the phas a) Mobile	e or the chromatograph. b) Real
	c) Stationary	d) Continuous
8)	•	ment of a solid phase with respect to a
	a) Diffusion	b) Drift
	c) Osmosis	d) Electrophoresis
9)	The electromagnetic flow meter meas blood.	ures instantaneous flow of
	a) pulsatile	b) pulsed
	c) continuous	d) real
10)	The peak to peak volume changes du	ring a quiet breath is called as
	a) absolute volume	b) tidal volume
	c) vital capacity	d) closing of valves
11)	The relationship between $\log PCO_2$ arm mHg.	nd pH is linear over the range of
	a) 100-900	b) 50-500
	c) 10-90	d) 100-150
	Dry gas supplied by anaesthesia macl a) saliva c) mucus	nine may cause clinically desiccation of b) bilirubin d) blood
\	,	,
13)	Nebulizers are used to supply moistu a) droplets	re in the form of b) vapour
	c) water	d) gas
14)	The provides a positive anaesthesia gas into apneic patient.	e force for transporting respiratory and
	a) spirometer	b) oxygenerator
	c) audiometer	d) ventilator



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – I

Day and Date: Thursday, 4-5-2017 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 schematic diagram and working of calorimeter.
- 2) Draw and explain working of any one type of blood cell counter.
- 3) List various blood flow measurement techniques and explain electromagnetic blood flow meter.
- 4) Define electrophoresis process and discuss its applications in medicine.
- 5) Explain the optical ray diagram of spectrometer and its significance in clinical application.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of complete blood gas analyzer.
- 2) Define pH. Explain in detail the process and application of pH measurement.
- 3) Draw and explain working of impedance plethysmograph in detail.

SECTION - II

4. Attempt any 4:

 $(4 \times 4 = 16)$

- 1) Discuss the concept and significance of masking in audiometry.
- 2) Explain the principle of pulse oximeter with necessary diagram.
- 3) Discuss various modes of ventilator in detail.
- 4) Explain the function of spirometer and mention its application.
- 5) Define and differentiate between pure tone and speech audiometry.

5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) Explain working of evoked response audiometry with necessary diagram.
- 2) Explain working of anesthesia machine in detail.
- 3) List various parts of heart lung machine and explain any two of it.

Set S

Seat No.	Set	Р
	-	

T.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 **BIOLOGICAL MODELLING AND SIMULATION**

Day and Date: Friday, 5-5-2017		Max. Marks: 70
Time: 10.00 a.m. to 1.00 p.m.		
Instructions: 1) O No	1 is compulsory	It should be solved in first

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 T	ype Questions				
Duratio	n : 30 Minutes	-		Marks: 14			
1. Ch	oose the correct an	swer:		(1×14=14)			
1)	Parkinson's occurr a) Respiratory		related to c) Urinary				
2)	a) Ohm's		s. c) Donnan's	d) Goldman			
3)	a) Ohm's	es drift process. b) Fick's	c) Goldman	d) Donnan's			
4)	a) Models			d) None of the above			
5)	a) Control system c) Stretch reflex	l as a controlling of					
6)	neutralit a) Space charge		of cations and anio c) Drift				
7)	Resting state of ac a) –20 mV	-	s from c) 90 mV	d) -90 mV			
8)	In thermoregulator a) Conduction	•	t resistor represents c) Radiation				
9)	Goldman equation a) Variable fieldc) Constant field	is called as	equation. b) Complex field d) Electric field				

SLR-VE	3 – 359	-2-				
10)	Donnan's equation	is called as		ion e	quation.	
	a) one	b) three	c)	four	d)	two
11)	equati	on defines membra	ane	current.		
	a) Nernst		,	Donnan		
	c) Cable		d)	Goldman		
12)	Saccadic eye mov position to another.	• -		t	hat jump	os from one eye
	a) Slow	b) Linear	c)	Variable	d)	Fast
13)	Smooth pursuit eye	e movements track	s_		_ objects	5.
	a) Moving	b) Stable	c)	Fixed	d)	None of the above
14)	Excited nerve muse a) +20 mV	•				



Seat	
No.	

T.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 BIOLOGICAL MODELLING AND SIMULATION

Day and Date: Friday, 5-5-2017 Marks: 56

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

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Define and differentiate lumped and distributed parameter models.
- 2) Explain Donnan's equation and its importance.
- 3) Define modelling and mention list of steps in modeling.
- 4) Explain concept of compartmental modeling.
- 5) Define and differentiate between Goldman's equation and Nernst equation.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Explain active transport mechanism with neat diagram.
- 2) Asquid Giant axon has following ratio of permeabilities and concentration.

lon	Cytoplasm (mM)	ECF (mM)	Ratio of Permeabilities
Na+	50	440	0.04
K ⁺	400	20	1
CI ⁻	52	560	0.45

Considering KT/q = 25.3 mV. Calculate,

Nernst potential for Na⁺ and K⁺ ion.

3) Draw and explain electrical equivalent model of a biological membrane.

SECTION - II

4. Attempt any four:

- 1) Differentiate between one control and two control mechanism for neuro muscular system.
- 2) Draw and explain drug delivery system.
- 3) Explain insulin glucose feedback system in short.
- 4) Discuss any two industrial applications of thermoregulatory system.
- 5) Define and explain concept of pharmacokinetics.

5. Attempt any two : (6×2=12)

- 1) Explain four types of eye movement and mention names of eye muscles responsible for eye movement.
- 2) Draw and explain thermoregulatory plant model in detail.
- 3) Discuss reciprocal innervation model of neuromuscular system in detail.

 $(4 \times 4 = 16)$

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T.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 BIOLOGICAL MODELLING AND SIMULATION

Day and Date: Friday, 5-5-2017 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.

	D	on't torget to men	ITIOI	n, Q.P. Set (P/Q/	H/S	s) on Top of Page.
Duratio	on : 30 Minutes	MCQ/Objective T	уре	Questions		Marks : 14
Durano	on . So Minutes					Marks . 14
1. Ch	oose the correct an	swer:				(1×14=14)
1)	In thermoregulator a) Conduction	•		•		Insulation
2)	Goldman equation a) Variable field c) Constant field		b)	equation. Complex field Electric field		
3)	Donnan's equation a) one			_		two
4)	a) Nernst c) Cable	on defines membra	b)	current. Donnan Goldman		
5)	Saccadic eye mov position to another. a) Slow					
6)	Smooth pursuit eye	e movements track	s_	obje	cts.	
7)	Excited nerve muse a) +20 mV	•				
8)	Parkinson's occurr a) Respiratory	•			-	



9)	law defines diffusion process.					
	a) Ohm's	b) Fick's	c) Donnan's	d)	Goldman	
10)	law defines drift process.					
	a) Ohm's	b) Fick's	c) Goldman	d)	Donnan's	
11)	ar	e simplified represen	tation of objects.			
	a) Models	b) Drifts	c) Images	d)	None of the above	
12)	is defined as a controlling of load dynamics of muscles.					
	a) Control sy	ystem	b) Drift			
	c) Stretch re	eflex	d) None of the a	d) None of the above		
13)	3) neutrality is representation of cations and anions.					
	a) Space cha	arge b) Diffusion	c) Drift	d)	Reflex	
14)	Resting state of action potential starts from					
	a) $-20 \mathrm{mV}$	b) 35 mV	c) 90 mV	d)	–90 mV	

Set Q



Seat	
No.	

T.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 BIOLOGICAL MODELLING AND SIMULATION

Day and Date: Friday, 5-5-2017 Marks: 56

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

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Define and differentiate lumped and distributed parameter models.
- 2) Explain Donnan's equation and its importance.
- 3) Define modelling and mention list of steps in modeling.
- 4) Explain concept of compartmental modeling.
- 5) Define and differentiate between Goldman's equation and Nernst equation.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Explain active transport mechanism with neat diagram.
- 2) Asquid Giant axon has following ratio of permeabilities and concentration.

lon	Cytoplasm (mM)	ECF (mM)	Ratio of Permeabilities
Na+	50	440	0.04
K ⁺	400	20	1
CI ⁻	52	560	0.45

Considering KT/q = 25.3 mV. Calculate,

Nernst potential for Na⁺ and K⁺ ion.

3) Draw and explain electrical equivalent model of a biological membrane.

SECTION - II

4. Attempt any four: (4×4=16)

- 1) Differentiate between one control and two control mechanism for neuro muscular system.
- 2) Draw and explain drug delivery system.
- 3) Explain insulin glucose feedback system in short.
- 4) Discuss any two industrial applications of thermoregulatory system.
- 5) Define and explain concept of pharmacokinetics.

5. Attempt any two : (6×2=12)

- 1) Explain four types of eye movement and mention names of eye muscles responsible for eye movement.
- 2) Draw and explain thermoregulatory plant model in detail.
- 3) Discuss reciprocal innervation model of neuromuscular system in detail.

position to another.

a) Slow

Seat No.	Set	R

I) (Riomedical Engineering) (CCPA) Evamination 2017

1.0	• • • • • • • • • • • • • • • • • • • •	_	ING AND SIMUL	ATION
	d Date : Friday, 5-5- 10.00 a.m. to 1.00 p			Max. Marks : 70
1	3 c 2) A	0 minutes in Ans arries one mark. .nswer MCQ/Obje	swer Book Page No ective type question	be solved in first o. 3. Each question os on Page No. 3 only. O/R/S) on Top of Page.
		MCQ/Objective	Type Questions	
Duratio	n : 30 Minutes			Marks : 14
1. Ch	oose the correct an	swer:		(1×14=14)
1)	a) Control system c) Stretch reflex	_	of load dynamics of b) Drift d) None of the ab	
2)	neutralit a) Space charge		n of cations and ani c) Drift	
3)	Resting state of aca) –20 mV	•	ts from c) 90 mV	d) -90 mV
4)	In thermoregulator a) Conduction		rt resistor represen c) Radiation	
5)	Goldman equation a) Variable fieldc) Constant field	is called as	equation. b) Complex field d) Electric field	
6)	Donnan's equation a) one	is called as b) three	ion equat c) four	ion. d) two
7)	a) Nernst c) Cable	ion defines memb	rane current. b) Donnan d) Goldman	
8)	Saccadic eye mov	rements are very	that j	umps from one eye

b) Linear c) Variable d) Fast

-2-



9)	Smooth pursuit eye	e movements track	s obje	ects.
·				d) None of the above
10)	Excited nerve mus a) +20 mV	•	ential state reaches c) -90 mV	
11)	Parkinson's occurr a) Respiratory		related to c) Urinary	-
12)	a) Ohm's	•	s. c) Donnan's	d) Goldman
13)	law define	es drift process.	c) Goldman	
14)	are simpa) Models	•	•	d) None of the above



Seat	
No.	

T.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 BIOLOGICAL MODELLING AND SIMULATION

Day and Date: Friday, 5-5-2017 Marks: 56

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

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Define and differentiate lumped and distributed parameter models.
- 2) Explain Donnan's equation and its importance.
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- 4) Explain concept of compartmental modeling.
- 5) Define and differentiate between Goldman's equation and Nernst equation.

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 $(6 \times 2 = 12)$

- 1) Explain active transport mechanism with neat diagram.
- 2) Asquid Giant axon has following ratio of permeabilities and concentration.

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Na+	50	440	0.04
K ⁺	400	20	1
CI ⁻	52	560	0.45

Considering KT/q = 25.3 mV. Calculate,

Nernst potential for Na⁺ and K⁺ ion.

3) Draw and explain electrical equivalent model of a biological membrane.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Differentiate between one control and two control mechanism for neuro muscular system.
- 2) Draw and explain drug delivery system.
- 3) Explain insulin glucose feedback system in short.
- 4) Discuss any two industrial applications of thermoregulatory system.
- 5) Define and explain concept of pharmacokinetics.

5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Explain four types of eye movement and mention names of eye muscles responsible for eye movement.
- 2) Draw and explain thermoregulatory plant model in detail.
- 3) Discuss reciprocal innervation model of neuromuscular system in detail.

Seat No.		Set	S	
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T.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 BIOLOGICAL MODELLING AND SIMULATION

Day and Date: Friday, 5-5-2017 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	on : 30 Minutes			Marks:	14
1. Ch	oose the correct ar	nswer:		(1×14=1	14)
1)	Donnan's equation	n is called as	ion equa	ation.	
	a) one	b) three	c) four	d) two	
2)	equa	tion defines memb	rane current.		
	a) Nernst		b) Donnan		
	c) Cable		d) Goldman		
3)		-	that	jumps from one eye	
	position to another		c) Variable	d) Fact	
4)	Smooth pursuit ey				
	a) Moving	b) Stable	c) Fixed	d) None of the above	'e
5)				es to mV.	
	a) +20 mV	b) +35 mV	c) -90 mV	d) -35 mV	
6)	Parkinson's occur	rence syndrome is	related to	system.	
	a) Respiratory	b) Nervous	c) Urinary	d) Digestive	
7)	law defin	es diffusion proces	SS.		
	a) Ohm's	b) Fick's	c) Donnan's	d) Goldman	
8)	law defin	es drift process.			
•	a) Ohm's	b) Fick's	c) Goldman	d) Donnan's	
9)	are sim				
,			c) Images		/e T. o .

SLR-V	B – 359	-2-			
10)	a) Control system c) Stretch reflex	l as a controlling of	f load dynamics of n b) Drift d) None of the abo		cles.
11)	neutralit a) Space charge	-	of cations and anio c) Drift		Reflex
12)	Resting state of ac a) -20 mV	•		d)	–90 mV
13)	In thermoregulator a) Conduction	•	t resistor represents c) Radiation		Insulation
14)	Goldman equation a) Variable fieldc) Constant field	is called as	equation. b) Complex field d) Electric field		

Set S



Seat	
No.	

T.E. (Part – I) (Biomedical Engineering) (CGPA) Examination, 2017 BIOLOGICAL MODELLING AND SIMULATION

Day and Date: Friday, 5-5-2017 Marks: 56

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

SECTION-I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Define and differentiate lumped and distributed parameter models.
- 2) Explain Donnan's equation and its importance.
- 3) Define modelling and mention list of steps in modeling.
- 4) Explain concept of compartmental modeling.
- 5) Define and differentiate between Goldman's equation and Nernst equation.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Explain active transport mechanism with neat diagram.
- 2) Asquid Giant axon has following ratio of permeabilities and concentration.

lon	Cytoplasm (mM)	ECF (mM)	Ratio of Permeabilities
Na+	50	440	0.04
K ⁺	400	20	1
CI ⁻	52	560	0.45

Considering KT/q = 25.3 mV. Calculate,

Nernst potential for Na⁺ and K⁺ ion.

3) Draw and explain electrical equivalent model of a biological membrane.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Differentiate between one control and two control mechanism for neuro muscular system.
- 2) Draw and explain drug delivery system.
- 3) Explain insulin glucose feedback system in short.
- 4) Discuss any two industrial applications of thermoregulatory system.
- 5) Define and explain concept of pharmacokinetics.

5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Explain four types of eye movement and mention names of eye muscles responsible for eye movement.
- 2) Draw and explain thermoregulatory plant model in detail.
- 3) Discuss reciprocal innervation model of neuromuscular system in detail.

Duration: 30 Minutes

	 _	
Seat No.	Set	Р

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Day and Date: Saturday, 6-5-2017 Total Marks: 70 Time: 10.00 a.m. to 1.00 p.m.

- Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
 - 3) All questions are compulsory.
 - 4) Figures to the right indicate full marks.
 - 5) Make suitable assumptions if necessary and mention them **clearly**.

MCQ/Objective Type Questions

1.	Ch	oose the correct ans	swer:		
	1)	Which of the follow a) Magnetic tape c) Floppy disc	ing is used as a pr	rimary storage devi b) PROM d) None of these	ce
	2)	The communication a) BUS	n line between the b) Line	CPU, memory and c) Media	peripherals d) None of these
	3)	IC74LS373 is a) Latch	b) Buffer	c) Media	d) None of these
	4)	Program counter is a) 8	bit c	of address. c) 4	d) 0

- 5) When referring to instruction words, a mnemonic is
 - a) A short abbreviation for the operand address
 - b) A short abbreviation for the operation to be performed
 - c) A short abbreviation for the data word stored at the operand address
 - d) Shorthand for machine language

Marks: 14



6)	The technique of a computer system is a) memory-mappe c) dedicated I/O	scalled	b)	address to each ported I/O wired I/O	ו ר	O device in the
7)	The interrupt reque a) Data line	est line is b) Control line	c)	Address line	d)	None
8)	The time between (a) Interrupt delay c) Interrupt latency		b)	t and its service Cycle time Switching time	is	
9)	The 8085 microproa) As soon as the tb) By checking the fetchc) By checking the instructiond) By checking the	trap pin becomes 'le trap pin for 'high'	LO' ' sta sta	W' atus at the end tus at the end of	of e	each instruction
10)	To avoid loading dua) latch	ıring read operatio b) flip-flop		he device used i buffer		tristate buffer
11)	In memory-mapped a) distinct I/O devi c) only input device	ces	b)	are viewed as memory locatio only output dev		3
12)	8051 series has ho a) 2	w many 16 bit regi b) 3	ste c)		d)	0
13)	If we push data ont a) Increases with e c) None of the mer	every push	b)	tack pointer. Decreases with Both of the men		
14)	Which hardware trigal Programmable in the control of the control o	nterval timer	b)	after certain pro Interrupt timer None of the me		

Set P



Seat	
No.	

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Day and Date: Saturday, 6-5-2017 Marks: 56

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

Instructions: 1) All questions are compulsory.

- 2) Q. 2 and Q. 4 are short answer type questions.
- 3) Q. 3 and Q. 5 are long answer type questions.
- 4) Neat diagrams must be drawn whenever necessary.
- 5) Figures to the **right** indicate **full** marks.
- 6) Make suitable assumptions if necessary and mention them **clearly**.
- 7) **Use** of log tables and non programmable single memory calculator is **allowed**.

SECTION-I

2.	An	swer any tive of the following questions.	15
	a)	Explain in detail different type of ROM.	3
	b)	Explain in detail flag register (PSW) of 8085.	3
	c)	Discuss the concept of HOLD and WAIT states in microprocessor?	3
	d)	$\label{lem:define} \mbox{Define addressing mode. Discuss different addressing mode with an example.}$	3
	e)	Explain following:	3
		i) LXI ii) LHL address.	
	f)	Write differences between hardware and software interrupts.	3
	g)	Draw the opcode fetch machine cycle.	3
3.	An	swer any three of the following questions:	13
	a)	With a neat diagram explain the architecture of 8085?	5
	b)	Write an assembly language program to arrange array of numbers in	
		descending order.	4
	c)	Explain and draw RIM and SIM instruction format.	4
	d)	With a neat diagram explain interrupt structure of 8085 microprocessor.	4



SECTION-II

4.	An	swer any five of the following questions :	15
	a)	List out all SFRs of MCS 51 and explain TMOD.	3
	b)	Differentiate between memory mapped I/O and I/O mapped I/O.	3
	c)	Compare microcontroller and microprocessor.	3
	d)	Explain following:	3
		i) DA A ii) MUL AB.	
	e)	Explain various type of serial data input output.	3
	f)	Explain the features and operator of I/O port of 8051. Sketch the internal circuit of port 1 and explain its operation.	3
5.	An	swer any three of the following questions:	13
	a)	With a neat diagram explain the architecture of 8051.	4
	b)	List and explain in detail different data transfer techniques.	4
	c)	Interface LED and explain in detail.	4
	d)	How do you differentiate between timer/counter operation in 8051 and also different modes of operator of timer/counter?	5

Seat No. Set

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Day and Date: Saturday, 6-5-2017 Total Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) All questions are compulsory.
- 4) Figures to the right indicate full marks.
- 5) Make suitable assumptions if necessary and mention them **clearly**.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

1)	The time between recieval of an int	errupt and its service i
	a) Interrupt delay	b) Cycle time
	c) Interrupt latency	d) Switching time

- 2) The 8085 microprocessor respond to the presence of an interrupt
 - a) As soon as the trap pin becomes 'LOW'
 - b) By checking the trap pin for 'high' status at the end of each instruction fetch
 - c) By checking the trap pin for 'high' status at the end of execution of each instruction
 - d) By checking the trap pin for 'high' status at regular intervals

3)	To avoid loading du	ıring read operatio	on, the device used	is	
	a) latch	b) flip-flop	c) buffer	d)	tristate buffer

- 4) In memory-mapped scheme, the devices are viewed as
 - a) distinct I/O devicesb) memory locationsc) only input devicesd) only output devices



5)	8051 series has ho a) 2	w many 16 bit regi b) 3	ste c)		d)	0
6)	If we push data ont a) Increases with e c) None of the mer	every push	b)	=		
7)	Which hardware trigal Programmable in Programmable to the control of the control	nterval timer	b)	=		
8)	Which of the follow a) Magnetic tape c) Floppy disc	ing is used as a pr	b)	ary storage device PROM None of these	се	
9)	The communication a) BUS	n line between the (b) Line		U, memory and լ Media		pherals None of these
10)	IC74LS373 is a) Latch	b) Buffer	c)	Media	d)	None of these
11)	Program counter is a) 8	bit o	of a c)		d)	0
12)	2) When referring to instruction words, a mnemonic is a) A short abbreviation for the operand address b) A short abbreviation for the operation to be performed c) A short abbreviation for the data word stored at the operand address d) Shorthand for machine language					
13)	The technique of a computer system is a) memory-mappe c) dedicated I/O	scalled	b)	address to eacl ported I/O wired I/O	ר I/0	O device in the
14)	The interrupt reque a) Data line		c)	Address line	d)	None

Set Q



Seat	
No.	

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Day and Date: Saturday, 6-5-2017 Marks: 56

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

Instructions: 1) **All** questions are **compulsory**.

- 2) Q. 2 and Q. 4 are short answer type questions.
- 3) Q. 3 and Q. 5 are long answer type questions.
- 4) Neat diagrams must be drawn whenever necessary.
- 5) Figures to the **right** indicate **full** marks.
- 6) Make suitable assumptions if necessary and mention them **clearly**.
- 7) **Use** of log tables and non programmable single memory calculator is **allowed**.

SECTION-I

2.	An	iswer any five of the following questions.	15
	a)	Explain in detail different type of ROM.	3
	b)	Explain in detail flag register (PSW) of 8085.	3
	c)	Discuss the concept of HOLD and WAIT states in microprocessor?	3
	d)	$\label{lem:define} \mbox{ Define addressing mode. Discuss different addressing mode with an example.}$	3
	e)	Explain following:	3
		i) LXI ii) LHL address.	
	f)	Write differences between hardware and software interrupts.	3
	g)	Draw the opcode fetch machine cycle.	3
3.	An	swer any three of the following questions:	13
	a)	With a neat diagram explain the architecture of 8085?	5
	b)	Write an assembly language program to arrange array of numbers in	
		descending order.	4
	c)	Explain and draw RIM and SIM instruction format.	4
	d)	With a neat diagram explain interrupt structure of 8085 microprocessor.	4

-4-



SECTION-II

4.	An	swer any five of the following questions :	15
	a)	List out all SFRs of MCS 51 and explain TMOD.	3
	b)	Differentiate between memory mapped I/O and I/O mapped I/O.	3
	c)	Compare microcontroller and microprocessor.	3
	d)	Explain following:	3
		i) DA A ii) MUL AB.	
	e)	Explain various type of serial data input output.	3
	f)	Explain the features and operator of I/O port of 8051. Sketch the internal circuit of port 1 and explain its operation.	3
5.	An	swer any three of the following questions:	13
	a)	With a neat diagram explain the architecture of 8051.	4
	b)	List and explain in detail different data transfer techniques.	4
	c)	Interface LED and explain in detail.	4
	d)	How do you differentiate between timer/counter operation in 8051 and also different modes of operator of timer/counter?	5

Seat	
No.	

Set R

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Day and Date: Saturday, 6-5-2017 Total Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) All questions are compulsory.
- 4) Figures to the right indicate full marks.
- 5) Make suitable assumptions if necessary and mention them **clearly**.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) When referring to instruction words, a mnemonic is
 - a) A short abbreviation for the operand address
 - b) A short abbreviation for the operation to be performed
 - c) A short abbreviation for the data word stored at the operand address
 - d) Shorthand for machine language
 - 2) The technique of assigning a memory address to each I/O device in the computer system is called
 - a) memory-mapped I/O

b) ported I/O

c) dedicated I/O

- d) wired I/O
- 3) The interrupt request line is
 - a) Data line
- b) Control line
- c) Address line
- d) None
- 4) The time between recieval of an interrupt and its service is
 - a) Interrupt delay

b) Cycle time

c) Interrupt latency

d) Switching time



5)	fetch	rap pin becomes 'e trap pin for 'high trap pin for 'high'	LOW' ' status at the end status at the end o	of each instruction
6)	To avoid loading dua) latch	uring read operatio b) flip-flop		
7)	In memory-mapped a) distinct I/O devi c) only input device	ces	ices are viewed as b) memory location d) only output dev	
8)	8051 series has ho a) 2	w many 16 bit regi b) 3	isters ? c) 1	d) 0
9)	If we push data ont a) Increases with e c) None of the mer	every push	b) Decreases with	• •
10)	Which hardware tri a) Programmable i c) Programmable t	nterval timer		_
11)	Which of the follow a) Magnetic tape c) Floppy disc	ing is used as a pr	rimary storage devi b) PROM d) None of these	ce
12)	The communication a) BUS	n line between the b) Line	CPU, memory and c) Media	
13)	IC74LS373 is a) Latch	b) Buffer	c) Media	d) None of these
14)	Program counter is a) 8	bit c	of address. c) 4	d) 0

Set R



Seat	
No.	

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Day and Date: Saturday, 6-5-2017 Marks: 56

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

Instructions: 1) All questions are compulsory.

- 2) Q. 2 and Q. 4 are short answer type questions.
- 3) Q. 3 and Q. 5 are long answer type questions.
- 4) Neat diagrams must be drawn whenever necessary.
- 5) Figures to the **right** indicate **full** marks.
- 6) Make suitable assumptions if necessary and mention them **clearly**.
- 7) **Use** of log tables and non programmable single memory calculator is **allowed**.

SECTION-I

2.	An	iswer any five of the following questions.	15
	a)	Explain in detail different type of ROM.	3
	b)	Explain in detail flag register (PSW) of 8085.	3
	c)	Discuss the concept of HOLD and WAIT states in microprocessor?	3
	d)	$\label{lem:define} \mbox{ Define addressing mode. Discuss different addressing mode with an example.}$	3
	e)	Explain following:	3
		i) LXI ii) LHL address.	
	f)	Write differences between hardware and software interrupts.	3
	g)	Draw the opcode fetch machine cycle.	3
3.	An	swer any three of the following questions:	13
	a)	With a neat diagram explain the architecture of 8085?	5
	b)	Write an assembly language program to arrange array of numbers in	
		descending order.	4
	c)	Explain and draw RIM and SIM instruction format.	4
	d)	With a neat diagram explain interrupt structure of 8085 microprocessor.	4

-4-

SECTION-II

4.	Answer any five of the following questions:		
	a)	List out all SFRs of MCS 51 and explain TMOD.	3
	b)	Differentiate between memory mapped I/O and I/O mapped I/O.	3
	c)	Compare microcontroller and microprocessor.	3
	d)	Explain following:	3
		i) DA A ii) MUL AB.	
	e)	Explain various type of serial data input output.	3
	f)	Explain the features and operator of I/O port of 8051. Sketch the internal circuit of port 1 and explain its operation.	3
5.	An	swer any three of the following questions:	13
	a)	With a neat diagram explain the architecture of 8051.	4
	b)	List and explain in detail different data transfer techniques.	4
	c)	Interface LED and explain in detail.	4
	d)	How do you differentiate between timer/counter operation in 8051 and also different modes of operator of timer/counter?	5

SLR-VB - 360

Seat	
No.	

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Total Marks:70 Day and Date: Saturday, 6-5-2017

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) All questions are compulsory.
 - 4) Figures to the **right** indicate **full** marks.
 - 5) Make suitable assumptions if necessary and mention them clearly.

d) None of the mentioned

MCQ/Objective Type Questions

Dura	atio	n : 30 Minutes				Marks: 14
1.	Ch	oose the correct ans	swer:			
	1)	To avoid loading dua) latch	ıring read operatio b) flip-flop	n, the device used i c) buffer	s d) tristate l	buffer
	2)	In memory-mapped a) distinct I/O device c) only input device	ces	ices are viewed as b) memory locatio d) only output dev		
	3)	8051 series has ho a) 2	w many 16 bit regi b) 3	isters? c) 1	d) 0	
	4)	If we push data ont a) Increases with e c) None of the men	every push	ne stack pointer. b) Decreases with d) Both of the mer	, ,	ı
	5)	Which hardware tric	agers some opera	tion after certain pr	ogrammed o	count?

a) Programmable interval timer b) Interrupt timer

c) Programmable timer



6)	Which of the follow a) Magnetic tape c) Floppy disc	ing is used as a pr	b)	ary storage devi PROM None of these	ce	
7)	The communication a) BUS	n line between the b) Line		J, memory and Media	•	pherals None of these
8)	IC74LS373 is a) Latch	b) Buffer	c)	Media	d)	None of these
9)	Program counter is a) 8	bit c	of a c)		d)	0
10)	When referring to in a) A short abbrevia b) A short abbrevia c) A short abbrevia d) Shorthand for m	ation for the operar ation for the operat ation for the data w	nd a	address to be performed		and address
11)	The technique of a computer system is a) memory-mappe c) dedicated I/O	s called	b)	address to eac ported I/O wired I/O	h I/	O device in the
12)	The interrupt reque a) Data line		c)	Address line	d)	None
13)	The time between a) Interrupt delay c) Interrupt latency		b)	t and its service Cycle time Switching time	is	
14)	The 8085 microproa) As soon as the tb) By checking the fetchc) By checking the instructiond) By checking the	trap pin becomes ' e trap pin for 'high e trap pin for 'high'	LO' sta	W' atus at the end tus at the end o	of e	each instruction ecution of each

Set S



Seat	
No.	

T.E. (Part – I) (CGPA) (Biomedical Engineering) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLER

Day and Date: Saturday, 6-5-2017 Marks: 56

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

- Instructions: 1) All questions are compulsory.
 - 2) Q. 2 and Q. 4 are short answer type questions.
 - 3) Q. 3 and Q. 5 are long answer type questions.
 - 4) Neat diagrams must be drawn whenever necessary.
 - 5) Figures to the **right** indicate **full** marks.
 - 6) Make suitable assumptions if necessary and mention them **clearly**.
 - 7) **Use** of log tables and non programmable single memory calculator is **allowed**.

SECTION-I

2.	An	iswer any five of the following questions.	15
	a)	Explain in detail different type of ROM.	3
	b)	Explain in detail flag register (PSW) of 8085.	3
	c)	Discuss the concept of HOLD and WAIT states in microprocessor?	3
	d)	Define addressing mode. Discuss different addressing mode with an example.	3
	e)	Explain following:	3
		i) LXI ii) LHL address.	
	f)	Write differences between hardware and software interrupts.	3
	g)	Draw the opcode fetch machine cycle.	3
3.	An	swer any three of the following questions:	13
	a)	With a neat diagram explain the architecture of 8085?	5
	b)	Write an assembly language program to arrange array of numbers in	
		descending order.	4
	c)	Explain and draw RIM and SIM instruction format.	4
	d)	With a neat diagram explain interrupt structure of 8085 microprocessor.	4



SECTION-II

4. Answer any five of the following questions:					
	a)	List out all SFRs of MCS 51 and explain TMOD.	3		
	b) Differentiate between memory mapped I/O and I/O mapped I/O.				
	c)	Compare microcontroller and microprocessor.	3		
	d)	Explain following:	3		
		i) DA A ii) MUL AB.			
	e)	Explain various type of serial data input output.	3		
f) Explain the features and operator of I/O port of 8051. Sketch the internal circuit of port 1 and explain its operation.			3		
5.	An	swer any three of the following questions:	13		
	a)	With a neat diagram explain the architecture of 8051.	4		
b) List and explain in detail different data transfer techniques.c) Interface LED and explain in detail.					
					d) How do you differentiate between timer/counter operation in 8051 and also different modes of operator of timer/counter?

	_		
Seat No.	Set	Р	Ì

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION

Day and Date : Monday, 8-5-2017 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 7	Type Questions	
Duratio	on : 30 Minutes	-		Marks : 14
1. Ch	oose the correct an	swer:		(1×14=14)
1)	is the rasignal.	ange of frequencie	s required for transr	nission of modulated
	a) Time	b) Frequency	c) Bandwidth	d) Wavelength
2)	output electrodes of	of an amplifying de	evice.	rrival of electrons at
	•	•	c) Transit	•
3)	when $m = 1$.	·		PAM = PC
	a) 2	b) 1.5	c) 2.5	d) 5
4)	A dio varies linearly with		ıctor diode whose j	unction capacitance
	a) PNP	b) NPN	c) Zener	d) Varactor
5)	Sampling theorem a) Fs≥2Fm		c) Fm ≤ 2 Fs	d) Fm ≥ 2 Fs
6)	•	•	•	zation and encoding
	a) Delta	b) ASK	c) PSK	d) VSB
7)	Frequency division		ntype n c) Pulsed	
0)				
8)	of possible encodir		•	er ratio and number
	a) Sequence	b) Linearity	c) Dimensions	d) Probability

SLR-VB - 361	-2-	
9)	efficiency is used to compare the p	erformance of one digital

 efficiency is used to compare the performance of one digital modulation technique to an other. 				
is the mea	asurement of remo	te variables or quar	ntities.	
a) Telemetry	b) ASK	c) FSK	d) PSK	
OSI reference mod	el defines a networ	king framework to in	mplement protocols	
in layer.				
a) 5	b) 7	c) 10	d) 11	
In half duplex data of direction.	communication mod	des transmission is p	oossible in	
a) single	b) tripple	c) 3D	d) dual	
3) is the physical medium that connects the transmitter with				
receiver.				
a) Channel	b) OSI	c) FSK	d) PSK	
14) Modulation index is amplitude modulation is given by m =				
a) Vm/Vc	la \ \ / a /\ / vaa	a) 0 \/m /\/a	d\ 0\/o/\/m	
	modulation techniq a) Wavelength is the mea a) Telemetry OSI reference mod in layer. a) 5 In half duplex data of direction. a) single is the ph receiver. a) Channel Modulation index is	modulation technique to an other. a) Wavelength b) Modulation is the measurement of remo a) Telemetry b) ASK OSI reference model defines a networ in layer. a) 5 b) 7 In half duplex data communication modulation. a) single b) tripple is the physical medium that receiver. a) Channel b) OSI Modulation index is amplitude modulation.	modulation technique to an other. a) Wavelength b) Modulation c) Probability is the measurement of remote variables or quartal techniques. a) Telemetry b) ASK c) FSK OSI reference model defines a networking framework to in in layer. a) 5 b) 7 c) 10 In half duplex data communication modes transmission is produced in the physical medium that connects the transference is the physical medium that connects the physical medi	



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION

Day and Date: Monday, 8-5-2017 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:
 - a) Bandwidth

b) Modulation

c) Wavelength

- d) Channel bandwidth.
- 2) Differentiate between amplitude modulation and frequency modulation.
- 3) Explain block diagram of element of analog communication.
- 4) Derive power relations in amplitude modulated wave.
- 5) Define and explain Pre-emphasis and De-emphasis concepts.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Calculate the % power saving when carrier and one of side band are suppressed in an AM wave modulated to a depth of
 - a) 100%
- b) 50%.
- 2) Define vestigial side band and derive power relations in VSB value.
- 3) Draw and explain working of stabilized reactance modulator of frequency modulation.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State sampling theorem and mention its condition.
- 2) Explain Frequency Division Multiplexing (FDM) with necessary diagram.
- 3) Define following codes:
 - a) Convolution codes

b) Hamming codes.

Set P



- 4) Differentiate between Pulse Amplitude Modulation (PAM) and Pulse Position Modulation (PPM).
- 5) Draw and explain Pulse Amplitude Modulation (PAM) circuit.

5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of indirect method (Armstrong frequency) of modulation system.
- 2) Draw and explain working of M-array FSK system.
- 3) Explain following techniques:
 - a) DPCM
- b) DM.

Set P

Seat No.		Set	Q			
T.E. (Piomodical Engineering) (Part. I) (CCPA) Examination, 2017						

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION

Day and Date: Monday, 8-5-2017 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 T	vpe Questions				
Duratio	Duration: 30 Minutes Marks: 14						
1. Choose the correct answer: (1x1							
1)	of error is	ng conditions used	•				
	•	•	c) Dimensions	•			
2)	modulation techniq	ue to an other.					
	a) Wavelength	b) Modulation	c) Probability	d) Bandwidth			
3)	is the mea						
	a) Telemetry	b) ASK	c) FSK	d) PSK			
4)	OSI reference mod in layer.		_				
	a) 5	b) 7	c) 10	d) 11			
5)	In half duplex data of direction.	communication mo	des transmission is p	oossible in			
	a) single	b) tripple	c) 3D	d) dual			
6) is the physical medium that connects the transmitter with receiver.				smitter with			
		b) OSI	c) FSK	d) PSK			
7)	7) Modulation index is amplitude modulation is given by m =						
ŕ			c) 2 Vm/Vc				
8)	is the rasignal.	ange of frequencies	s required for transm	ission of modulated			
	a) Time	b) Frequency	c) Bandwidth	d) Wavelength			

9)	noise is caused by random variations in the arrival of electrons at output electrodes of an amplifying device.				
	a) Internal	. , ,		d) Shot	
10)	Maximum power in when $m = 1$.	amplitude modul	ation is given by P	AM = PC	
	a) 2	b) 1.5	c) 2.5	d) 5	
,	A dioc varies linearly with a	applied voltage.	•	·	
	a) PNP	,	c) Zener	d) varactor	
12)	Sampling theorem				
	a) Fs≥2Fm	b) Fs \leq 2 Fm	c) $Fm \leq 2 Fs$	d) $Fm \ge 2 Fs$	
13)	modulation process of PCM.	n is obtained by sir	nplifying the quantiz	ation and encoding	
	a) Delta	b) ASK	c) PSK	d) VSB	
14)	Frequency division a) Digital				



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION

Day and Date: Monday, 8-5-2017 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:
 - a) Bandwidth

b) Modulation

c) Wavelength

- d) Channel bandwidth.
- 2) Differentiate between amplitude modulation and frequency modulation.
- 3) Explain block diagram of element of analog communication.
- 4) Derive power relations in amplitude modulated wave.
- 5) Define and explain Pre-emphasis and De-emphasis concepts.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Calculate the % power saving when carrier and one of side band are suppressed in an AM wave modulated to a depth of
 - a) 100%
- b) 50%.
- 2) Define vestigial side band and derive power relations in VSB value.
- 3) Draw and explain working of stabilized reactance modulator of frequency modulation.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State sampling theorem and mention its condition.
- 2) Explain Frequency Division Multiplexing (FDM) with necessary diagram.
- 3) Define following codes:
 - a) Convolution codes

b) Hamming codes.

Set Q



- 4) Differentiate between Pulse Amplitude Modulation (PAM) and Pulse Position Modulation (PPM).
- 5) Draw and explain Pulse Amplitude Modulation (PAM) circuit.

5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of indirect method (Armstrong frequency) of modulation system.
- 2) Draw and explain working of M-array FSK system.
- 3) Explain following techniques:
 - a) DPCM
- b) DM.

Set Q

|--|--|--|

						SLR-	VB –	361
Seat No.							Set	R
T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION								
-	d Date : Monda 10.00 a.m. to 1	•	017			Ма	x. Mark	s: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.							ark. nly.	
MCQ/Objective Type Questions								
Duratio	n : 30 Minutes						Mark	s:14
1. Ch	oose the corre	ct answe	er:				(1×1	4=14)
1)	Sampling the							
	a) Fs≥2Fm	b)	$Fs \leq 2 Fm$	c)	$Fm \leq 2 Fs$	d) Fm ≥	2 Fs	
2)	mod		obtained by si	mpl	ifying the quan	tization and	encodin	g
	a) Delta		ASK	c)	PSK	d) VSB		
3)	Frequency div	vision mu	ıltiplexing is an		type	multiplexing	system	
	a) Digital	b)	Analog	c)	Pulsed	d) Linear	•	
4)			function of a		er to noise po	wer ratio and	admun t	∍r
	•	_	onditions used Linearity		Dimensions	d) Proba	hility	
5)		-	cy is used to c	-		-	-	al
0)	modulation te			OIII	bare the perior		ne digite	<i>A</i> 1
	a) Wavelengt	h b)	Modulation	c)	Probability	d) Bandv	vidth	
6)			rement of remo					
	a) Telemetry	,	ASK	,		d) PSK		
7)	OSI reference in layer		efines a netwo	rkin	g framework to	implement	protocol	S

c) 10

c) 3D

8) In half duplex data communication modes transmission is possible in ______

d) 11

d) dual

b) 7

b) tripple

a) 5

direction. a) single 14) A _____ diode is a semiconductor diode whose junction capacitance

c) Zener

d) Varactor

varies linearly with applied voltage.

a) PNP

b) NPN

Set R



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION

Day and Date: Monday, 8-5-2017 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:
 - a) Bandwidth

b) Modulation

c) Wavelength

- d) Channel bandwidth.
- 2) Differentiate between amplitude modulation and frequency modulation.
- 3) Explain block diagram of element of analog communication.
- 4) Derive power relations in amplitude modulated wave.
- 5) Define and explain Pre-emphasis and De-emphasis concepts.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Calculate the % power saving when carrier and one of side band are suppressed in an AM wave modulated to a depth of
 - a) 100%
- b) 50%.
- 2) Define vestigial side band and derive power relations in VSB value.
- 3) Draw and explain working of stabilized reactance modulator of frequency modulation.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State sampling theorem and mention its condition.
- 2) Explain Frequency Division Multiplexing (FDM) with necessary diagram.
- 3) Define following codes:
 - a) Convolution codes

b) Hamming codes.

Set R



- 4) Differentiate between Pulse Amplitude Modulation (PAM) and Pulse Position Modulation (PPM).
- 5) Draw and explain Pulse Amplitude Modulation (PAM) circuit.

5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of indirect method (Armstrong frequency) of modulation system.
- 2) Draw and explain working of M-array FSK system.
- 3) Explain following techniques:
 - a) DPCM
- b) DM.

Seat No.					Se	t	S	
T.	T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION							
Day and Date : Monday, 8-5-2017 Max. Marks : 70 Time : 10.00 a.m. to 1.00 p.m.								
	Instructions:	1) Q. No. 1 is c	compulsory.	lt should be solve	d in first 30 mi	nu	tes	

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

		-		_				n Page No. 3 only. i) on Top of Page.
			MC	Q/Objective Ty	vpe	Questions		
Dura	tioı	n : 30 Minutes			, 1.			Marks: 14
1. (Cho	oose the correct ans	swe	er:				(1×14=14)
	1)	is the mea						es. PSK
	-	OSI reference mode in layer.					-	ement protocols
		a) 5	b)	7	c)	10	d)	11
	-	In half duplex data c direction.	om	munication mod	des '	transmission is p	oss	sible in
		a) single	b)	tripple	c)	3D	d)	dual
		is the ph receiver.	ysid	cal medium tha	t co	nnects the trans	mit	ter with
		a) Channel	b)	OSI	c)	FSK	d)	PSK
	5)	Modulation index is	an	nplitude modula	atior	n is given by m =	=	
	•	a) Vm/Vc		=				2 Vc/Vm
	-	is the ra signal.	nge	e of frequencies	req	uired for transm	issio	on of modulated
		a) Time	b)	Frequency	c)	Bandwidth	d)	Wavelength
i		noise is c					riva	l of electrons at
		a) Internal					d)	Shot
	•	Maximum power in when m = 1.	an	nplitude modul	atio	n is given by P	ΑM	= PC
		a) 2	b)	1.5	c)	2.5	d)	5

9)	A dioc		ctor diode whose ju	nction capacitance
	a) PNP	•	c) Zener	d) Varactor
10)	Sampling theorem			
	a) Fs≥2Fm	b) Fs \leq 2 Fm	c) $Fm \leq 2 Fs$	d) $Fm \ge 2 Fs$
11)	modulatio	n is obtained by sir	nplifying the quantiz	ation and encoding
	process of PCM.	1.) 4017) DOI/	N 1/0D
	a) Delta	b) ASK	c) PSK	d) VSB
12)	Frequency division	multiplexing is an	type mu	ultiplexing system.
	a) Digital	b) Analog	c) Pulsed	d) Linear
13)	of error is	the function of a c	arrier to noise powe	er ratio and number
,	of possible encodir	ng conditions used.	·	
	•	•	c) Dimensions	d) Probability
14)	effic	eiency is used to co	ompare the perform	ance of one digital
	modulation techniq	ue to an other.		
	a) Wavelength	b) Modulation	c) Probability	d) Bandwidth



Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 PRINCIPLES OF COMMUNICATION

Day and Date: Monday, 8-5-2017 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:
 - a) Bandwidth

b) Modulation

c) Wavelength

- d) Channel bandwidth.
- 2) Differentiate between amplitude modulation and frequency modulation.
- 3) Explain block diagram of element of analog communication.
- 4) Derive power relations in amplitude modulated wave.
- 5) Define and explain Pre-emphasis and De-emphasis concepts.

3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Calculate the % power saving when carrier and one of side band are suppressed in an AM wave modulated to a depth of
 - a) 100%
- b) 50%.
- 2) Define vestigial side band and derive power relations in VSB value.
- 3) Draw and explain working of stabilized reactance modulator of frequency modulation.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) State sampling theorem and mention its condition.
- 2) Explain Frequency Division Multiplexing (FDM) with necessary diagram.
- 3) Define following codes:
 - a) Convolution codes

b) Hamming codes.



- 4) Differentiate between Pulse Amplitude Modulation (PAM) and Pulse Position Modulation (PPM).
- 5) Draw and explain Pulse Amplitude Modulation (PAM) circuit.

5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of indirect method (Armstrong frequency) of modulation system.
- 2) Draw and explain working of M-array FSK system.
- 3) Explain following techniques:
 - a) DPCM
- b) DM.

Set S

Seat	
No.	

Set P

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

Day and Date: Tuesday, 9-5-2017 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.

Don t lorget to mention, Q.P. Set (P/Q/R/S) on Top of Page.				
	MCQ/Objec	tive Type Question	ns	
Duration: 30 Minute	es			Marks: 14
1. Choose the corr	rect answer :			(1×14=14)
1) A discrete ti	me signal $x(n) = (-1)^n$) ⁿ is periodic with f	undamental per	riod
a) 6	b) 4	c) 2	d) 0	

- 2) The Fourier transform of the exponential signal e^{jω₀t} is
 a) can't be determined
 b) is zero
 c) is unity
 d) is infinity
- 3) The unit impulse response of a linear time invariant system is the unit step function u(t). For t > 0, the response of the system to an excitation $e^{-at}u(t)$; a > 0 will be
 - a) ae^{-at} b) $1-e^{-at}$ c) $a\left(1-e^{-at}\right)$ d) 1
- 4) The system characterized by the equation y(t) = ax(t) + b is
 a) Linear for any value of b
 b) linear of b > 0
 c) Linear if b < 0
 d) Non linear
 - The region of convergence if the z transform of the sig
- 5) The region of convergence if the z-transform of the signal $2^n u(n) 3^n u(-n-1)$ is a) |z| > 1 b) |z| < 1c) 2 < |z| < 3 d) Does not exist

6) Given a unit step function u(t), its time derivative is



	a) unit impulsec) unit vamp function	on		another step fur sine function	ncti	on
7)	Z transform conver a) Addition	ts convolution of to b) Substraction		-	d)	Division
8)	Region of converge a) entire s-plane c) left half of s-plan		b)	ystem is right half of s-pl does not exist	ane)
9)	The unit step respon	se of a system with	imp	ulse response h(n) =	$\delta(n) - \delta(n-1)$ is
	a) $\delta(n-1)$	b) δ(n)	c)	u(n-1)	d)	u(n)
10)	The Fourier transfo	orm of u(t) is				
	a) $\frac{1}{2j\pi f}$	b) 2jπf	c)	$\frac{1}{1+2j\pi f}$	d)	None of these
11)	The region converg	ence of the z trans	sfor	m of the signal x	(n) :	= {2, 1, 1, 2} is
	a) all z, except z = c) all z, except z =		b) d)	all z except z = all z	0	,
12)	A given system is c	haracterized by th	e d	ifferential equati	on	
	$\frac{d^2y(t)}{dt^2} - \frac{dy(t)}{dt} - 2y(t)$	t) = x(t), system is	8			
	a) linear and unstac) nonlinear and ur	ble nstable	b) d)	linear and stable nonlinear and s	e tabl	e
13)	The number of pos	sible region of con	ver	gence of the fun	ctio	n
	$\frac{\left(e^{-2}-2\right)z}{\left(z-e^{-2}\right)\left(z-2\right)} \text{ is }$					
ć	a)1	b) 2	c)	3	d)	4
14)	If G(f) represents the symmetric in time to		n o	f a signal g(t) wh	iich	is real and odd
	a) complexc) real			imaginary real and comple	ex	

Seat No.

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

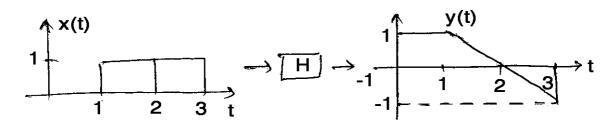
Day and Date: Tuesday, 9-5-2017 Marks: 56

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

SECTION - I

2. Answer any 4: (4×4=16)

- 1) Determine whether the signal x(t) described by $x(t) = \exp[-at] u(t)$, a > 0 is a power signal or energy signal.
- 2) Define energy and power signals of a system with their expressions.
- 3) A linear system H has an input output pair as shown. Determine whether the system is causal and time invarient

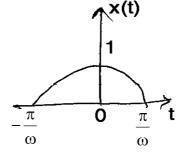


- 4) State and explain sampling theorem in time and frequency domain.
- 5) Define a unit impulse function $\delta(t)$.
- 3. Answer the following questions:

 $(6 \times 2 = 12)$

1) Determine the total energy of the raised cosine pulse x(t), defined by

$$x(t) = \begin{cases} \frac{1}{2} (\cos \omega + 1), & \frac{-\pi}{\omega} \le t \le \frac{\pi}{\omega} \\ 0 & \text{otherwise} \end{cases}$$



Set P



2) State the initial value and final value theorem of Laplace transform compute it for given below $x(s) = \frac{3s+4}{s(s+1)(s+2)^2}$.

SECTION - II

- 4. Attempt any 4: $(4 \times 4 = 16)$
 - 1) Explain convolution property for Fourier transform signal.
 - 2) Let the z transform of x(n) be X(z). Show that the z transform of x(-n) is $X\left(\frac{1}{z}\right)$.
 - 3) Calculate the fundamental frequency of given signal, $x(n) = e^{-4j\pi \frac{n}{3}} + e^{-3j\pi n}$.
 - 4) Determine the Fourier transform a two sided exponential function $x(t) = e^{-|1|}$ add draw its magnitude spectrum.
 - 5) State and prove Parseval's theorem for continuous time periodic signal.
- 5. Attempt any two: $(6 \times 2 = 12)$
 - 1) Determine the inverse z transform of following x(z) by the partial fraction expansion method $x(z) = \frac{z+2}{2z^2-7z+3}$ if, ROC's are
 - i) |z| > 3
- ii) $z < \frac{1}{2}$ iii) $\frac{1}{2} < |z| < 3$
- 2) Determine the Fourier transforms of

 - i) $x_1[n] = \sin \omega_0$ ii) $x_2[n] = (\sin n\omega_0) u(n)$
- 3) Explain following terms:
 - a) Stability and causality of system in z transform
 - b) Convolution method for z transform.

Seat No.

Set Q

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

Day and Date: Tuesday, 9-5-2017

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) Region of convergence of a causal LTI system is
 - a) entire s-plane

b) right half of s-plane

c) left half of s-plane

- d) does not exist
- 2) The unit step response of a system with impulse response $h(n) = \delta(n) \delta(n-1)$ is
 - a) $\delta(n-1)$
- b) $\delta(n)$
- c) u(n-1)
- d) u(n)

- 3) The Fourier transform of u(t) is
 - a) $\frac{1}{2j\pi f}$
- b) 2jπf
- c) $\frac{1}{1+2j\pi f}$
- d) None of these
- 4) The region convergence of the z transform of the signal $x(n) = \{2, 1, 1, 2\}$ is
 - a) all z, except z = 0 and $z = \infty$
- b) all z except z = 0

c) all z, except $z = \infty$

- d) all z
- 5) A given system is characterized by the differential equation

$$\frac{d^2y(t)}{dt^2} - \frac{dy(t)}{dt} - 2y(t) = x(t), \text{ system is}$$

a) linear and unstable

- b) linear and stable
- c) nonlinear and unstable
- d) nonlinear and stable



6) The number of possible region of convergence of the function

$$\frac{(e^{-2}-2)z}{(z-e^{-2})(z-2)} \text{ is}$$
a)1 b) 2 c) 3 d) 4

7) If G(f) represents the fourier transform of a signal g(t) which is real and odd symmetric in time then G(f) is

-		
a`) com	plex

b) imaginary

c) real

d) real and complex

8) A discrete time signal $x(n) = (-1)^n$ is periodic with fundamental period

- a) 6
- b) 4
- c) 2

d) 0

9) The Fourier transform of the exponential signal $e^{j\omega_0t}$ is

- a) can't be determined
- b) is zero

c) is unity

d) is infinity

10) The unit impulse response of a linear time invariant system is the unit step function u(t). For t > 0, the response of the system to an excitation $e^{-at}u(t)$; a > 0 will be

- a) ae^{-at}
- b) $1 e^{-at}$ c) $a(1 e^{-at})$
- d) 1

11) The system characterized by the equation y(t) = ax(t) + b is

- a) Linear for any value of b
- b) linear of b > 0

c) Linear if b < 0

d) Non linear

12) The region of convergence if the z-transform of the signal $2^{n} u(n) - 3^{n} u(-n-1)$ is

a) |z| > 1

b) |z| < 1

c) 2 < |z| < 3

d) Does not exist

13) Given a unit step function u(t), its time derivative is

a) unit impulse

b) another step function

c) unit vamp function

d) sine function

14) Z transform converts convolution of time signals to

- a) Addition
- b) Substraction c) Multiplication
- d) Division

Seat No.

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

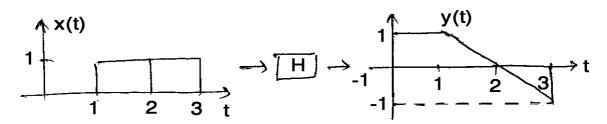
Day and Date: Tuesday, 9-5-2017 Marks: 56

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

SECTION - I

2. Answer any 4: (4×4=16)

- 1) Determine whether the signal x(t) described by $x(t) = \exp[-at] u(t)$, a > 0 is a power signal or energy signal.
- 2) Define energy and power signals of a system with their expressions.
- 3) A linear system H has an input output pair as shown. Determine whether the system is causal and time invarient

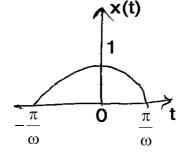


- 4) State and explain sampling theorem in time and frequency domain.
- 5) Define a unit impulse function $\delta(t)$.
- 3. Answer the following questions:

 $(6 \times 2 = 12)$

1) Determine the total energy of the raised cosine pulse x(t), defined by

$$x(t) = \begin{cases} \frac{1}{2} (\cos \omega + 1), & \frac{-\pi}{\omega} \le t \le \frac{\pi}{\omega} \\ 0 & \text{otherwise} \end{cases}$$



Set Q



2) State the initial value and final value theorem of Laplace transform compute it for given below $x(s) = \frac{3s+4}{s(s+1)(s+2)^2}$.

SECTION - II

4. Attempt any 4: $(4 \times 4 = 16)$

- 1) Explain convolution property for Fourier transform signal.
- 2) Let the z transform of x(n) be X(z). Show that the z transform of x(-n) is $X\left(\frac{1}{z}\right)$.
- 3) Calculate the fundamental frequency of given signal, $x(n) = e^{-4j\pi \frac{n}{3}} + e^{-3j\pi n}$.
- 4) Determine the Fourier transform a two sided exponential function $x(t) = e^{-|1|}$ add draw its magnitude spectrum.
- 5) State and prove Parseval's theorem for continuous time periodic signal.
- 5. Attempt any two: $(6 \times 2 = 12)$
 - 1) Determine the inverse z transform of following x(z) by the partial fraction expansion method $x(z) = \frac{z+2}{2z^2-7z+3}$ if, ROC's are
 - i) |z| > 3
- ii) $z < \frac{1}{2}$ iii) $\frac{1}{2} < |z| < 3$
- 2) Determine the Fourier transforms of

 - i) $x_1[n] = \sin \omega_0$ ii) $x_2[n] = (\sin n\omega_0) u(n)$
- 3) Explain following terms:
 - a) Stability and causality of system in z transform
 - b) Convolution method for z transform.

Seat	
No.	

P.T.O.

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

Day and Date: Tuesday, 9-5-2017 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.

Duration: 30 Minutes	Marks: 14
1. Choose the correct answer:	(1×14=14)

- 1) The region of convergence if the z-transform of the signal $2^{n} u(n) - 3^{n} u(-n-1)$ is a) |z| > 1b) |z| < 1
 - c) 2 < |z| < 3d) Does not exist
- 2) Given a unit step function u(t), its time derivative is a) unit impulse b) another step function c) unit vamp function d) sine function
- 3) Z transform converts convolution of time signals to a) Addition b) Substraction c) Multiplication d) Division
- 4) Region of convergence of a causal LTI system is a) entire s-plane b) right half of s-plane c) left half of s-plane d) does not exist
- 5) The unit step response of a system with impulse response $h(n) = \delta(n) \delta(n-1)$ is c) u(n-1) d) u(n) a) $\delta(n-1)$ b) $\delta(n)$
- 6) The Fourier transform of u(t) is
 - c) $\frac{1}{1+2i\pi f}$ d) None of these b) 2jπf



- 7) The region convergence of the z transform of the signal $x(n) = \{2, 1, 1, 2\}$ is
 - a) all z, except z = 0 and $z = \infty$
- b) all z except z = 0

c) all z, except $z = \infty$

- d) all z
- 8) A given system is characterized by the differential equation

$$\frac{d^2y(t)}{dt^2} - \frac{dy(t)}{dt} - 2y(t) = x(t), \text{ system is}$$

a) linear and unstable

- b) linear and stable
- c) nonlinear and unstable
- d) nonlinear and stable
- 9) The number of possible region of convergence of the function

$$\frac{\left(e^{-2}-2\right)z}{\left(z-e^{-2}\right)\left(z-2\right)} \text{ is }$$

a)1

- b) 2
- c) 3
- d) 4
- 10) If G(f) represents the fourier transform of a signal g(t) which is real and odd symmetric in time then G(f) is
 - a) complex

b) imaginary

c) real

- d) real and complex
- 11) A discrete time signal $x(n) = (-1)^n$ is periodic with fundamental period
 - a) 6
- b) 4
- c) 2
- d) 0
- 12) The Fourier transform of the exponential signal $e^{j\omega_0 t}$ is
 - a) can't be determined
- b) is zero

c) is unity

- d) is infinity
- 13) The unit impulse response of a linear time invariant system is the unit step function u(t). For t > 0, the response of the system to an excitation $e^{-at}u(t)$; a > 0 will be
 - a) ae^{-at}
- b) $1 e^{-at}$ c) $a(1 e^{-at})$ d) 1
- 14) The system characterized by the equation y(t) = ax(t) + b is
 - a) Linear for any value of b
- b) linear of b > 0

c) Linear if b < 0

d) Non linear

Seat No.

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

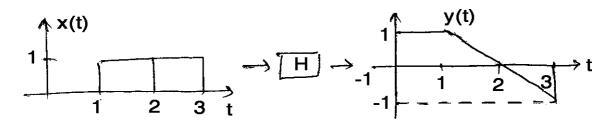
Day and Date: Tuesday, 9-5-2017 Marks: 56

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

SECTION - I

2. Answer any 4: (4×4=16)

- 1) Determine whether the signal x(t) described by $x(t) = \exp[-at] u(t)$, a > 0 is a power signal or energy signal.
- 2) Define energy and power signals of a system with their expressions.
- 3) A linear system H has an input output pair as shown. Determine whether the system is causal and time invarient

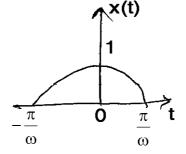


- 4) State and explain sampling theorem in time and frequency domain.
- 5) Define a unit impulse function $\delta(t)$.
- 3. Answer the following questions:

 $(6 \times 2 = 12)$

1) Determine the total energy of the raised cosine pulse x(t), defined by

$$x(t) = \begin{cases} \frac{1}{2} (\cos \omega + 1), & \frac{-\pi}{\omega} \le t \le \frac{\pi}{\omega} \\ 0 & \text{otherwise} \end{cases}$$



Set R



2) State the initial value and final value theorem of Laplace transform compute it for given below $x(s) = \frac{3s+4}{s(s+1)(s+2)^2}$.

SECTION - II

4. Attempt any 4: $(4 \times 4 = 16)$

- 1) Explain convolution property for Fourier transform signal.
- 2) Let the z transform of x(n) be X(z). Show that the z transform of x(-n) is $X\left(\frac{1}{z}\right)$.
- 3) Calculate the fundamental frequency of given signal, $x(n) = e^{-4j\pi \frac{n}{3}} + e^{-3j\pi n}$.
- 4) Determine the Fourier transform a two sided exponential function $x(t) = e^{-|1|}$ add draw its magnitude spectrum.
- 5) State and prove Parseval's theorem for continuous time periodic signal.
- 5. Attempt any two: $(6 \times 2 = 12)$
 - 1) Determine the inverse z transform of following x(z) by the partial fraction expansion method $x(z) = \frac{z+2}{2z^2-7z+3}$ if, ROC's are
 - i) |z| > 3
- ii) $z < \frac{1}{2}$ iii) $\frac{1}{2} < |z| < 3$
- 2) Determine the Fourier transforms of

 - i) $x_1[n] = \sin \omega_0$ ii) $x_2[n] = (\sin n\omega_0) u(n)$
- 3) Explain following terms:
 - a) Stability and causality of system in z transform
 - b) Convolution method for z transform.

Seat	
No.	

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

Day and Date: Tuesday, 9-5-2017

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) The Fourier transform of u(t) is

a)
$$\frac{1}{2i\pi f}$$

c)
$$\frac{1}{1+2i\pi f}$$

b) $2j\pi f$ c) $\frac{1}{1+2i\pi f}$ d) None of these

2) The region convergence of the z transform of the signal $x(n) = \{2, 1, 1, 2\}$ is

a) all z, except
$$z = 0$$
 and $z = \infty$

b) all
$$z$$
 except $z = 0$

c) all z, except
$$z = \infty$$

3) A given system is characterized by the differential equation

$$\frac{d^2y(t)}{dt^2} - \frac{dy(t)}{dt} - 2y(t) = x(t), \text{ system is}$$

a) linear and unstable

- b) linear and stable
- c) nonlinear and unstable
- d) nonlinear and stable

4) The number of possible region of convergence of the function

$$\frac{\left(e^{-2}-2\right)z}{\left(z-e^{-2}\right)\!\left(z-2\right)} \ is$$

- b) 2
- c) 3
- d) 4



5)	If $G(f)$ represents the fourier transform of a signal $g(t)$ which is real and odd symmetric in time then $G(f)$ is			
	a) complexc) real		b) imaginaryd) real and complete	ex
6)	A discrete time signal 6	nal x(n) = (-1) ⁿ is p b) 4		mental period d) 0
7)	The Fourier transforms (a) can't be determined is unity		ntial signal e ^{j∞₀t} is b) is zero d) is infinity	
8)	The unit impulse re	esponse of a linear	r time invariant sys	tem is the unit step
	function u(t). For t : a > 0 will be	> 0, the response of	of the system to an	excitation e ^{-at} u(t);
	a) ae ^{-at}	b) $1 - e^{-at}$	c) $a(1-e^{-at})$	d) 1
9)	The system character a) Linear for any voc.) Linear if b < 0	•	tation y(t) = ax(t) + b) linear of b > 0 d) Non linear	b is
10)	The region of conve $2^n u(n) - 3^n u(-n)$	_	insform of the signa	al
	a) z > 1 c) 2 < z < 3	.,	b) z < 1d) Does not exist	:
11)	Given a unit step fu a) unit impulse c) unit vamp functi	• •	ne derivative is b) another step fu d) sine function	nction
12)	Z transform conver a) Addition		me signals to c) Multiplication	d) Division
13)	Region of converge a) entire s-plane c) left half of s-plane		TI system is b) right half of s-p d) does not exist	lane
14)	The unit step respon	se of a system with	impulse response h($f(n) = \delta(n) - \delta(n-1)$ is
	a) $\delta(n-1)$	b) δ(n)	c) u(n-1)	d) u(n)

Seat No.

T.E. (Biomedical Engineering) (Part – I) (CGPA) Examination, 2017 SIGNALS AND SYSTEM

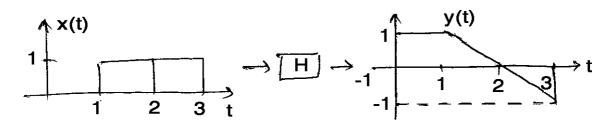
Day and Date: Tuesday, 9-5-2017 Marks: 56

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

SECTION - I

2. Answer any 4: (4×4=16)

- 1) Determine whether the signal x(t) described by $x(t) = \exp[-at] u(t)$, a > 0 is a power signal or energy signal.
- 2) Define energy and power signals of a system with their expressions.
- 3) A linear system H has an input output pair as shown. Determine whether the system is causal and time invarient

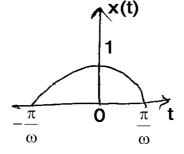


- 4) State and explain sampling theorem in time and frequency domain.
- 5) Define a unit impulse function $\delta(t)$.
- 3. Answer the following questions:

 $(6 \times 2 = 12)$

1) Determine the total energy of the raised cosine pulse x(t), defined by

$$x(t) = \begin{cases} \frac{1}{2} (\cos \omega + 1), & \frac{-\pi}{\omega} \le t \le \frac{\pi}{\omega} \\ 0 & \text{otherwise} \end{cases}$$



Set S



2) State the initial value and final value theorem of Laplace transform compute it for given below $x(s) = \frac{3s+4}{s(s+1)(s+2)^2}$.

SECTION - II

- 4. Attempt any 4: $(4 \times 4 = 16)$
 - 1) Explain convolution property for Fourier transform signal.
 - 2) Let the z transform of x(n) be X(z). Show that the z transform of x(-n) is
 - 3) Calculate the fundamental frequency of given signal, $x(n) = e^{-4j\pi \frac{n}{3}} + e^{-3j\pi n}$.
 - 4) Determine the Fourier transform a two sided exponential function $x(t) = e^{-|1|}$ add draw its magnitude spectrum.
 - 5) State and prove Parseval's theorem for continuous time periodic signal.
- 5. Attempt any two: $(6 \times 2 = 12)$
 - 1) Determine the inverse z transform of following x(z) by the partial fraction expansion method $x(z) = \frac{z+2}{2z^2 - 7z + 3}$ if, ROC's are
 - i) |z| > 3
- ii) $z < \frac{1}{2}$ iii) $\frac{1}{2} < |z| < 3$
- 2) Determine the Fourier transforms of

 - i) $x_1[n] = \sin \omega_0$ ii) $x_2[n] = (\sin n\omega_0) u (n)$
- 3) Explain following terms:
 - a) Stability and causality of system in z transform
 - b) Convolution method for z transform.

|--|

Seat		
No.	Set	P
IVO.		•

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – II

Day and Date: Monday, 15-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

	3) Q in 4) A	ssume the suitable No. 1 is compulse Answer Book Pag nswer MCQ/Object	e data wherever red ory. It should be solv te No. 3. Each quest ctive type question tion, Q.P. Set (P/Q/	
Duratio	n : 30 Minutes	wod/objective i	ype Questions	Marks : 1
1. Ch	oose the correct an	swer:		1
1)	The 'P' wave of EC a) Depolarization (c)	of atria	b) Repolarization	
2)	Tracing of the heart is called a		any two sites due to	electrical activity of
	a) Current	b) Resistance	c) Voltage	d) ECG wave
3)	The heart sounds acycle.	are produced by m	echanical events th	nat occur during the
	a) Cardiac	b) Respiratory	c) Circulation	d) Chemical
4)	A pattern of electronis called as	des on the head a	nd the channels the	ey are connected to
	a) Leads	b) Scalp	c) Jack box	d) Montage
5)	potenti		response of the acc	

6)	The oscillometric m the cuff during infla		oscillometric	generated in
	a) Nerves	b) Veins	c) Arteries	d) Pulses
7)	The respiratory cyc	cle is accomplished	d by changes in the	thoracic
	a) Volume	b) Distance	c) Blood	d) Air
8)	are de to beat basis.	esigned to measure	e and record foetal I	neart rate on a beat
	a) Pulse oximetry		b) Blood pressure	meter
	c) Hb meter		d) Cardiotographs	
9)	The foetal heart rate the foetal	•	the foetal ECG by ap	ppropriately shaping
	a) QRS	b) P	c) PQRST	d) T
10)	In a telemedicine _	is the p	orimary information	source.
	a) Records	b) Reports	c) Patients	d) Scans
11)	The c conductor by using			able of releasing a
	a) Threshold	b) Minimum	c) Maximum	d) Leakage
12)	The risk of producing and electrode area.	-	illation is related to	the current density
	a) Ventricular	b) Arterial	c) Cardiac valves	d) A. V. node
13)	The patient leakaginstrument between		•	•
	a) Line	b) Metal chases		d) Earth
14)	Holter monitors pro	vide continuous re	ecording of 24-72 ho	ours of
	a) Heart rate	b) Pulse rate	c) ECG	d) Telemedicine



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – II

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

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

2) **Assume** the suitable data **wherever** required.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain process of action potential generation with necessary diagram.
- 2) Explain the ways of measuring human body temperature.
- 3) Define and explain various types of heart sounds with neat figures.
- 4) List various blood pressure measurement techniques and explain any one direct method.
- 5) Design an instrumentation amplifier for amplifying EMG signal.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Explain using suitable diagram 12 lead ECG machine.
- 2) Explain working of EEG machine and draw various EEG wave patterns.
- 3) Classify arrhythmia and explain working of ambulatory monitoring system.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain the concept of telemedicine with example.
- 2) Differentiate between Micro, Macro and Leakage current with their ranges.
- 3) Draw and explain working of ECG telemetry transmitter.
- 4) Discuss various effects of electric current on the human body.
- 5) Which precautions that has to be taken to minimize electric hazards.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain block diagram of fetal monitoring system.
- 2) Draw and explain block diagram of EEG biofeedback technique.
- 3) Explain block diagram and working of a typical telemedicine setup.

Set P

Seat		
	Set	
No.	Set	U

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 **BIOMEDICAL INSTRUMENTATION - II**

Day and Date: Monday, 15-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Assume the 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

	,	•	tion, Q.P. Set (P/Q/	•	•
Duratio	n : 30 Minutes	MCQ/Objective T	ype Questions		Marks : 14
1. Ch	oose the correct ans	swer:			14
1)	are de to beat basis.	esigned to measur	e and record foetal I	neart rate on	a beat
	a) Pulse oximetry		b) Blood pressure	meter	
	c) Hb meter		d) Cardiotographs		
2)	The foetal heart rate the foetal	•	the foetal ECG by ap	propriately s	haping
	a) QRS	b) P	c) PQRST	d) T	
3)	In a telemedicine _	is the p	orimary information	source.	
	a) Records	b) Reports	c) Patients	d) Scans	
4)	Thec		•	able of relea	ising a
	a) Threshold	b) Minimum	c) Maximum	d) Leakage	
5)	The risk of producing and electrode area.	_	illation is related to	the current o	lensity
	a) Ventricular	b) Arterial	c) Cardiac valves	d) A. V. noo	de

6)	The patient leakage instrument between			ing the measuring outs.
	a) Line	b) Metal chases	c) Neutral	d) Earth
7)	Holter monitors pro		_	
	a) Heart rate	b) Pulse rate	c) ECG	d) Telemedicine
8)	The 'P' wave of EC	•	-	
	a) Depolarization of		b) Repolarization	of atria
	c) Depolarization	of ventricles	d) None	
9)	Tracing of the heart is called a		any two sites due to	electrical activity of
	a) Current	b) Resistance	c) Voltage	d) ECG wave
10)	The heart sounds acycle.	are produced by m	echanical events th	nat occur during the
	a) Cardiac	b) Respiratory	c) Circulation	d) Chemical
11)	A pattern of electro is called as	des on the head a	nd the channels the	ey are connected to
	a) Leads	b) Scalp	c) Jack box	d) Montage
12)	potenti	al is the integrated	response of the ac	tion of many cells.
	a) Resting	b) Polarizing	c) Evoked	d) Depolarized
13)	The oscillometric m		oscillometric	generated in
	a) Nerves	b) Veins	c) Arteries	d) Pulses
14)	The respiratory cyc	cle is accomplished	d by changes in the	thoracic
	a) Volume	b) Distance	c) Blood	d) Air



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – II

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

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

2) **Assume** the suitable data **wherever** required.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain process of action potential generation with necessary diagram.
- 2) Explain the ways of measuring human body temperature.
- 3) Define and explain various types of heart sounds with neat figures.
- 4) List various blood pressure measurement techniques and explain any one direct method.
- 5) Design an instrumentation amplifier for amplifying EMG signal.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Explain using suitable diagram 12 lead ECG machine.
- 2) Explain working of EEG machine and draw various EEG wave patterns.
- 3) Classify arrhythmia and explain working of ambulatory monitoring system.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain the concept of telemedicine with example.
- 2) Differentiate between Micro, Macro and Leakage current with their ranges.
- 3) Draw and explain working of ECG telemetry transmitter.
- 4) Discuss various effects of electric current on the human body.
- 5) Which precautions that has to be taken to minimize electric hazards.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain block diagram of fetal monitoring system.
- 2) Draw and explain block diagram of EEG biofeedback technique.
- 3) Explain block diagram and working of a typical telemedicine setup.

Seat No.	Set	R

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – II

Day and Date: Monday, 15-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Assume the 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

	MCQ/Objective	Type Questions		
Duration: 30 Minutes	•		Mark	s:14
1. Choose the correct a	ınswer:			14
	_	-	action of many cells. d) Depolarized	
The oscillometric the cuff during inf		n oscillometric	generated i	n
a) Nerves	b) Veins	c) Arteries	d) Pulses	
 The respiratory of a) Volume 	•	ed by changes in c) Blood		
4)are to beat basis.	designed to measu	ure and record foe	tal heart rate on a bea	at
a) Pulse oximetr	у	b) Blood press	ure meter	
c) Hb meter		d) Cardiotogra	phs	
5) The foetal heart ra	•	n the foetal ECG b	y appropriately shapin	g
a) QRS	b) P	c) PQRST	d) T	

6)	In a telemedicinea) Records		-	
7)	The c conductor by using	urrent at which the	e subject is still cap	•
	a) Threshold			d) Leakage
8)	The risk of producing and electrode area.		illation is related to	the current density
	a) Ventricular	b) Arterial	c) Cardiac valves	d) A. V. node
9)	The patient leakaginstrument between		-	
	a) Line	b) Metal chases	c) Neutral	d) Earth
10)	Holter monitors pro	vide continuous re	cording of 24-72 ho	ours of
	a) Heart rate	b) Pulse rate	c) ECG	d) Telemedicine
11)	The 'P' wave of EC a) Depolarization of	•	-	
	c) Depolarization of			or allia
12)	Tracing ofthe heart is called a		any two sites due to	electrical activity of
	a) Current	b) Resistance	c) Voltage	d) ECG wave
13)	The heart sounds a cycle.	are produced by m	echanical events th	nat occur during the
	a) Cardiac	b) Respiratory	c) Circulation	d) Chemical
14)	A pattern of electro is called as	des on the head a	nd the channels the	ey are connected to
	a) Leads	b) Scalp	c) Jack box	d) Montage

Set R



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – II

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

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

2) **Assume** the suitable data **wherever** required.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain process of action potential generation with necessary diagram.
- 2) Explain the ways of measuring human body temperature.
- 3) Define and explain various types of heart sounds with neat figures.
- 4) List various blood pressure measurement techniques and explain any one direct method.
- 5) Design an instrumentation amplifier for amplifying EMG signal.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Explain using suitable diagram 12 lead ECG machine.
- 2) Explain working of EEG machine and draw various EEG wave patterns.
- 3) Classify arrhythmia and explain working of ambulatory monitoring system.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain the concept of telemedicine with example.
- 2) Differentiate between Micro, Macro and Leakage current with their ranges.
- 3) Draw and explain working of ECG telemetry transmitter.
- 4) Discuss various effects of electric current on the human body.
- 5) Which precautions that has to be taken to minimize electric hazards.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain block diagram of fetal monitoring system.
- 2) Draw and explain block diagram of EEG biofeedback technique.
- 3) Explain block diagram and working of a typical telemedicine setup.

_____ Set R

Seat	
No.	

Set S

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – II

Day and Date: Monday, 15-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Assume the 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 T	ype Questions			
Duratio	n : 30 Minutes	_		Marks	: 14	
1. Ch	oose the correct ans	swer:			14	
1)	In a telemedicine _ a) Records	•	-			
2)	The conductor by using		•	able of releasing a		
	a) Threshold	b) Minimum	c) Maximum	d) Leakage		
3)	The risk of producing and electrode area.	•	illation is related to	the current density		
	a) Ventricular	b) Arterial	c) Cardiac valves	d) A. V. node		
4)	The patient leakaginstrument between		•	•		
	a) Line	b) Metal chases	c) Neutral	d) Earth		
5)	5) Holter monitors provide continuous recording of 24-72 hours of					
ŕ	a) Heart rate	b) Pulse rate	c) ECG	d) Telemedicine		

6)		of atria	ctrical activity associated with b) Repolarization of atria d) None			
7)	Tracing of the heart is called a		any	two sites due to	ele	ctrical activity of
	a) Current	b) Resistance	c)	Voltage	d)	ECG wave
8)	The heart sounds acycle.	are produced by m	ech	nanical events th	at c	occur during the
	a) Cardiac	b) Respiratory	c)	Circulation	d)	Chemical
9)	A pattern of electro is called as	des on the head a	nd	the channels the	y a	re connected to
	a) Leads	b) Scalp	c)	Jack box	d)	Montage
10)	potenti	al is the integrated	res	sponse of the ac	tion	of many cells.
	a) Resting	b) Polarizing	c)	Evoked	d)	Depolarized
11)	The oscillometric m the cuff during infla		osc	illometric		generated in
	a) Nerves	b) Veins	c)	Arteries	d)	Pulses
12)	The respiratory cyc	cle is accomplished	d b	y changes in the	tho	oracic
	a) Volume	b) Distance	c)	Blood	d)	Air
13)	are deto beat basis.					
	a) Pulse oximetry					eter
	c) Hb meter		d)	Cardiotographs		
14)	The foetal heart rate is computed from the foetal ECG by appropriately shaping the foetal wave.					
	a) QRS	b) P	c)	PQRST	d)	Т



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New – CGPA) Examination, 2017 BIOMEDICAL INSTRUMENTATION – II

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

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

2) **Assume** the suitable data **wherever** required.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain process of action potential generation with necessary diagram.
- 2) Explain the ways of measuring human body temperature.
- 3) Define and explain various types of heart sounds with neat figures.
- 4) List various blood pressure measurement techniques and explain any one direct method.
- 5) Design an instrumentation amplifier for amplifying EMG signal.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Explain using suitable diagram 12 lead ECG machine.
- 2) Explain working of EEG machine and draw various EEG wave patterns.
- 3) Classify arrhythmia and explain working of ambulatory monitoring system.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain the concept of telemedicine with example.
- 2) Differentiate between Micro, Macro and Leakage current with their ranges.
- 3) Draw and explain working of ECG telemetry transmitter.
- 4) Discuss various effects of electric current on the human body.
- 5) Which precautions that has to be taken to minimize electric hazards.

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain block diagram of fetal monitoring system.
- 2) Draw and explain block diagram of EEG biofeedback technique.
- 3) Explain block diagram and working of a typical telemedicine setup.

Total Marks: 70

Seat No.	Set	Р

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017

Time: 3.00 p.m. to 6.00 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	oose the correct an	swe	r:				
	1)	The primary X-ray by increasing the _		•	(per	cent) through a	patie	ent can be increased
		a) focus	b)	MAS	c)	Filtration	d)	Beam area
	2)	Speed of ultrasound	d de _l	pends upon				
		a) medium			b)	amplitude		
		c) material			d)	wavelength		
	3)	Gradual decrease	in X-	ray beam inte	nsit	y as it passes th	rou	gh material is called
		a) attenuation	b)	decay	c)	radioactivity	d)	imaging
	4)	Scattered X-ray be	ams	approach det	ecto	or screen		
		a) perpendicularly			b)	parallel		
		c) anti parallel			d)	at an angle		
	5)	Change in speed of	fultra	asound cause	s			
		a) reflection	b)	diffraction	c)	refraction	d)	image
	6)	Wavelength of X-ra	ays is	s in range				
,		a) 10^{-8} to 10^{-13} m			b)	10^{-7} to 10^{-14} r	n	
		c) 10^{-10} to 10^{-15} r	m		d)	10 ² to 10 ⁹ m		

7)	Attenuation coefficient depends on					
	a) frequency of X-ray photons	b) wavelength of X-ray photons				
	c) energy of X-ray photons	d) amplitude of X-ray photons				
8)	While fluoroscopy, the gain of the ima increasing the	ge intensifier tube can be increased by				
	a) KV	b) Density control				
	c) Gain control	d) Field of view (mode)				
9)	Visibility of detail in fluoroscopy can go	enerally be improved by using				
	a) Low KV	b) Small FOV (field of view)				
	c) Low MA	d) Low exposure rate				
10)	The quantum noise in a fluoroscopic image can generally be reduced by increasing					
	a) The KV	b) The field of view (mode)				
	c) Focal spot size	d) none of above				
11)	The maximum MA which can be used for a single radiographic exposure is related to the					
	a) KV	b) Exposure time				
	c) Focal spot size	d) all above				
12)	Molybdenum is the most common filter material in mammographic systems. It is used because it produces					
	a) Characteristic radiation					
	b) Increased breast penetration					
	c) High absorption above the K-edge energyd) High absorption below the K-edge energy					
	, .					
13)	The radiographic visibility and contrast of a 1 cm soft tissue mass in the body would generally be decreased by an increase in the					
	a) Focal spot sizec) Object	b) Field of viewd) Object-receptor distance				
14)	The thickness of an intensifying screen	has a significant effect on				
	a) Image contrast	b) Image data				
	c) Receptor capacity	d) Patient exposure				



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Total Marks : 56

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain given terms with reference to X rays:
 - a) Saturation voltage
 - b) Line focus principle
- 2) Describe various modes and applications of ultrasound imaging.
- 3) Define and explain Doppler principle.
- 4) Draw and explain construction of ultrasound transducer.
- 5) Explain all techniques of X-ray interaction with matter in short.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of X-ray image intensifier.
- 2) Explain continuous and pulsed Doppler ultrasound system.
- 3) Draw and explain working of X-ray tube and X-ray generator.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain construction and working principle of endoscopy.
- 2) Explain various detectors used in radiographic recording.
- 3) Describe principle and applications of mammography technique.
- 4) List and explain various components of endoscopy equipment.
- 5) Define and differentiate between fluoroscopy and image intensifier.



5. Attempt any 2 questions:

- 1) List various medical applications of endoscopy.
- 2) Explain working of thermographic machine with necessary diagrams.
- 3) Describe angiographic technique and with its applications.

Marks: 14

Seat No.		Set	Q
	II.		

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017 Total Marks: 70

Time: 3.00 p.m. to 6.00 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.

MCQ/Objective Type Questions

1. Choose the correct answer: 1) While fluoroscopy, the gain of the image intensifier tube can be increased by increasing the _____ a) KV b) Density control d) Field of view (mode) c) Gain control 2) Visibility of detail in fluoroscopy can generally be improved by using ______ b) Small FOV (field of view) a) Low KV c) Low MA d) Low exposure rate 3) The quantum noise in a fluoroscopic image can generally be reduced by increasing _____ a) The KV b) The field of view (mode) c) Focal spot size d) none of above 4) The maximum MA which can be used for a single radiographic exposure is related to the _____ a) KV b) Exposure time c) Focal spot size d) all above

5)	Molybdenum is the is used because it page a) Characteristic rabby Increased breast c) High absorption d) High absorption	oroduces adiation st penetration above the K-edge	ene	ergy	nog	graphic systems. It
6)	The radiographic v would generally be a) Focal spot size c) Object	•	ncre b)			
7)	The thickness of an a) Image contrast c) Receptor capac		h ha b)		fect	
8)	The primary X-ray by increasing thea) focus					ent can be increased Beam area
9)	Speed of ultrasound a) medium c) material	d depends upon	b)	amplitude wavelength	ŕ	
10)	Gradual decrease ia) attenuation	n X-ray beam inter b) decay				gh material is called imaging
1)	Scattered X-ray bea a) perpendicularly c) anti parallel	ams approach dete	b)	or screen parallel at an angle		
12)	Change in speed of a) reflection	ultrasound causes b) diffraction		refraction	d)	image
13)	Wavelength of X-ra a) 10^{-8} to 10^{-13} m c) 10^{-10} to 10^{-15} r	- 	,	10^{-7} to 10^{-14} n 10^2 to 10^9 m	n	
14)	Attenuation coefficional frequency of X-ray c) energy of X-ray	ay photons	-	wavelength of X-		•



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

Total Marks: 56

- 1) Explain given terms with reference to X rays:
 - a) Saturation voltage
 - b) Line focus principle
- 2) Describe various modes and applications of ultrasound imaging.
- 3) Define and explain Doppler principle.
- 4) Draw and explain construction of ultrasound transducer.
- 5) Explain all techniques of X-ray interaction with matter in short.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of X-ray image intensifier.
- 2) Explain continuous and pulsed Doppler ultrasound system.
- 3) Draw and explain working of X-ray tube and X-ray generator.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain construction and working principle of endoscopy.
- 2) Explain various detectors used in radiographic recording.
- 3) Describe principle and applications of mammography technique.
- 4) List and explain various components of endoscopy equipment.
- 5) Define and differentiate between fluoroscopy and image intensifier.

Set Q

5. Attempt any 2 questions:

- 1) List various medical applications of endoscopy.
- 2) Explain working of thermographic machine with necessary diagrams.
- 3) Describe angiographic technique and with its applications.

Seat	
No.	

Set R

Total Marks: 70

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017

Time: 3.00 p.m. to 6.00 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

Durati	on : 30 Minutes		Marks: 14
1. C	hoose the correct answer :		
1) Change in speed of ultrasound caus	ses	
	a) reflection b) diffraction	c) refraction	d) image
2) Wavelength of X-rays is in range		
	a) 10 ⁻⁸ to 10 ⁻¹³ m	b) 10 ⁻⁷ to 10 ⁻¹⁴ r	n
	c) 10^{-10} to 10^{-15} m	d) 10 ² to 10 ⁹ m	
3) Attenuation coefficient depends on _		
	a) frequency of X-ray photons	b) wavelength of	X-ray photons
	c) energy of X-ray photons	d) amplitude of X-	-ray photons
4) While fluoroscopy, the gain of the ir increasing the	nage intensifier tube	can be increased by
	a) KV	b) Density contro	I
	c) Gain control	d) Field of view (n	node)
5) Visibility of detail in fluoroscopy car	generally be improv	ed by using
	a) Low KV	b) Small FOV (fie	ld of view)
	c) Low MA	d) Low exposure	rate

6)	The quantum noise in a fluoroscopic image can generally be reduced by increasing				
	a) The KV		b)	The field of view	w (mode)
	c) Focal spot size		,	none of above	(
7)	The maximum MA related to the		d fo	r a single radiog	raphic exposure is
	a) KV		b)	Exposure time	
	c) Focal spot size		d)	all above	
8)	Molybdenum is the is used because it p				mographic systems. It
	a) Characteristic ra	adiation			
	b) Increased breas	•			
	c) High absorption	•		0,	
	d) High absorption	•		. ,	
9)	The radiographic v would generally be	-			sue mass in the body
	a) Focal spot size	decreased by arm		Field of view	
	c) Object		,	Object-recepto	r distance
10)	The thickness of an	intensifying screer	n ha	s a significant ef	fect on
. • ,	a) Image contrast	g co.co.		Image data	
	c) Receptor capac	ity	,	Patient exposu	re
11)	The primary X-ray by increasing the	-	per	cent) through a p	patient can be increased
	a) focus		c)	Filtration	d) Beam area
12)	Speed of ultrasound	d depends upon			
	a) medium		b)	amplitude	
	c) material		d)	wavelength	
13)	Gradual decrease i	n X-ray beam inte	nsit	y as it passes th	rough material is called
	a) attenuation	b) decay	c)	radioactivity	d) imaging
14)	Scattered X-ray bea	ams approach dete	ecto	or screen	
	a) perpendicularly		b)	parallel	
	c) anti parallel		d)	at an angle	



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

Total Marks: 56

- 1) Explain given terms with reference to X rays:
 - a) Saturation voltage
 - b) Line focus principle
- 2) Describe various modes and applications of ultrasound imaging.
- 3) Define and explain Doppler principle.
- 4) Draw and explain construction of ultrasound transducer.
- 5) Explain all techniques of X-ray interaction with matter in short.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of X-ray image intensifier.
- 2) Explain continuous and pulsed Doppler ultrasound system.
- 3) Draw and explain working of X-ray tube and X-ray generator.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain construction and working principle of endoscopy.
- 2) Explain various detectors used in radiographic recording.
- 3) Describe principle and applications of mammography technique.
- 4) List and explain various components of endoscopy equipment.
- 5) Define and differentiate between fluoroscopy and image intensifier.

Set R

5. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) List various medical applications of endoscopy.
- 2) Explain working of thermographic machine with necessary diagrams.
- 3) Describe angiographic technique and with its applications.

-4-

	SL	R-	V	Β	_	3	64
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Seat	Set)
No.	Set	5

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017 Total Marks: 70

Time: 3.00 p.m. to 6.00 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) The quantum noise in a fluoroscopic image can generally be reduced by increasing a) The KV b) The field of view (mode) d) none of above c) Focal spot size 2) The maximum MA which can be used for a single radiographic exposure is related to the a) KV b) Exposure time d) all above c) Focal spot size 3) Molybdenum is the most common filter material in mammographic systems. It is used because it produces _____ a) Characteristic radiation b) Increased breast penetration c) High absorption above the K-edge energy d) High absorption below the K-edge energy

4) The radiographic visibility and contrast of a 1 cm soft tissue mass in the body

b) Field of view

d) Object-receptor distance

would generally be decreased by an increase in the ___

a) Focal spot size

c) Object

5)	The thickness of an a) Image contrast c) Receptor capaci	n has a significant effect on b) Image data d) Patient exposure				
6)	The primary X-ray by increasing thea) focus					ent can be increased Beam area
7)	Speed of ultrasounce a) medium c) material	•	b)		u)	Beamarea
8)	•	n X-ray beam inter b) decay	rsit	y as it passes t		gh material is called imaging
9)	Scattered X-ray bea a) perpendicularly c) anti parallel	ams approach dete	b)	or screen parallel at an angle	,	
10)	Change in speed of a) reflection				d)	image
11)	Wavelength of X-ra a) 10^{-8} to 10^{-13} m c) 10^{-10} to 10^{-15} n		b)	10 ⁻⁷ to 10 ⁻¹⁴ 10 ² to 10 ⁹ m	m	
12)	Attenuation coefficients a) frequency of X-ray energy of X-ray	ay photons	b)	wavelength of amplitude of X		
13)	While fluoroscopy, increasing thea) KV c) Gain control		b)	intensifier tube Density contro Field of view (ol	
14)	Visibility of detail in a) Low KV c) Low MA	fluoroscopy can g	ene b)	`	ved b	y using



Seat	
No.	

T.E. (Biomedical Engineering) (Part – II) (New-CGPA) Examination, 2017 MEDICAL IMAGING – I

Day and Date: Wednesday, 17-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Total Marks: 56

SECTION - I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain given terms with reference to X rays:
 - a) Saturation voltage
 - b) Line focus principle
- 2) Describe various modes and applications of ultrasound imaging.
- 3) Define and explain Doppler principle.
- 4) Draw and explain construction of ultrasound transducer.
- 5) Explain all techniques of X-ray interaction with matter in short.

3. Attempt any 2 questions:

 $(6 \times 2 = 12)$

- 1) Draw and explain working of X-ray image intensifier.
- 2) Explain continuous and pulsed Doppler ultrasound system.
- 3) Draw and explain working of X-ray tube and X-ray generator.

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) Explain construction and working principle of endoscopy.
- 2) Explain various detectors used in radiographic recording.
- 3) Describe principle and applications of mammography technique.
- 4) List and explain various components of endoscopy equipment.
- 5) Define and differentiate between fluoroscopy and image intensifier.



5. Attempt any 2 questions:

- 1) List various medical applications of endoscopy.
- 2) Explain working of thermographic machine with necessary diagrams.
- 3) Describe angiographic technique and with its applications.

Seat No.		Set	Р
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T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 CONTROL SYSTEMS

Day and Date: Friday, 19-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 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				
	MCQ/	Objective Type	Question	S	
Dur	ation : 30 Minutes	, ,,			Marks: 14
1.	Choose the correct answer:				(1×14=14)
	 A signal flow graph is a grather the variables of a set of a) Linear algebraic c) First order 	equa b)		r	between
	2) The input is a linearly with time.a) Stepc) Ramp	b)	arts at a val Impulse None	ue of zero and i	ncreases
	3) With the use of obtained. a) Mass c) Dashpot	b)	chanical tr Spring All above	anslational sys	tems are
	4) For Nyquist contour, the s a) 25 b) 0	size of radius is c)		d) ∞	
	5) According to Nyquist state zero's of 9(s) corresponda) On left halfc) On right half	ing 9 to s-plane b)		·	on of all

6)	If the constant 'K' is be	s positive then its o	con	tribution on the p	oha	se plot will
	a) 0°	b) 45°	c)	90°	d)	180°
7)	The system is said	to be marginally st	tabl	e, if gain margin	is	
	a) 0	b) 1	c)	+∞	d)	None of above
8)	For a unity feedbac	ck system with G(s	s) =	10/s ² the value	of o	centroid will
	be					
	a) 0	b) 2	c)	5	d)	10
9)	The steady state er	ror of the system o	dep	ends on		
	a) Order	b) Type	c)	Size	d)	Prototype
10)	In signal flow graph forward path is kno			gains wh	ile	going through a
	a) Branch	b) Path		Node	d)	Loop
11)	The nature of bandwidth for a good control system is					
	a) Large	_	b)	Small		
	c) Medium		d)	All above		
12)	The nature of root le	ocus about the rea	al ax	dis is	_	
	a) Asymmetric		b)	Symmetric		
	c) Exponential		d)	Decaying		
13)	In a second order system, if the damping ratio is greater than equal to '1'					
	then, the nature of roots will be					
	a) Imaginary		b)	Real and equal		
	c) Real but not equ	ıal	d)	Complex conjug	gate	9
14)	In block diagram re	presentation, the I	line	s connecting the	blo	ocks, called
	as					
	a) Branches		,	Nodes		
	c) Daturn		d)	Sources		



Seat	
No.	

T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 CONTROL SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) State and explain Mason's gain formula in detail.
- 2) Explain differential equation for translational systems with necessary figure.
- 3) Draw symbols for following block diagram reduction technique.
 - a) Moving summing point rafter a block.
 - b) Eliminating a feedback loop.
- 4) Define following standard test signals.
 - a) Step function

b) Ramp signal

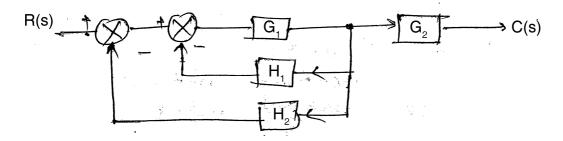
c) Parabolic function

- d) Impulse signal
- 5) Draw time response specifications of 2nd order system and indicate all time constants.

3. Attempt any 2:

 $(6 \times 2 = 12)$

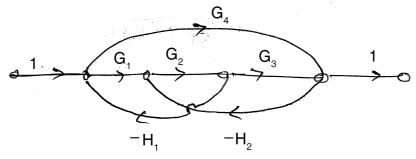
1) Find C(s)/R(s) for given block diagram using block reduction technique.



2) With the help of diagram explain time response specifications of second order system.

-4-

3) Find transfer function of given system using Mason's gain formula.



SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Define following terms and mention their significance.
 - a) Gain margin
- b) Phase margin
- 2) Find the root locus of the unity feedback system having $G(s) = \frac{k}{s+1}$ for given figure.

$$R(s) \xrightarrow{k} C(s)$$

- 3) Define and differentiate between Bode plot and Polar plot.
- 4) A unity feedback control system has G(s) = 40. Draw Bode plot.
- 5) Find the polar plot of $G(s) = \frac{8}{[s(s+1)]}$.
- 5. Attempt any two questions:

- 1) A unity feedback system has $G(s) = \frac{20}{s(s+2)}$. Draw the Bode plot.
- 2) Write a note on:
 - a) Lead compensating network.
 - b) Log compensating network.
- 3) Find frequency domain specification with a unity feedback system having

$$G(s) = \frac{36}{[s(s+8)]}$$

Seat No.		Set	Q	
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T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 CONTROL SYSTEMS

Day and Date: Friday, 19-5-2017 Max. Marks: 70
Time: 3.00 p.m. to 6.00 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/Objecti	ve Type Questions	S
Duration	on : 30 Minutes	•	••	Marks: 14
1. Cl	hoose the correc	ct answer :		(1×14=14)
1)) For a unity fe	edback system w	ith $G(s) = 10/s^2$ th	e value of centroid will
	a) 0	b) 2	c) 5	d) 10
2) The steady sta	ite error of the syst	em depends on	
	a) Order	b) Type	c) Size	d) Prototype
3)		raph, the product of known as "Path g		ns while going through a
	a) Branch	b) Path	c) Node	d) Loop
4)) The nature of b a) Large c) Medium	oandwidth for a god	od control system is b) Small d) All above	S
5)	The nature of ra) Asymmetricc) Exponentia	C	e real axis is b) Symmetric d) Decaying	

6)	In a second order sy	stem, if the damp	oing	ratio is greater	tha	n equal to '1'
	then, the nature of ro	ots will be		_		
	a) Imaginary		b)	Real and equal		
	c) Real but not equa	l	d)	Complex conjug	jate	•
7)	In block diagram rep	resentation, the I	ine	s connecting the	blc	ocks, called
	as					
	a) Branches		b)	Nodes		
	c) Daturn		d)	Sources		
8)	A signal flow graph is the variables of a set	• .			atio	nships between
	a) Linear algebraic		,	Zero order		
	c) First order		d)	Variable algebra	aic	
9)	Theinpu linearly with time.	t is a signal which	sta	arts at a value of	zer	o and increases
	a) Step		b)	Impulse		
	c) Ramp		d)	None		
10)	With the use of	element	me	chanical transla	tior	nal systems are
	obtained.					
	a) Mass		,	Spring		
	c) Dashpot			All above		
11)	For Nyquist contour,					
	a) 25 k	o) 0	c)	I	d)	∞
12)	According to Nyquist zero's of 9(s) corresp a) On left half	•	ane		the	position of all
	c) On right half			Random		
13)	If the constant 'K' is p	positive then its o	,		oha	se plot will
,	be					
	a) 0° k	o) 45°	c)	90°	d)	180°
14)	The system is said to	be marginally st	tabl	e, if gain margin	is_	
	a) 0 k	o) 1	c)	+∞	d)	None of above



T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 CONTROL SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) State and explain Mason's gain formula in detail.
- 2) Explain differential equation for translational systems with necessary figure.
- 3) Draw symbols for following block diagram reduction technique.
 - a) Moving summing point rafter a block.
 - b) Eliminating a feedback loop.
- 4) Define following standard test signals.
 - a) Step function

b) Ramp signal

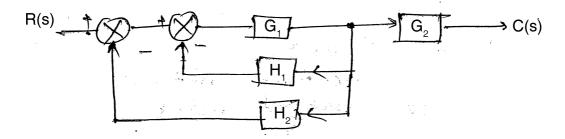
c) Parabolic function

- d) Impulse signal
- 5) Draw time response specifications of 2nd order system and indicate all time constants.

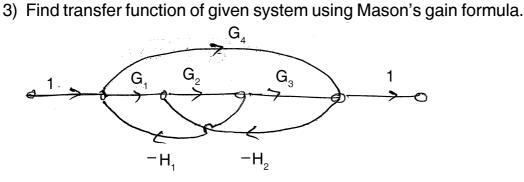
3. Attempt any 2:

 $(6 \times 2 = 12)$

1) Find C(s)/R(s) for given block diagram using block reduction technique.



2) With the help of diagram explain time response specifications of second order system.



SECTION - II

-4-

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Define following terms and mention their significance.
 - a) Gain margin
- b) Phase margin
- 2) Find the root locus of the unity feedback system having $G(s) = \frac{k}{s+1}$ for given figure.

$$R(s) \xrightarrow{k} C(s)$$

- 3) Define and differentiate between Bode plot and Polar plot.
- 4) A unity feedback control system has G(s) = 40. Draw Bode plot.
- 5) Find the polar plot of $G(s) = \frac{8}{[s(s+1)]}$.
- 5. Attempt any two questions:

- 1) A unity feedback system has $G(s) = \frac{20}{s(s+2)}$. Draw the Bode plot.
- 2) Write a note on:
 - a) Lead compensating network.
 - b) Log compensating network.
- 3) Find frequency domain specification with a unity feedback system having

$$G(s) = \frac{36}{[s(s+8)]}.$$

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T.E	. (Biomedica		II) (New – CGPA DL SYSTEMS) Examination	, 20°	17	
-	d Date : Friday 3.00 p.m. to 6.0			Max.	Mark	s:70)
	Instructions :	30 minutes in A carries one ma 2) Answer MCQ/	npulsory. It should It Answer book Page N rk. Objective type que get to mention, Q.F	No. 3. Each quest estions on Page	ion No.		
		MCQ/Objecti	ve Type Questions				
Duratio	on : 30 Minutes				Mark	s: 14	1
1. Ch	oose the corre	ct answer:			(1×1	4=14)
1)	_	corresponding 9 to f	terion, where shoul s-plane. b) At the cento d) Random	•	of a	ıll	
2)	If the constan	t 'K' is positive ther	its contribution on	the phase plot wi	11		
	a) 0°	 b) 45°	c) 90°	d) 180°			
3)	The system is a) 0	s said to be margina b) 1	Illy stable, if gain matching $c) + \infty$	argin is d) None of a	— abov	e	
4)	For a unity fee	-	$G(s) = 10/s^2$ the va	alue of centroid w	/ill		
	a) 0	b) 2	c) 5	d) 10			
5)	The steady st	ate error of the syst	em depends on				
	a) Order	b) Type	c) Size	d) Prototype)		
6)	In signal flow	graph, the product o	of allgain	s while going thro	ough	a	

forward path is known as "Path gain".

b) Path

c) Node

a) Branch

d) Loop

7)	The nature of bandwidth for a good co	ntr	ol system is
	a) Large	b)	Small
	c) Medium	d)	All above
8)	The nature of root locus about the rea	lax	kis is
	a) Asymmetric	b)	Symmetric
	c) Exponential	d)	Decaying
9)	In a second order system, if the damp then, the nature of roots will be		
	a) Imaginary	b)	Real and equal
	c) Real but not equal	d)	Complex conjugate
10)	In block diagram representation, the I	ine	s connecting the blocks, called
	as		
	a) Branches	b)	Nodes
	c) Daturn	d)	Sources
11)	A signal flow graph is a graphical repretible variables of a set of ed		
	a) Linear algebraic	,	
	c) First order	d)	Variable algebraic
12)	The input is a signal which linearly with time.	sta	arts at a value of zero and increases
	a) Step	b)	Impulse
	c) Ramp	,	None
13)	With the use of element obtained.	me	chanical translational systems are
	a) Mass	b)	Spring
	c) Dashpot	d)	All above
14)	For Nyquist contour, the size of radius	s is	
	a) 25 b) 0	c)	I d) ∞



T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 CONTROL SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) State and explain Mason's gain formula in detail.
- 2) Explain differential equation for translational systems with necessary figure.
- 3) Draw symbols for following block diagram reduction technique.
 - a) Moving summing point rafter a block.
 - b) Eliminating a feedback loop.
- 4) Define following standard test signals.
 - a) Step function

b) Ramp signal

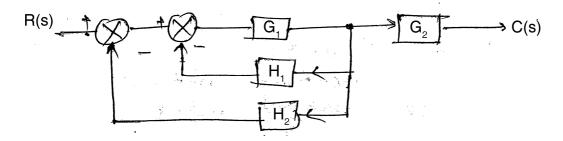
c) Parabolic function

- d) Impulse signal
- 5) Draw time response specifications of 2nd order system and indicate all time constants.

3. Attempt any 2:

 $(6 \times 2 = 12)$

1) Find C(s)/R(s) for given block diagram using block reduction technique.

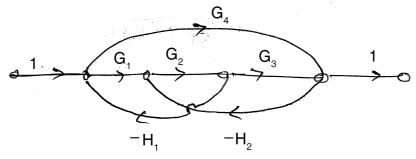


2) With the help of diagram explain time response specifications of second order system.



-4-

3) Find transfer function of given system using Mason's gain formula.



SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Define following terms and mention their significance.
 - a) Gain margin
- b) Phase margin
- 2) Find the root locus of the unity feedback system having $G(s) = \frac{k}{s+1}$ for given figure.

$$R(s) \xrightarrow{f} C(s)$$

- 3) Define and differentiate between Bode plot and Polar plot.
- 4) A unity feedback control system has G(s) = 40. Draw Bode plot.
- 5) Find the polar plot of $G(s) = \frac{8}{[s(s+1)]}$.
- 5. Attempt any two questions:

 $(6 \times 2 = 12)$

- 1) A unity feedback system has $G(s) = \frac{20}{s(s+2)}$. Draw the Bode plot.
- 2) Write a note on:
 - a) Lead compensating network.
 - b) Log compensating network.
- 3) Find frequency domain specification with a unity feedback system having

$$G(s) = \frac{36}{[s(s+8)]}.$$

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T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 CONTROL SYSTEMS

Day and Date: Friday, 19-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 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	atio	n : 30 Minutes					Marks: 14
1.	Ch	oose the correct an	swer:				(1×14=14)
	1)	In signal flow graph forward path is kno	•		gains w	hile going thr	ough a
		a) Branch	b) Path	c)	Node	d) Loop	
	2)	The nature of band	lwidth for a good co	ontr	ol system is		
		a) Large		b)	Small		
		c) Medium		d)	All above		
	3)	The nature of root	locus about the rea	al ax	dis is		
		a) Asymmetric		b)	Symmetric		
		c) Exponential		d)	Decaying		
	4)	In a second order	system, if the dam	ping	ratio is greate	than equal t	o '1'
		then, the nature of	roots will be		_		
		a) Imaginary		b)	Real and equa	I	
		c) Real but not equ	ual	d)	Complex conju	gate	

5)	In block diagram representation, the lines connecting the blocks, called as					
	a) Branches c) Daturn		,	Nodes Sources		
6)	A signal flow graph is a graphical representation of the relationships between the variables of a set of equations.					
	a) Linear algebraicc) First order		,	Zero order Variable algebra	aic	
7)	The input is a signal which starts at a value of zero and increases					
	linearly with time. a) Step c) Ramp			Impulse None		
8)	With the use of element mechanical translational systems are obtained.					
	a) Massc) Dashpot		•	Spring All above		
9)	For Nyquist contou a) 25	r, the size of radium b) 0	s is c)		d)	∞
10)	According to Nyquist stability criterion, where should be the position of all zero's of 9(s) corresponding 9 to s-plane. a) On left half b) At the center					position of all
c) On right halfd) Random11) If the constant 'K' is positive then its contribution on the pha					se plot will	
,	be	•		·		•
12\	a) 0°The system is said	b) 45°	•		,	180°
12)	a) 0					None of above
13)	For a unity feedbac	·			•	
ŕ	be	·	•			
	a) 0	b) 2	c)	5	d)	10
14)	The steady state er	ror of the system o	depe	ends on		_
	a) Order	b) Type	c)	Size	d)	Prototype



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T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 CONTROL SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any 4 questions:

 $(4 \times 4 = 16)$

- 1) State and explain Mason's gain formula in detail.
- 2) Explain differential equation for translational systems with necessary figure.
- 3) Draw symbols for following block diagram reduction technique.
 - a) Moving summing point rafter a block.
 - b) Eliminating a feedback loop.
- 4) Define following standard test signals.
 - a) Step function

b) Ramp signal

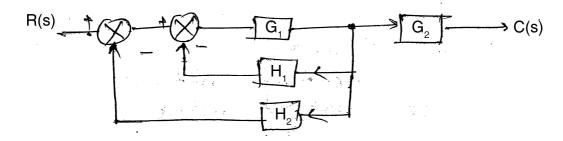
c) Parabolic function

- d) Impulse signal
- 5) Draw time response specifications of 2nd order system and indicate all time constants.

3. Attempt any 2:

 $(6 \times 2 = 12)$

1) Find C(s)/R(s) for given block diagram using block reduction technique.

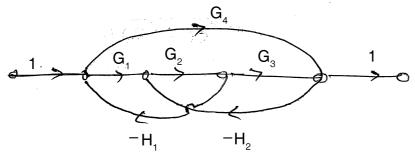


2) With the help of diagram explain time response specifications of second order system.



-4-

3) Find transfer function of given system using Mason's gain formula.



SECTION - II

4. Attempt any four questions:

 $(4 \times 4 = 16)$

- 1) Define following terms and mention their significance.
 - a) Gain margin
- b) Phase margin
- 2) Find the root locus of the unity feedback system having $G(s) = \frac{k}{s+1}$ for given figure.

$$R(s) \xrightarrow{k} C(s)$$

- 3) Define and differentiate between Bode plot and Polar plot.
- 4) A unity feedback control system has G(s) = 40. Draw Bode plot.
- 5) Find the polar plot of $G(s) = \frac{8}{[s(s+1)]}$.
- 5. Attempt any two questions:

- 1) A unity feedback system has $G(s) = \frac{20}{s(s+2)}$. Draw the Bode plot.
- 2) Write a note on:
 - a) Lead compensating network.
 - b) Log compensating network.
- 3) Find frequency domain specification with a unity feedback system having

$$G(s) = \frac{36}{[s(s+8)]}.$$

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T.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2017 DIGITAL SIGNAL PROCESSING

DIGITAL SIGNAL PROCESSING						
-	Day and Date : Monday, 22-5-2017 Max. Marks : 7 Time : 3.00 p.m. to 6.00 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 Ty	pe Questions			
Duration	: 30 Minutes			Marks: 14		
1. Cho	oose the correct answe	er:		(14×1=14)		
1)	is the d	isadvantage of impuls	e invariant method.			
	a) aliasing	b) one mapping	c) anti aliasing	d) warping		
2)	The most common ted	chnique for design of I	IR digital filter is	method.		
	a) direct	b) indirect	c) recursive	d) non recursive		
3)	The transition band is	move in				
	a) Butterworth filter		b) Chebyshev 1			
	c) Chebyshev 2		d) FIR filter			
4)	A causal and stable II	R filter has				
	a) linear phase		b) non linear phase			
	c) linear amplitude		d) no amplitude			
5)	DFT is applied to					
	a) infinite sequence					
	b) finite discrete sequences					
c) continuous infinite signalsd) continuous finite sequence						
c)	•	•				
6)	The basic properties (a) linearity		c) summation	d) circular symmetry		
٦١		, .	,	,		
/)	Giving one period of p a) periodic	b) aperiodic	called con	d) circular		
C \	, .	, .	,	•		
8)	Forward and inverse					
	a) integers	b) infinite	c) finite	d) discrete		

-2-



9)	is the width of the main lobe of the frequency response of a rectangular window					
	of length M – 1.					
	a) π/M	b) $2\pi/M$	c)	$4\pi/M$	d)	8π/M
10)	is the approximate transition width of main lobe of a Hamming window.					
	a) $4\pi/M$	b) 8π/M	c)	12π/M	d)	$2\pi/M$
11)) For the calculation of N-point DFT, Radix – 2 FFT algorithm repeatss					stages.
	a) 2(N Log	2N)	b)	(N Log2 N) ² /2		
	c) (N Log 2	N)/2 stage	d)	(Log N)/2N		
12)	system filters exhibit their dependency upon the system design for stabili					
response.						
	a) FIR	b) IIR	c)	Both a and b	d)	None
13)	In cascade for coefficient.	orm of realization bit	s sh	ould be used to	repres	sent the FIR filter
	a) 5 to 10	b) 12 to 14	c)	20 to 24	d)	28 to 40
14)		is the operating level of s	am	oling rate for th	e sub	filters involved in
	polyphase fil	Iters.				
	a) low	b) moderate	c)	high	d)	none

Seat No.

T.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2017 DIGITAL SIGNAL PROCESSING

-3-

Day and Date: Monday, 22-5-2017

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any 4: (4×4=16)

1) State shifting property of DFT.

- 2) State the relationship between DTFT and Z transform.
- 3) Find the DTFT of u(n).
- 4) Find the N point DFT for $x(n) = a^n$ for 0 < a < 1.
- 5) Realise the following non-causal linear phase FIR system function $H(z) = \frac{2}{3}z + 1 + \frac{2}{3}z^{-1}$.
- 3. Attempt any two: (6×2=12)
 - 1) Find 4 point DFT sequence of $x(n) = \cos \frac{n\pi}{4}$.
 - 2) Compute $X_1(n) \times X_2(n)$ if,

$$x_1(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3)$$

$$x_{2}(n) = \delta(n) - \delta(n-2) + \delta(n-4)$$
 for N = 5.

3) Obtain a cascade realisation of the system characterized by transfer function

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}.$$

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

Marks: 56

1) A low pass filter has the desired response as given below:

$$H_{d}\left(e^{j\omega}\right) = \begin{cases} e^{-3j\omega} & \text{,} \quad 0 \leq \omega < \frac{\pi}{2} \\ \\ 0 & \text{,} \quad \frac{\pi}{2} \leq \omega \leq \pi \end{cases}$$

Determine filter coefficient h(n) for M = 7 using Type I frequency sampling technique.

Set P

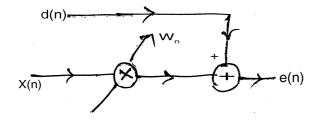


- 2) Use the backward difference for the derivative and convert the analog filter with system function $H(s) = \frac{1}{s^2 + 16}$.
- 3) What is an IIR filter? Compare its characteristics with an FIR filter.
- 4) Explain how noise cancellation is done using adaptive filters.
- 5) The length of FIR filter is 13. If the filter has a linear phase show that

$$\sum_{n=0}^{\frac{M-1}{2}}\,h(n)\,sin\,\omega\,(\tau-n)=0\;.$$

5. Attempt any two : (6×2=12)

- 1) Using a rectangular window, design a low pass filter with passband gain of unity, cutoff frequency of 1 KHz and working at a sampling frequency of 5 KHz. The length of the impulse response is 7.
- 2) Apply bilinear transformation to $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
- 3) Consider a single weight adaptive filter shown and write LMS algorithm for updating the weight w.



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	T.E. (Biome	dical Engg.) (Part – II DIGITAL SIGNA) (New CGPA) Exa L PROCESSING	minat	ion, 2017
-	Date : Monday, .00 p.m. to 6.00 p				Max. Marks : 70
	Instructions :	2) Answer MCQ/Object	lo. 3 . Each question c	arries c on Page	ne mark. No. 3 only. Don't
Duration	: 30 Minutes	MCQ/Objective	Type Questions		Marks : 14
1. Cho	oose the correct	answer:			(14×1=14)
1)	Forward and inv	verse Fourier transform ex	kists for samples havir	ng value	es
	a) integers	b) infinite	c) finite	d) (discrete
2)	is the of length M – 1.	width of the main lobe of the	ne frequency response	of a red	ctangular window
	a) π/M	b) 2π/M	c) 4π/M	d)	8π/M
3)	is t	he approximate transition	width of main lobe of a	a Hamn	ning window.
	a) 4π/M		c) 12π/M		2π/M
4)	For the calculati	on of N-point DFT, Radix	- 2 FFT algorithm rep	eats	stages.
	a) 2(N Log 2N)		b) (N Log2 N) ² /2		
	c) (N Log 2N)/2	2 stage	d) (Log N)/2N		
5)	sys	stem filters exhibit their de	ependency upon the sy	/stem d	esign for stability
	a) FIR	b) IIR	c) Both a and b	d) I	None
6)	In cascade form coefficient.	of realization b	oits should be used to	represe	ent the FIR filter
	a) 5 to 10	b) 12 to 14	c) 20 to 24	d) 2	28 to 40
7)		is the operating level of	sampling rate for the	e sub f	ilters involved in
	polyphase filters	S.			
	a) low	b) moderate	c) high	d) r	none
8)	is	the disadvantage of impu	ılse invariant method.		
	a) aliasing	b) one mapping	c) anti aliasing	d) ۱	warping

-2-



9)	The most common tec	hnique for design of I	IR digital filter is	method.
	a) direct	b) indirect	c) recursive	d) non recursive
10)	The transition band is	move in		
	a) Butterworth filter		b) Chebyshev 1	
	c) Chebyshev 2		d) FIR filter	
11)	A causal and stable III	R filter has		
	a) linear phase		b) non linear phase	
	c) linear amplitude		d) no amplitude	
12)	DFT is applied to			
	a) infinite sequence			
	b) finite discrete sequ	uence		
	c) continuous infinite	signals		
	d) continuous finite se	equence		
13)	The basic properties of	of DFT includes		
	a) linearity	b) periodicity	c) summation	d) circular symmetry
14)	Giving one period of p	eriodic convolution is	called con	volution.
	a) periodic	b) aperiodic	c) correlation	d) circular

Seat No.

T.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2017 DIGITAL SIGNAL PROCESSING

Day and Date: Monday, 22-5-2017

Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any 4: (4×4=16)

1) State shifting property of DFT.

- 2) State the relationship between DTFT and Z transform.
- 3) Find the DTFT of u(n).
- 4) Find the N point DFT for $x(n) = a^n$ for 0 < a < 1.
- 5) Realise the following non-causal linear phase FIR system function $H(z) = \frac{2}{3}z + 1 + \frac{2}{3}z^{-1}$.
- 3. Attempt any two: (6×2=12)
 - 1) Find 4 point DFT sequence of $x(n) = \cos \frac{n\pi}{4}$.
 - 2) Compute $X_1(n) \times X_2(n)$ if,

$$x_1(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3)$$

$$x_{2}(n) = \delta(n) - \delta(n-2) + \delta(n-4)$$
 for N = 5.

3) Obtain a cascade realisation of the system characterized by transfer function

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}.$$

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

1) A low pass filter has the desired response as given below:

$$H_{d}\left(e^{j\omega}\right) = \begin{cases} e^{-3j\omega} & \text{,} \quad 0 \leq \omega < \frac{\pi}{2} \\ \\ 0 & \text{,} \quad \frac{\pi}{2} \leq \omega \leq \pi \end{cases}$$

Determine filter coefficient h(n) for M = 7 using Type I frequency sampling technique.

Set Q

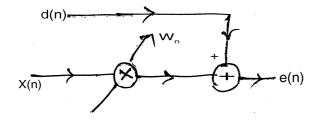


- 2) Use the backward difference for the derivative and convert the analog filter with system function $H(s) = \frac{1}{s^2 + 16}$.
- 3) What is an IIR filter? Compare its characteristics with an FIR filter.
- 4) Explain how noise cancellation is done using adaptive filters.
- 5) The length of FIR filter is 13. If the filter has a linear phase show that

$$\sum_{n=0}^{\frac{M-1}{2}} h(n) \sin \omega (\tau - n) = 0.$$

5. Attempt any two: (6×2=12)

- 1) Using a rectangular window, design a low pass filter with passband gain of unity, cutoff frequency of 1 KHz and working at a sampling frequency of 5 KHz. The length of the impulse response is 7.
- 2) Apply bilinear transformation to $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
- 3) Consider a single weight adaptive filter shown and write LMS algorithm for updating the weight w.



Seat No. Set R	I		Set	R
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	i.E. (bioineaid	•• , ,	IAL PROCESSING	amination, 201 <i>1</i>	
-	Date : Monday, 22- 00 p.m. to 6.00 p.m.			Max. M	arks : 70
	•	Answer Book Page Answer MCQ/Obje	llsory. It should be solve to No. 3. Each question of the ective type questions to Q.P. Set (P/Q/R/S) on	carries one mark. on Page No. 3 only.	
Duration	: 30 Minutes	MCQ/Objectiv	e Type Questions	M	arks : 14
1. Cho	oose the correct ans	wer:		(1	4×1=14)
1)	DFT is applied to				
	a) infinite sequenc	e			
	b) finite discrete se	equence			
	c) continuous infin	ite signals			
	d) continuous finite	e sequence			
2)	The basic propertie	es of DFT includes			
	a) linearity	b) periodicity	c) summation	d) circular symm	etry
3)	Giving one period of	of periodic convolution	on is called c	convolution.	
	a) periodic	b) aperiodic	c) correlation	d) circular	
4)	Forward and invers	e Fourier transform	exists for samples havi	ng values	
	a) integers	b) infinite	c) finite	d) discrete	
5)	is the wic	Ith of the main lobe o	of the frequency response	e of a rectangular win	dow
	of length M – 1.				
	a) π/M	b) $2\pi/M$	c) $4\pi/M$	d) $8\pi/M$	
6)	is the	approximate transiti	on width of main lobe of	a Hamming window.	
	a) 4π/M	b) 8π/M	c) 12π/M	d) $2\pi/M$	
7)	For the calculation	of N-point DFT, Rac	lix – 2 FFT algorithm rep	oeatsstag	ges.
	a) 2(N Log 2N)		b) (N Log2 N) ² /2		
	c) (N Log 2N)/2 st	age	d) (Log N)/2N		

-2-



8)	system fi	Iters exhibit their dep	end	ency upon the sys	tem	design for stability
	response.					
	a) FIR	b) IIR	c)	Both a and b	d)	None
9)	In cascade form of rea	lization bit	s sh	nould be used to re	pres	sent the FIR filter
	coefficient.					
	a) 5 to 10	b) 12 to 14	c)	20 to 24	d)	28 to 40
10)	is the	operating level of s	am	oling rate for the	sub	filters involved in
	polyphase filters.					
	a) low	b) moderate	c)	high	d)	none
11)	is the di	sadvantage of impuls	e in	variant method.		
	a) aliasing	b) one mapping	c)	anti aliasing	d)	warping
12)	The most common tec	hnique for design of I	IR c	ligital filter is		method.
	a) direct	b) indirect	c)	recursive	d)	non recursive
13)	The transition band is	move in				
	a) Butterworth filter		b)	Chebyshev 1		
	c) Chebyshev 2		d)	FIR filter		
14)	A causal and stable III	R filter has				
	a) linear phase		b)	non linear phase		
	c) linear amplitude		d)	no amplitude		

T.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2017 DIGITAL SIGNAL PROCESSING

-3-

Day and Date: Monday, 22-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any 4: (4×4=16)

1) State shifting property of DFT.

- 2) State the relationship between DTFT and Z transform.
- 3) Find the DTFT of u(n).
- 4) Find the N point DFT for $x(n) = a^n$ for 0 < a < 1.
- 5) Realise the following non-causal linear phase FIR system function $H(z) = \frac{2}{3}z + 1 + \frac{2}{3}z^{-1}$.
- 3. Attempt any two: (6×2=12)
 - 1) Find 4 point DFT sequence of $x(n) = \cos \frac{n\pi}{4}$.
 - 2) Compute $X_1(n) \times X_2(n)$ if,

$$x_1(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3)$$

$$x_{2}(n) = \delta(n) - \delta(n-2) + \delta(n-4)$$
 for N = 5.

3) Obtain a cascade realisation of the system characterized by transfer function

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}.$$

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

1) A low pass filter has the desired response as given below:

$$H_{d}\left(e^{j\omega}\right) = \begin{cases} e^{-3j\omega} & \text{,} \quad 0 \leq \omega < \frac{\pi}{2} \\ \\ 0 & \text{,} \quad \frac{\pi}{2} \leq \omega \leq \pi \end{cases}$$

Determine filter coefficient h(n) for M = 7 using Type I frequency sampling technique.

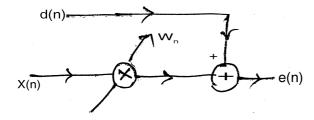
Set R



- 2) Use the backward difference for the derivative and convert the analog filter with system function $H(s) = \frac{1}{s^2 + 16}$.
- 3) What is an IIR filter? Compare its characteristics with an FIR filter.
- 4) Explain how noise cancellation is done using adaptive filters.
- 5) The length of FIR filter is 13. If the filter has a linear phase show that

$$\sum_{n=0}^{\frac{M-1}{2}} h(n) \sin \omega (\tau - n) = 0.$$

- 5. Attempt any two: (6×2=12)
 - 1) Using a rectangular window, design a low pass filter with passband gain of unity, cutoff frequency of 1 KHz and working at a sampling frequency of 5 KHz. The length of the impulse response is 7.
 - 2) Apply bilinear transformation to $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
 - 3) Consider a single weight adaptive filter shown and write LMS algorithm for updating the weight w.



T.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2017 DIGITAL SIGNAL PROCESSING

Day and Date : Monday, 22-5-2017	Max. Marks : 70
Day and Date: Monday, 22-5-2017	Max. Marks : 70

Time: 3.00 p.m. to 6.00 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.

			forget to mention	, Q.P. Set (P/Q/R/S) on	Тор с	of Page.
Dur	ation	: 30 Minutes	MCQ/Objecti	ve Type Questions		Marks : 14
1.	Cho	oose the correct ans	wer:			(14×1=14)
	1)	is the a	approximate transit	ion width of main lobe of	a Han	nming window.
		a) 4π/M	b) $8\pi/M$	c) 12π/M	d)	2π/M
	2)	For the calculation (a) 2(N Log 2N) c) (N Log 2N)/2 sta		dix – 2 FFT algorithm rep b) (N Log2 N) ² /2 d) (Log N)/2N	eats _	stages.
	3)	system response.	n filters exhibit their	dependency upon the s	ystem	design for stability
		a) FIR	b) IIR	c) Both a and b	d)	None
	4)	In cascade form of coefficient.	realization	_ bits should be used to	repres	sent the FIR filter
		a) 5 to 10	b) 12 to 14	c) 20 to 24	d)	28 to 40
	5)	polyphase filters.		of sampling rate for th		filters involved in none
	6)	•	•	npulse invariant method.	•	
	0,	a) aliasing		g c) anti aliasing		warping
	7)	The most common	technique for desig	n of IIR digital filter is		method.
		a) direct	b) indirect	c) recursive	d)	non recursive
	8)	The transition band	is move in			
		a) Butterworth filte	r	b) Chebyshev 1		
		c) Chebyshev 2		d) FIR filter		

-2-



9)	A causal and stable III	R filter has		
	a) linear phase		b) non linear phase	
	c) linear amplitude		d) no amplitude	
10)	DFT is applied to			
	a) infinite sequence			
	b) finite discrete sequ	uence .		
	c) continuous infinite	signals		
	d) continuous finite se	equence		
11)	The basic properties of	of DFT includes		
	a) linearity	b) periodicity	c) summation	d) circular symmetry
12)	Giving one period of p	eriodic convolution is	called con	volution.
	a) periodic	b) aperiodic	c) correlation	d) circular
13)	Forward and inverse F	ourier transform exis	sts for samples having	values
	a) integers	b) infinite	c) finite	d) discrete
14)	is the width	of the main lobe of the	frequency response o	f a rectangular window
	of length M – 1.			
	a) π/M	b) 2π/M	c) $4\pi/M$	d) $8\pi/M$

Seat No.

T.E. (Biomedical Engg.) (Part – II) (New CGPA) Examination, 2017 DIGITAL SIGNAL PROCESSING

Day and Date: Monday, 22-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Marks: 56

SECTION - I

2. Attempt any 4:

 $(4 \times 4 = 16)$

- 1) State shifting property of DFT.
- 2) State the relationship between DTFT and Z transform.
- 3) Find the DTFT of u(n).
- 4) Find the N point DFT for $x(n) = a^n$ for 0 < a < 1.
- 5) Realise the following non-causal linear phase FIR system function $H(z) = \frac{2}{3}z + 1 + \frac{2}{3}z^{-1}$.
- 3. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Find 4 point DFT sequence of $x(n) = \cos \frac{n\pi}{4}$.
- 2) Compute $X_1(n) \times X_2(n)$ if,

$$x_1(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3)$$

$$x_{2}(n) = \delta(n) - \delta(n-2) + \delta(n-4)$$
 for N = 5.

3) Obtain a cascade realisation of the system characterized by transfer function

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}.$$

SECTION - II

4. Attempt any 4 questions:

 $(4 \times 4 = 16)$

1) A low pass filter has the desired response as given below:

$$H_{d}\left(e^{j\omega}\right) = \begin{cases} e^{-3j\omega} & \text{,} \quad 0 \leq \omega < \frac{\pi}{2} \\ \\ 0 & \text{,} \quad \frac{\pi}{2} \leq \omega \leq \pi \end{cases}$$

Determine filter coefficient h(n) for M = 7 using Type I frequency sampling technique.

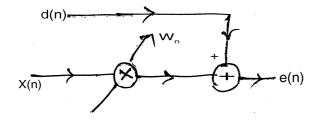


- 2) Use the backward difference for the derivative and convert the analog filter with system function $H(s) = \frac{1}{s^2 + 16}$.
- 3) What is an IIR filter? Compare its characteristics with an FIR filter.
- 4) Explain how noise cancellation is done using adaptive filters.
- 5) The length of FIR filter is 13. If the filter has a linear phase show that

$$\sum_{n=0}^{\frac{M-1}{2}} h(n) \sin \omega (\tau - n) = 0.$$

5. Attempt any two : (6×2=12)

- 1) Using a rectangular window, design a low pass filter with passband gain of unity, cutoff frequency of 1 KHz and working at a sampling frequency of 5 KHz. The length of the impulse response is 7.
- 2) Apply bilinear transformation to $H(s) = \frac{2}{(s+1)(s+3)}$ with T = 0.1s.
- 3) Consider a single weight adaptive filter shown and write LMS algorithm for updating the weight w.



a) 20

6) μ cos – II can manage upto _____ tasks.

b) 64

				SLR-VB - 367
Seat No.				Set P
T.E	. (Biomedica	• • • •	II) (New - CGPA) ED SYSTEMS) Examination, 2017
-	d Date : Wedne 3.00 p.m. to 6.0	esday, 24-5-2017 00 p.m.		Max. Marks : 70
	Instructions :	2) Assume suitable3) Q. No. 1 is comp in Answer Book4) Answer MCQ/O	Page No. 3. Each qu bjective type quest	
		MCQ/Objectiv	ve Type Questions	
Duratio	on : 30 Minutes	-		Marks: 14
1. Ch	oose the corre	ct answer :		14
1)	is a ha a) SPI	alf-duplex communio b) 12C	cation protocol. c) CAN	d) All of the above
2)	a) The waysb) Ways of an the bus or instancec) Both a) an	the ways of polling	f signals on the bus eral devices need to	communicate through need of the bus at an on
3)	Inter process a) Mails	communication can b) Messages	be done through c) System cell	s d) Traps
4)		vare allows the sys elements called task b) Shell		e divided into multiple d) Device Driver
5)	,	e μ C/OS-II service eate()	es is used to delete to b) OSTaskDel d) OSSemTas	task. ()

c) 128

d) 256



7)	For real time operate a) Minimal c) Zero	ting systems, inter	b)	t latency should Maximum Dependent on t		
8)	RISC stands for a) Restricted Instruction b) Restricted Instruction c) Reduced Instruction d) Reduced Induction	iction Sequential C ction Set Computer	Con	=		
9)	In ARM7 core archi	tecture register b) R13				pointer. R15
10)	In ARM7TDMI-S, T a) Transfer c) Thumb	stands for	,	Transmission Telecommunica	atio	n
11)	A is a s for resources held to a) Priority Inversion c) Pending	oy each other.	b)	asks are each u Deadlock Dormant	nkn	nowingly waiting
12)	In ARMe a) Reset c) System	exception is having	b)	e highest priority Supervisor Interrupt reques		
13)		ode is a special ve	rsic	on of user mode	tha	t allows full
14)	read-write access t a) Supervisor is the mu a) SPI	•	l.	Undefined 12C		Abort None of above

Set P



Seat	
No.	

T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 EMBEDDED SYSTEMS

Day and Date: Wednesday, 24-5-2017

Time: 3.00 p.m. to 6.00 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) List and explain various communication protocols used in embedded systems.
- 2) Differentiate between RISC and CISC architecture.
- 3) Explain PLL with neat block diagram.
- 4) List and explain different addressing modes used in ARM processor.
- 5) Explain the communication protocol I2C in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the concept of interrupt controller for LPC2148.
- 2) What are three types of instruction sets in ARM? Explain each with two instructions.
- 3) Explain the concept of direct memory access in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Write short note on embedded communication using CAN and Ethernet.
- 2) Write a short note on RTOS poring in embedded.
- 3) Explain GSM module with AT commands and state its importance in embedded communication.
- 4) What is RTOS? Differentiate between soft and hard real time systems with examples.
- 5) List down the types of priority-based kernels. Elaborate any with example.

Set P



5. Attempt any two:

 $(6 \times 2 = 12)$

1) Define task. What are the states of task? Draw and explain the characteristics of each task state with block diagram of task control block.

-4-

- 2) List and explain various features of Micro OS-II system.
- 3) Elaborate with examples various inter-task/process communication tools like mailbox and message queue used in RTOS environment.

Seat No.	Set	Q

T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 EMBEDDED SYSTEMS

Day and Date: Wednesday, 24-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 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/Ob	jective Type Questions	
Duratio	n : 30 Minutes	,	Marks : 14
1. Ch	oose the correct answer :		14
1)	 RISC stands for a) Restricted Instruction Sec b) Restricted Instruction Sec c) Reduced Instruction Set Co d) Reduced Induction Set Co 	quential Compiler Computer	
2)		egister is used as stack pointer c) R14 d) R15	
3)	In ARM7TDMI-S, T stands for a) Transfer b) Transmission c) Thumb d) Telecommunication	or	
4)	A is a situation in for resources held by each ca) Priority Inversion c) Pending	n which two tasks are each unknowingly other. b) Deadlock d) Dormant	v waiting
5)	In ARM exception a) Reset c) System	n is having the highest priority. b) Supervisor d) Interrupt request	

6)		_	ersion of user mode	e that allows full		
	read-write access	to the cpsr.				
	a) Supervisor	b) System	c) Undefined	d) Abort		
7)	is the m	nulti master protoco	ol.			
,	a) SPI	b) CAN		d) None of above		
8)	is a half-d	uplex communicati	ion protocol.			
,				d) All of the above		
9)	A communication	protocol specifies				
,	a) The ways of co	mmunication of si	gnals on the bus			
				mmunicate through		
				ed of the bus at an		
	instance					
	c) Both a) and b)					
	d) Minimum rate	of data transfer dur	ing communication			
) Inter process communication can be done through					
10)	Inter process com	munication can be	done through			
10)	•		done through c) System cells	d) Traps		
,	a) Mails	b) Messages	c) System cells	•		
,	a) Mailssoftware	b) Messages allows the system	c) System cells	d) Traps divided into multiple		
,	a) Mails software independent elem	b) Messages allows the systen ents called tasks.	c) System cells n activities to be d	livided into multiple		
11)	a) Mails software independent elema) Kernel	b) Messages allows the systen ents called tasks. b) Shell	c) System cellsn activities to be dc) Processor	d) Device Driver		
11)	 a) Mails software independent elema a) Kernel is the μ 	b) Messages allows the systements called tasks. b) Shell C/OS-II services is	c) System cellsn activities to be dc) Processors used to delete tas	divided into multiple d) Device Driver		
11)	 a) Mails software independent elema a) Kernel is the μ a) OSTaskCreate 	b) Messages allows the systements called tasks. b) Shell C/OS-II services is	c) System cellsn activities to be dc) Processors used to delete tas	divided into multiple d) Device Driver		
11) 12)	 a) Mails software independent elema a) Kernel is the μ a) OSTaskCreate c) OSTaskResum 	b) Messages allows the systements called tasks. b) Shell C/OS-II services is e() ne()	c) System cells n activities to be d c) Processor s used to delete tas b) OSTaskDel() d) OSSemTask()	divided into multiple d) Device Driver		
11) 12)	a) Mails software independent elem a) Kernel is the μ a) OSTaskCreate c) OSTaskResum μ cos – II can mar	b) Messages allows the systements called tasks. b) Shell C/OS-II services is e() ne()	c) System cells n activities to be d c) Processor s used to delete tas b) OSTaskDel() d) OSSemTask() tasks.	divided into multiple d) Device Driver sk.		
11) 12) 13)	a) Mails software independent elem a) Kernel is the μ a) OSTaskCreate c) OSTaskResum μ cos – II can mar a) 20	b) Messages allows the systemments called tasks. b) Shell C/OS-II services is e() ne() nage upto b) 64	c) System cells n activities to be d c) Processor s used to delete tas b) OSTaskDel() d) OSSemTask()tasks. c) 128	divided into multiple d) Device Driver sk. d) 256		
11) 12) 13)	a) Mails software independent elem a) Kernel is the μ a) OSTaskCreate c) OSTaskResum μ cos – II can mar a) 20 For real time oper	b) Messages allows the systemments called tasks. b) Shell C/OS-II services is e() ne() nage upto b) 64	c) System cells n activities to be d c) Processor s used to delete tas b) OSTaskDel() d) OSSemTask()tasks. c) 128 errupt latency should	divided into multiple d) Device Driver sk. d) 256		
11) 12) 13)	a) Mails software independent elema) Kernel is the μ a) OSTaskCreate c) OSTaskResum μ cos – II can mara) 20 For real time opera) Minimal	b) Messages allows the systemments called tasks. b) Shell C/OS-II services is e() ne() nage upto b) 64	c) System cells n activities to be d c) Processor s used to delete tas b) OSTaskDel() d) OSSemTask()tasks. c) 128 errupt latency should b) Maximum	d) Device Driver sk. d) 256 d be		
11) 12) 13)	a) Mails software independent elem a) Kernel is the μ a) OSTaskCreate c) OSTaskResum μ cos – II can mar a) 20 For real time oper	b) Messages allows the systemments called tasks. b) Shell C/OS-II services is e() ne() nage upto b) 64	c) System cells n activities to be d c) Processor s used to delete tas b) OSTaskDel() d) OSSemTask()tasks. c) 128 errupt latency should	d) Device Driver sk. d) 256 d be		



Seat	
No.	

T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 EMBEDDED SYSTEMS

Day and Date: Wednesday, 24-5-2017

Time: 3.00 p.m. to 6.00 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) List and explain various communication protocols used in embedded systems.
- 2) Differentiate between RISC and CISC architecture.
- 3) Explain PLL with neat block diagram.
- 4) List and explain different addressing modes used in ARM processor.
- 5) Explain the communication protocol I2C in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the concept of interrupt controller for LPC2148.
- 2) What are three types of instruction sets in ARM? Explain each with two instructions.
- 3) Explain the concept of direct memory access in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Write short note on embedded communication using CAN and Ethernet.
- 2) Write a short note on RTOS poring in embedded.
- 3) Explain GSM module with AT commands and state its importance in embedded communication.
- 4) What is RTOS? Differentiate between soft and hard real time systems with examples.
- 5) List down the types of priority-based kernels. Elaborate any with example.

Set Q



5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Define task. What are the states of task? Draw and explain the characteristics of each task state with block diagram of task control block.
- 2) List and explain various features of Micro OS-II system.
- 3) Elaborate with examples various inter-task/process communication tools like mailbox and message queue used in RTOS environment.

SLR-VB – 367

Seat No.	Set	R	

T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017

EMBEDDED SYSTEMS Day and Date: Wednesday, 24-5-2017 Max. Marks: 70 Time: 3.00 p.m. to 6.00 p.m. **Instructions**: 1) Figures to the **right** indicate **full** marks. 2) Assume suitable data wherever required. 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark. 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 1. Choose the correct answer: 14 1) is the μ C/OS-II services is used to delete task. b) OSTaskDel() a) OSTaskCreate() c) OSTaskResume() d) OSSemTask() 2) $\mu \cos - II$ can manage upto _____ tasks. c) 128 b) 64 d) 256 a) 20 3) For real time operating systems, interrupt latency should be a) Minimal b) Maximum c) Zero d) Dependent on the scheduling 4) RISC stands for a) Restricted Instruction Sequencing Computer b) Restricted Instruction Sequential Compiler c) Reduced Instruction Set Computer d) Reduced Induction Set Computer 5) In ARM7 core architecture register _____ is used as stack pointer. d) R15 c) R14 a) R12 b) R13 6) In ARM7TDMI-S, T stands for a) Transfer b) Transmission c) Thumb d) Telecommunication

7)	A is a situation in which two tasks are each unknowingly waiting for resources held by each other.				
	a) Priority Inversion	•	b) Deadlock		
	c) Pending		d) Dormant		
8)	In ARM	exception is having	g the highest priority	y .	
	a) Reset		b) Supervisor		
	c) System		d) Interrupt reques	st	
9)		•	ersion of user mode	that allows full	
	read-write access	•			
	a) Supervisor	b) System	c) Undefined	d) Abort	
10)	is the m				
	a) SPI	b) CAN	c) 12C	d) None of above	
11)	is a half-du				
	a) SPI	b) 12C	c) CAN	d) All of the above	
12)	A communication p	protocol specifies			
	a) The ways of co	_			
	,			mmunicate through	
	the bus or the instance	ways of polling fro	om the devices nee	ed of the bus at an	
	c) Both a) and b)				
	d) Minimum rate o	f data transfer duri	ng communication		
13)	Inter process communication can be done through				
,	a) Mails		c) System cells	d) Traps	
14)	software	allows the system	activities to be di	vided into multiple	
,	independent eleme			·	
	a) Kernel	b) Shell	c) Processor	d) Device Driver	



Seat	
No.	

T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 EMBEDDED SYSTEMS

Day and Date: Wednesday, 24-5-2017

Time: 3.00 p.m. to 6.00 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) List and explain various communication protocols used in embedded systems.
- 2) Differentiate between RISC and CISC architecture.
- 3) Explain PLL with neat block diagram.
- 4) List and explain different addressing modes used in ARM processor.
- 5) Explain the communication protocol I2C in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the concept of interrupt controller for LPC2148.
- 2) What are three types of instruction sets in ARM? Explain each with two instructions.
- 3) Explain the concept of direct memory access in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Write short note on embedded communication using CAN and Ethernet.
- 2) Write a short note on RTOS poring in embedded.
- 3) Explain GSM module with AT commands and state its importance in embedded communication.
- 4) What is RTOS? Differentiate between soft and hard real time systems with examples.
- 5) List down the types of priority-based kernels. Elaborate any with example.

Set R



5. Attempt any two:

 $(6 \times 2 = 12)$

- 1) Define task. What are the states of task? Draw and explain the characteristics of each task state with block diagram of task control block.
- 2) List and explain various features of Micro OS-II system.
- 3) Elaborate with examples various inter-task/process communication tools like mailbox and message queue used in RTOS environment.

	Seat No.		Set	S
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T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 **EMBEDDED SYSTEMS**

Day and Date: Wednesday, 24-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 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)		jective type questions o ention, Q.P. Set (P/Q/R/			
		MCQ/Objective	Type Questions			
Duration	on : 30 Minutes			Marks: 14		
1. Cł	noose the correct a	answer:		14		
1)) In ARM7TDMI-S	, T stands for				
	a) Transfer		b) Transmission			
	c) Thumb		d) Telecommunication	on		
2)	for resources hel	d by each other.	two tasks are each unk	nowingly waiting		
	a) Priority Invers	sion	b) Deadlock			
	c) Pending		d) Dormant			
3)) In ARM					
	a) Reset		b) Supervisor			
	c) System		d) Interrupt request			
4)	4) mode is a special version of user mode that allows ful					
·	read-write acces	s to the cpsr.				
	a) Supervisor	b) System	c) Undefined d)	Abort		
5)is the	multi master proto	col.			
•	a) SPI	•	b) CAN			
	c) 12C		d) None of above			
6) is a half-	duplex communic	ation protocol.			
- /	a) SPI	b) 12C	•	All of the above		



7)	A communication protocol specifiesa) The ways of communication of signals on the busb) Ways of arbitration when several devices need to communicate through the bus or the ways of polling from the devices need of the bus at an instance				
	c) Both a) and b)d) Minimum rate of d	ata transfer durir	ng communication		
8)	Inter process commu a) Mails b		done through c) System cells	d) Traps	
9)	software allo	s called tasks.			
\	•	•	c) Processor	•	
10)	is the μ C/0 a) OSTaskCreate() c) OSTaskResume()		b) OSTaskDel()	ζ.	
11)	$\mu \cos - II \operatorname{can} \operatorname{manage}$ a) 20 b		_ tasks. c) 128	d) 256	
12)	For real time operatir a) Minimal c) Zero	ng systems, inter	rupt latency should b) Maximum d) Dependent on t		
13)	RISC stands for a) Restricted Instruct b) Restricted Instruct c) Reduced Instruction d) Reduced Induction	tion Sequential C on Set Computer	Compiler		
14)	In ARM7 core archite a) R12 b	ecture register) R13	is used as sta c) R14	ack pointer. d) R15	



Seat	
No.	

T.E. (Biomedical Engg.) (Part – II) (New – CGPA) Examination, 2017 EMBEDDED SYSTEMS

Day and Date: Wednesday, 24-5-2017

Time: 3.00 p.m. to 6.00 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) List and explain various communication protocols used in embedded systems.
- 2) Differentiate between RISC and CISC architecture.
- 3) Explain PLL with neat block diagram.
- 4) List and explain different addressing modes used in ARM processor.
- 5) Explain the communication protocol I2C in detail.

3. Attempt any 2:

 $(6 \times 2 = 12)$

- 1) Explain the concept of interrupt controller for LPC2148.
- 2) What are three types of instruction sets in ARM? Explain each with two instructions.
- 3) Explain the concept of direct memory access in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Write short note on embedded communication using CAN and Ethernet.
- 2) Write a short note on RTOS poring in embedded.
- 3) Explain GSM module with AT commands and state its importance in embedded communication.
- 4) What is RTOS? Differentiate between soft and hard real time systems with examples.
- 5) List down the types of priority-based kernels. Elaborate any with example.

 $(6 \times 2 = 12)$

5. Attempt any two:

1) Define task. What are the states of task? Draw and explain the characteristics of each task state with block diagram of task control block.

- 2) List and explain various features of Micro OS-II system.
- 3) Elaborate with examples various inter-task/process communication tools like mailbox and message queue used in RTOS environment.

Seat No.	Set	Р
	$oldsymbol{1}$	

	B.E. (Biomed	lical Engineering) NUCLEAR N		natio	n, 2017
•	Date: Thursday, 4-5-2	2017			Max. Marks : 100
1	2) A	nswer Book Page No	ve type question o	carries on Pag	one mark. ge No. 3 only. Don't
Duration	: 30 Minutes	MCQ/Objective T	ype Questions		Marks : 20
1 Cho	pose the correct answe	ar ·			(20×1=20)
	decays of electromagnetic rac	involves the emission	n of energy from an	unstab	,
	a) Beta	b) Alpha	c) Electromagnet	d)	Gamma
2)	Decay process are us	ed to give a visual re	presentation of		decay.
	a) radioactive	b) emission	c) tracer	d)	transition
3)	a) lead collimators c) 511 KeV photons		ET. b) positron emitter d) attenuation cor		
The principle disadvantage in using a high resolution coll that it has		resolution collimato b) more distortion		gamma camera is	
	a) limited FOVc) less scatter reject	ion	d) lower sensitivit		
5)	rays are		•	,	
3)	a) α rays			d)	All of above
6)	As per radioactive de portion period is equa	-		of the	isotope in a small
	a) $-\lambda N$	b) λN	c) $-2\lambda N$	d)	2λΝ
7)	The international syst	em of units (SI) of rac	dioactivity is		
	a) Becquerel	b) Curie	c) Fermi	d)	Ronetgen
8)	The half life of radioac a) $0.693/\lambda$	tive nuclei is b) $0.793/\lambda$	 c) 0.693 λ	d)	0.793 λ
9)	Compound containing	same amount of radi	io isotope is	_	
	a) tracer		b) spontaneous		
	c) radioactive compo	ound	d) non radioactive)	



10)	The Full Width at Half Maximum (FWHM) of a photo peak is a measure of						
	a) PHA window setting			b) Camera sensitivity			
	c) Field of view		d)	Detector energy re	esol	lution	
11)	To minimize dose, patients are advised to _						
	a) drink less water		b)	empty bladder fred	que	ntly	
	c) wear lead gowns		d)	wear lead goggles	;		
12)	Dose to a patient is re-	duced by using					
	a) grids	b) high kV	c)	transform	d)	camera	
13)	Tc. 99m is used in						
	a) PET scan	b) Renal scan	c)	Spleen scan	d)	SPECT scan	
14)	Desirable properties of	f radionuclide include					
	a) low specific activity	y	b)	long effective half	life		
	c) non toxic		d)	disperse all over b	ody	/	
15)	Regarding SPECT						
	a) Noise limited		b)	Noise unlimited			
	c) Worse resolution		d)	Good contrast			
16) would be the most desirable for radionuclide imaging.							
	a) 15 KeV gamma		b)	150 KeV gamma			
	c) 150 KeV beta		d)	1500 KeV gamma			
17)	In crystal scintillation of	letector the size of ele	ectr	ical pulse is propor	tion	al to	
	a) activity		b)	gamma photon en	erg	y	
	c) focusing		d)	constant			
18)	A flood source can be	used to check a gam	ma	camera's			
	a) maximum concent	rate	b)	collimator focusing	9		
	c) uniformity		d)	spatial distortion			
19)	If PHA window on a ga	mma camera is incor	rect	ly set below the pho	oto	peak energy, it will	
	produce						
	a) decreased FOV		b)	decreased sensiti	vity		
	c) increased FOV		d)	increased contras	t		
20)	Compared to diverging	g collimator, a conver	ging	collimator will prod	duce	e	
	a) reduced FOV		,	increased FOV			
	c) moderate FOV		d)	smaller image			



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 NUCLEAR MEDICINE

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four: (4×5=20)

- Derive relationship between the linear attenuation coefficient and half value layer of radioactivity.
- 2) Discuss alpha, beta and gamma radiation emission in detail.
- 3) Find the radioactivity of a 1g sample of 226 R given that $t_{1/2}$ = 1620 yrs. and Avogadro's number = 6.023×10^{23}
- 4) Derive an expression for radioactive decay law and mention various units of radioactivities.
- 5) Explain following:
 - a) Single channel pulse height analyzer.
 - b) Thyroid uptake monitoring system.

3. Attempt any two: (10×2=20)

- 1) Explain working of scintillation detector and gas filled detector with necessary figure.
- 2) Explain working of gamma camera in detail and explain various quality control functions in short.
- 3) Explain working of rectilinear scanner with neat figure, also differentiate between rectilinear scanner and gamma camera.



SECTION - II

4. Attempt any four: (4×5=20)

- 1) List and explain various radio tracers used in RIA and also mention its advantage.
- 2) List and explain various types of collimatous with neat figures.
- 3) Explain principle of PET scanning with neat figure.
- 4) Differentiate between PET and SPECT system.
- 5) Define RIA technique and explain its functioning.

5. Attempt any 2: (10×2=20)

- 1) Write a note on:
 - a) Principle and advantages of SPECT over PET.
 - b) Disposal of biological waste.
- 2) Explain working of liquid scintillation counting system with neat diagram.
- 3) Discuss internal and external radiation exposure and hazards. List various biological effects of radiation exposure.

Seat	
No.	

Set

Q

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 NUCLEAR MEDICINE

Day and Date: Thursday, 4-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 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/Objecti	ve Type	Questions			
Dura	ation	: 30 Minutes							Marks : 20
1.	Cho	oose the correct answ	ver:						(20×1=20)
	1)	a) 15 KeV gamma c) 150 KeV beta	oe the	most desira	b)	dionuclide imagin 150 KeV gamma 1500 KeV gamm	-		
	2)	In crystal scintillation a) activity c) focusing	n dete	ctor the size	b)	ical pulse is propo gamma photon e constant			
	3)	A flood source can be a) maximum conce c) uniformity			b)	camera's collimator focusin spatial distortion		_	
	4)	If PHA window on a producea) decreased FOV c) increased FOV	gamm	a camera is	b)	ly set below the pl decreased sensi increased contra	tivity		y, it will
	5)	Compared to diverg a) reduced FOV c) moderate FOV	ing co	llimator, a co	b)	collimator will pro increased FOV smaller image	oduce	e	_
	6)	decay of electromagnetic ra	adiatio			energy from an ui			in form
	7)	Decay process are a) radioactive		o give a visu emission		sentation of tracer			
	8)	a) lead collimators c) 511 KeV photon		aracteristic o	b)	positron emitter	ection	1	

9)	The principle disadvar that it has		res	olution collimator o	n a	gamma camera is
	a) limited FOV		b)	more distortion		
	c) less scatter rejecti	on	d)	lower sensitivity		
10)	rays are					
	a) α rays	b) β rays	c)	Gamma	d)	All of above
11)	As per radioactive deportion period is equal	-	nt o	f disintegration of	the	isotope in a small
	a) $-\lambda N$	b) λN	c)	$-2\lambda N$	d)	2λN
12)	The international syste	em of units (SI) of rad	ioad	ctivity is		
	a) Becquerel	b) Curie	c)	Fermi	d)	Ronetgen
13)	The half life of radioac	tive nuclei is				
	a) $0.693/\lambda$	b) $0.793/\lambda$	c)	0.693 λ	d)	0.793λ
14)	Compound containing	same amount of radio	o iso	otope is		
	a) tracer		b)	spontaneous		
	c) radioactive compo	und	d)	non radioactive		
15)	The Full Width at Half	Maximum (FWHM) of	fap	hoto peak is a me	asur	re of
	a) PHA window settir	ng	b)	Camera sensitivit	y	
	c) Field of view		d)	Detector energy r	esol	lution
16)	To minimize dose, pati	ients are advised to				
,	a) drink less water	_		empty bladder fre	aue	ntlv
	c) wear lead gowns		•	wear lead goggles	•	,
17)	,	duood by using	,			
17)	Dose to a patient is re-	·		transform	٩/	oomoro
	a) grids	b) high kV	G)	transionn	u)	camera
18)	Tc. 99m is used in					
	a) PET scan	b) Renal scan	c)	Spleen scan	d)	SPECT scan
19)	Desirable properties of	f radionuclide include				
	a) low specific activity	y	b)	long effective half	life	
	c) non toxic		d)	disperse all over I	body	/
20)	Regarding SPECT					
•	a) Noise limited		b)	Noise unlimited		
	c) Worse resolution		•	Good contrast		
	•					



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 NUCLEAR MEDICINE

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four: (4×5=20)

- Derive relationship between the linear attenuation coefficient and half value layer of radioactivity.
- 2) Discuss alpha, beta and gamma radiation emission in detail.
- 3) Find the radioactivity of a 1g sample of 226 R given that $t_{1/2}$ = 1620 yrs. and Avogadro's number = 6.023×10^{23}
- 4) Derive an expression for radioactive decay law and mention various units of radioactivities.
- 5) Explain following:
 - a) Single channel pulse height analyzer.
 - b) Thyroid uptake monitoring system.

3. Attempt any two: (10×2=20)

- 1) Explain working of scintillation detector and gas filled detector with necessary figure.
- 2) Explain working of gamma camera in detail and explain various quality control functions in short.
- 3) Explain working of rectilinear scanner with neat figure, also differentiate between rectilinear scanner and gamma camera.



SECTION - II

4. Attempt any four: (4×5=20)

- 1) List and explain various radio tracers used in RIA and also mention its advantage.
- 2) List and explain various types of collimatous with neat figures.
- 3) Explain principle of PET scanning with neat figure.
- 4) Differentiate between PET and SPECT system.
- 5) Define RIA technique and explain its functioning.

5. Attempt any 2: (10×2=20)

- 1) Write a note on:
 - a) Principle and advantages of SPECT over PET.
 - b) Disposal of biological waste.
- 2) Explain working of liquid scintillation counting system with neat diagram.
- 3) Discuss internal and external radiation exposure and hazards. List various biological effects of radiation exposure.

Seat	
No.	

Set



B.E. (Biomedical Engineering) (Part – I) Examination, 2017 NUCLEAR MEDICINE

Day and Date : Thursday, 4-5-2017 Max. Marks : 100

Time: 3.00 p.m. to 6.00 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 : 20
1.	Cho	oose the correct an	swer:						(20×1=20)
	1)	To minimize dose,	patient	s are advised	to				
		a) drink less wate	r		b)	empty bladder f	frequen	itly	
		c) wear lead gow	ns		d)	wear lead gogg	les		
	2)	Dose to a patient is	s reduc	ed by using					
	,	a) grids		high kV		transform	d)	camera	
	3)	Tc. 99m is used in							
		a) PET scan	b)	Renal scan	c)	Spleen scan	d)	SPECT so	an
	4)	Desirable propertie	es of ra	dionuclide incl	ude				
		a) low specific ac	tivity		b)	long effective h	alf life		
		c) non toxic			d)	disperse all ove	er body		
	5)	Regarding SPECT							
		a) Noise limited			b)	Noise unlimited			
		c) Worse resolution	on		d)	Good contrast			
	6)	would	d be the	most desirabl	e for ra	dionuclide imagi	ng.		
	,	a) 15 KeV gamma				150 KeV gamm			
		c) 150 KeV beta			d)	1500 KeV gamı	ma		
	7)	In crystal scintillation	ctor the size o	f electri	cal pulse is prop	ortiona	ıl to		
		a) activity			b)	gamma photon	energy	,	
		c) focusing			d)	constant			
	8)	A flood source can	be use	ed to check a g	gamma	camera's		_	
		a) maximum cond	entrate)	b)	collimator focus	sing		
		c) uniformity			d)	spatial distortion	n		



9)	If PHA window on a ga	amma camera is incor	rec	tly set below the ph	oto	peak energy, it will
	produce		L .\	decreed consid		
	a) decreased FOV		•	decreased sensit	•	
	c) increased FOV		a)	increased contra	Sī	
10)	Compared to diverging	g collimator, a conver	ging	g collimator will pro	duce	e
	a) reduced FOV		b)	increased FOV		
	c) moderate FOV		d)	smaller image		
11)	decays	involves the emission	n of	energy from an ur	stat	ole nucleus in form
	of electromagnetic rad					
	a) Beta	b) Alpha	c)	Electromagnet	d)	Gamma
12)	Decay process are us	-	-			
	a) radioactive	b) emission	c)	tracer	d)	transition
13)						
	a) lead collimators		b)	positron emitter		
	c) 511 KeV photons					
14)	The principle disadvaruhat it has		res	olution collimator o	n a	gamma camera is
	a) limited FOV		•	more distortion		
	c) less scatter rejecti	on	d)	lower sensitivity		
15)	rays are	e emitted during radio	acti	vity.		
	a) α rays	b) β rays	c)	Gamma	d)	All of above
16)	As per radioactive de portion period is equal	-	nt c	f disintegration of	the	isotope in a small
	a) $-\lambda N$	b) λN	c)	$-2\lambda N$	d)	2λ N
17)	The international systematical	em of units (SI) of rac	lioa	ctivity is		
	a) Becquerel	b) Curie	c)	Fermi	d)	Ronetgen
18)	The half life of radioac	tive nuclei is				
	a) 0.693/λ	b) $0.793/\lambda$	c)	0.693 λ	d)	0.793 λ
19)	Compound containing	same amount of radi	o is	otope is		
	a) tracer		b)	spontaneous		
	c) radioactive compo	und	d)	non radioactive		
20)	The Full Width at Half	Maximum (FWHM) o	fap	ohoto peak is a me	asu	re of
	a) PHA window setting	ng	b)	Camera sensitivi	ty	
	c) Field of view		d)	Detector energy i	eso	lution



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 NUCLEAR MEDICINE

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four: (4×5=20)

- 1) Derive relationship between the linear attenuation coefficient and half value layer of radioactivity.
- 2) Discuss alpha, beta and gamma radiation emission in detail.
- 3) Find the radioactivity of a 1g sample of 226 R given that $t_{1/2}$ = 1620 yrs. and Avogadro's number = 6.023×10^{23}
- 4) Derive an expression for radioactive decay law and mention various units of radioactivities.
- 5) Explain following:
 - a) Single channel pulse height analyzer.
 - b) Thyroid uptake monitoring system.

3. Attempt any two: (10×2=20)

- 1) Explain working of scintillation detector and gas filled detector with necessary figure.
- 2) Explain working of gamma camera in detail and explain various quality control functions in short.
- 3) Explain working of rectilinear scanner with neat figure, also differentiate between rectilinear scanner and gamma camera.



SECTION - II

4. Attempt any four : (4×5=20)

- 1) List and explain various radio tracers used in RIA and also mention its advantage.
- 2) List and explain various types of collimatous with neat figures.
- 3) Explain principle of PET scanning with neat figure.
- 4) Differentiate between PET and SPECT system.
- 5) Define RIA technique and explain its functioning.

5. Attempt any 2: (10×2=20)

- 1) Write a note on:
 - a) Principle and advantages of SPECT over PET.
 - b) Disposal of biological waste.
- 2) Explain working of liquid scintillation counting system with neat diagram.
- 3) Discuss internal and external radiation exposure and hazards. List various biological effects of radiation exposure.

Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017

Max. Marks : 100
n first 30 minutes in ies one mark. Page No. 3 only. Don't p of Page.
Marks : 20
(20×1=20)
ne isotope in a small
d) 2λN
- d\ Danataan
d) Ronetgen
d) 0.793 λ
,
sure of
solution
uently
d) camera
a) barriora
d) SPECT scan
a, or 201 ooun
ife
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-2-



10)	Regarding SPECT								
	a) Noise limited		b)	Noise unlimited					
	c) Worse resolution		d)	Good contrast					
11)	would be	the most desirable fo	r ra	dionuclide imaging					
	a) 15 KeV gamma		b)	150 KeV gamma					
	c) 150 KeV beta		d)	1500 KeV gamma					
12)	12) In crystal scintillation detector the size of electrical pulse is proportional to								
	a) activity		b)	gamma photon en	erg	y			
	c) focusing		d)	constant					
13)	A flood source can be	used to check a gam	ma	camera's					
	a) maximum concentr	ate	b)	collimator focusing	g				
	c) uniformity		d)	spatial distortion					
14)	If PHA window on a gar	mma camera is incor	rect	ly set below the ph	oto	peak energy, it will			
	produce								
	a) decreased FOV		b)	decreased sensiti	vity				
	c) increased FOV		d)	increased contras	t				
15)	Compared to diverging	collimator, a converg	ging	collimator will prod	duce	e			
	a) reduced FOV		b)	increased FOV					
	c) moderate FOV		d)	smaller image					
16)	decays i	nvolves the emission	of	energy from an un	stab	le nucleus in form			
	of electromagnetic radia					_			
	•	b) Alpha	•	Electromagnet	•				
17)	Decay process are use	-							
40)	•	b) emission	,	tracer	u)	transition			
18)	is not a a) lead collimators	characteristic of PE		positron emitter					
	c) 511 KeV photons		•	attenuation correct	tion				
19)	The principle disadvanthat it has		,						
	a) limited FOV	_	b)	more distortion					
	c) less scatter rejection	on	d)	lower sensitivity					
20)	rays are	emitted during radioa	acti	vity.					
	a) α rays	b) β rays	c)	Gamma	d)	All of above			
20)	c) less scatter rejection rays are	emitted during radioa	d) acti	lower sensitivity vity.	.1١	All of alazza			
	a) α rays	D) β rays	C)	Gamma	d)	All of above			



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 NUCLEAR MEDICINE

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four: (4×5=20)

- Derive relationship between the linear attenuation coefficient and half value layer of radioactivity.
- 2) Discuss alpha, beta and gamma radiation emission in detail.
- 3) Find the radioactivity of a 1g sample of 226 R given that $t_{1/2}$ = 1620 yrs. and Avogadro's number = 6.023×10^{23}
- 4) Derive an expression for radioactive decay law and mention various units of radioactivities.
- 5) Explain following:
 - a) Single channel pulse height analyzer.
 - b) Thyroid uptake monitoring system.

3. Attempt any two: (10×2=20)

- 1) Explain working of scintillation detector and gas filled detector with necessary figure.
- 2) Explain working of gamma camera in detail and explain various quality control functions in short.
- 3) Explain working of rectilinear scanner with neat figure, also differentiate between rectilinear scanner and gamma camera.



SECTION - II

4. Attempt any four: (4×5=20)

- 1) List and explain various radio tracers used in RIA and also mention its advantage.
- 2) List and explain various types of collimatous with neat figures.
- 3) Explain principle of PET scanning with neat figure.
- 4) Differentiate between PET and SPECT system.
- 5) Define RIA technique and explain its functioning.

5. Attempt any 2: (10×2=20)

- 1) Write a note on:
 - a) Principle and advantages of SPECT over PET.
 - b) Disposal of biological waste.
- 2) Explain working of liquid scintillation counting system with neat diagram.
- 3) Discuss internal and external radiation exposure and hazards. List various biological effects of radiation exposure.

Seat	Cod	D
No.	Set	

B.F. (Bio-medical Fngg.) (Part – I) Examination 2017

	MEDICAL INF	•
•	d Date : Friday, 5-5-2017 .00 p.m. to 6.00 p.m.	Total Marks : 100
1	Answer Book Page N 2) Answer MCQ/Objec	ry. It should be solved in first 30 minutes in lo. 3. Each question carries one mark. tive type questions on Page No. 3 only. tion, Q.P. Set (P/Q/R/S) on Top of Page.
Duration	MCQ/Objective To	ype Questions Marks : 20
1 Cho	pose the correct answer :	(20×1=20)
	DICOM stands for	(20×1-20)
1)	a) Digital Image Compression c) Data Integration Communication	b) Digital Image Communicationd) None
2)	HIMS fail due to a) Incomplete entry of data c) Both a) and b)	b) Lack of communication d) None
3)	Expert systems generate alerts anda) help b) information	assist in diagnosis. c) reminders d) none of above
4)	Medical information system deals with a) Only patient related information c) Only hospital related information	b) Only doctor related informationd) Only health related information
5)	PACS having benefit of a) Reduced cost c) Film consumption	b) Simultaneous viewing of imagesd) All above
6)	Artificial Intelligence (AI) having following a) ES b) KBS	ng branches c) GPS d) All above
7)	In CAS the computer providef a) Image guidance c) Lab guidance	or the surgeon. b) Patient's situation d) None
8)	Ethernet network offers maximum speed a) 1000 mbps b) 100 mbps	d of c) 10 mbps d) 10000 mbps
9)	MRI required a) Less acquisition time periods c) Long scanning time	b) Long acquisition time periodsd) Less scanning time

d) All the above

20) Among these which is not type of knowledge in expert system?

a) Declarative knowledge
b) Procedural knowledge
c) Heuristic knowledge
d) Standard knowledge

b) Introduction of health care informaticsc) Introduction of digital knowledge system



Seat	
No.	

B.E. (Bio-medical Engg.) (Part – I) Examination, 2017 MEDICAL INFORMATICS

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) State and explain different application of medical informatics.
- 2) Explain needs and benefits of HMIS.
- 3) Explain in detail need and different technology used in surgical simulation.
- 4) Explain about radiology modules.
- 5) Write note on future of surgical simulation.
- 3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- 1) Explain in detail the need for medical informatics education/training field.
- 2) State and explain different reasons to faults the HMIS.
- 3) Write a note on:
 - a) Patient care module
 - b) Advantages of surgical simulation.

SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) With a neat figure explain Artificial Intelligence (AI).
- 2) State and explain different patient counselling software.
- 3) What are the different needs of telemedicine?
- 4) What are the limitations of conventional surgery?
- 5) Write benefits and risk of ASP (Application Service Provider).
- 5. Attempt any two of the following:

 $(2\times10=20)$

- 1) Write and explain different application of telemedicine.
- 2) Write and explain different components and functionability of CPR.
- 3) Write in detail reliability and cost analysis of telemedicine.

Seat No. Set	Q
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B.E. (Bio-medical Engg.) (Part – I) Examination, 2017 MEDICAL INFORMATICS

Day and Date:	Friday, 5-5-2017	Total Marks : 100

Time: 3.00 p.m. to 6.00 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: 20

1. Choose the correct answer:

 $(20 \times 1 = 20)$

- 1) Pre anaesthetic checkup is a function of
 - a) Blood Bank Module

- b) Pharmacy Module
- c) Operation theater module
- d) Inventory Module
- 2) While sending the data in tele-medicine the analog data is convert into digital data with the help of
 - a) Multiplexer
- b) Counter
- c) Decoder
- d) Modem

- 3) Render means
 - a) Convert a numeric representation of an object into a visual representation
 - b) Convert visual representation into a numeric representation of an object
 - c) Convert graphical image
 - d) Convert large image into small image
- 4) Prospect of medical informatics includes
 - a) Medical informatics
 - b) Introduction of health care informatics
 - c) Introduction of digital knowledge system
 - d) All the above
- 5) Among these which is not type of knowledge in expert system?
 - a) Declarative knowledge
- b) Procedural knowledge
- c) Heuristic knowledge
- d) Standard knowledge

- 6) DICOM stands for
 - a) Digital Image Compression
- b) Digital Image Communication
- c) Data Integration Communication
- d) None

- 7) HIMS fail due to
 - a) Incomplete entry of data
- b) Lack of communication

c) Both a) and b)

d) None

8)	Expert systems generate alerts and a) help b) information	assist in diagnosis. c) reminders d) none of above	e
9)	Medical information system deals with a) Only patient related information c) Only hospital related information	b) Only doctor related information	_
10)	PACS having benefit of a) Reduced cost c) Film consumption	b) Simultaneous viewing of imagesd) All above	
11)	Artificial Intelligence (AI) having following a) ES b) KBS		
12)	In CAS the computer provide f a) Image guidance c) Lab guidance	for the surgeon. b) Patient's situation d) None	
13)	Ethernet network offers maximum speed a) 1000 mbps b) 100 mbps		
14)	MRI required a) Less acquisition time periods c) Long scanning time	b) Long acquisition time periodsd) Less scanning time	
15)	Tele-education consists of vide a) Synchronous b) Asynchronous c) Synchronous as well as asynchronous d) None		
16)	Telemedicine technique is used ina) urban c) urban and rural	areas. b) rural d) none	
17)	In robotic surgery the robot consists of a) Actuator and sensors c) Only scanner	b) Scanner and X-ray d) Only X-ray	
18)	a) HTTP b) WWW	c) HTML d) CGI	
19)	Because of incomplete entering of data a) ES b) HMIS	afails. c) KBS d) CPR	
20)	CORBA stands for a) Common Organization Request Brok b) Committee Of Request Based Asser c) Computer Organization Request Brok d) Common Object Request Broker Arc	embly oker Architecture	



Seat	
No.	

B.E. (Bio-medical Engg.) (Part – I) Examination, 2017 MEDICAL INFORMATICS

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) State and explain different application of medical informatics.
- 2) Explain needs and benefits of HMIS.
- 3) Explain in detail need and different technology used in surgical simulation.
- 4) Explain about radiology modules.
- 5) Write note on future of surgical simulation.
- 3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- 1) Explain in detail the need for medical informatics education/training field.
- 2) State and explain different reasons to faults the HMIS.
- 3) Write a note on:
 - a) Patient care module
 - b) Advantages of surgical simulation.

SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) With a neat figure explain Artificial Intelligence (AI).
- 2) State and explain different patient counselling software.
- 3) What are the different needs of telemedicine?
- 4) What are the limitations of conventional surgery?
- 5) Write benefits and risk of ASP (Application Service Provider).
- 5. Attempt any two of the following:

 $(2\times10=20)$

- 1) Write and explain different application of telemedicine.
- 2) Write and explain different components and functionability of CPR.
- 3) Write in detail reliability and cost analysis of telemedicine.

Seat	Set	D
No.	Set	R

B.F. (Bio-medical Fngg.) (Part – I) Examination 2017

MEDICAL INF	•
Day and Date : Friday, 5-5-2017 Time : 3.00 p.m. to 6.00 p.m.	Total Marks : 100
Answer Book Page N 2) Answer MCQ/Objec	ory. It should be solved in first 30 minutes in lo. 3. Each question carries one mark. It is tive type questions on Page No. 3 only. It is tion, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective Ty	· ·
Duration : 30 Minutes	Marks : 20
Choose the correct answer :	(20×1=20)
 Telemedicine technique is used in a) urban 	areas. b) rural
c) urban and rural	d) none
2) In robotic surgery the robot consists ofa) Actuator and sensorsc) Only scanner	b) Scanner and X-ray d) Only X-ray
3) is the heart of web browser. a) HTTP b) WWW	c) HTML d) CGI
4) Because of incomplete entering of dataa) ESb) HMIS	
 5) CORBA stands for a) Common Organization Request Broket b) Committee Of Request Based Assert c) Computer Organization Request Broket d) Common Object Request Broker Arc 	mbly oker Architecture
6) Pre anaesthetic checkup is a function of a) Blood Bank Modulec) Operation theater module	f b) Pharmacy Module d) Inventory Module
7) While sending the data in tele-medicin data with the help ofa) Multiplexerb) Counter	e the analog data is convert into digital c) Decoder d) Modem
 8) Render means a) Convert a numeric representation of b) Convert visual representation into a c) Convert graphical image d) Convert large image into small imag 	numeric representation of an object

9)	Prospect of medical informatics includes a) Medical informaticsb) Introduction of health care informaticc) Introduction of digital knowledge sysd) All the above	s	1
10)	Among these which is not type of knowledge c) Heuristic knowledge	b)	je in expert system ? Procedural knowledge Standard knowledge
11)	DICOM stands for a) Digital Image Compression c) Data Integration Communication	,	Digital Image Communication None
12)	HIMS fail due to a) Incomplete entry of data c) Both a) and b)	,	Lack of communication None
13)	Expert systems generate alerts and a) help b) information		assist in diagnosis. reminders d) none of above
14)	Medical information system deals with a) Only patient related information c) Only hospital related information	,	Only doctor related information Only health related information
15)	PACS having benefit of a) Reduced cost c) Film consumption	,	Simultaneous viewing of images All above
16)	Artificial Intelligence (AI) having following a) ES b) KBS	_	oranches GPS d) All above
17)	In CAS the computer providefor a) Image guidance c) Lab guidance	b)	he surgeon. Patient's situation None
18)	Ethernet network offers maximum speed a) 1000 mbps b) 100 mbps		
19)	MRI required a) Less acquisition time periods c) Long scanning time		Long acquisition time periods Less scanning time
20)	Tele-education consists of vide a) Synchronous b) Asynchronous c) Synchronous as well as asynchrono d) None		conferencing.



Seat	
No.	

B.E. (Bio-medical Engg.) (Part – I) Examination, 2017 MEDICAL INFORMATICS

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) State and explain different application of medical informatics.
- 2) Explain needs and benefits of HMIS.
- 3) Explain in detail need and different technology used in surgical simulation.
- 4) Explain about radiology modules.
- 5) Write note on future of surgical simulation.
- 3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- 1) Explain in detail the need for medical informatics education/training field.
- 2) State and explain different reasons to faults the HMIS.
- 3) Write a note on:
 - a) Patient care module
 - b) Advantages of surgical simulation.

SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) With a neat figure explain Artificial Intelligence (AI).
- 2) State and explain different patient counselling software.
- 3) What are the different needs of telemedicine?
- 4) What are the limitations of conventional surgery?
- 5) Write benefits and risk of ASP (Application Service Provider).
- 5. Attempt any two of the following:

 $(2\times10=20)$

- 1) Write and explain different application of telemedicine.
- 2) Write and explain different components and functionability of CPR.
- 3) Write in detail reliability and cost analysis of telemedicine.

	-	
Seat No.	Set	S

B.E. (Bio-medical Engg.) (Part – I) Examination, 2017 MEDICAL INFORMATICS

	•	MEDICAL INF	OF	RMÁTICS		,	
•	l Date : Friday, 5-5-2 .00 p.m. to 6.00 p.m.					Total Marks	s : 100
 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. 							
Duration	n : 30 Minutes	MCQ/Objective T	ype	Questions		Mar	ks : 20
1. Cho	oose the correct ansv	wer:				(20>	(1=20)
1)	Artificial Intelligence a) ES	(AI) having followir b) KBS	_		d)	All above	
2)	In CAS the compute a) Image guidance c) Lab guidance		b)	he surgeon. Patient's situatic None	n		
3)	Ethernet network of a) 1000 mbps	•			d)	10000 mbps	
4)	MRI required a) Less acquisition c) Long scanning to	time periods me	b) d)	Long acquisition Less scanning ti	tim me	ne periods	
5)	Tele-education cons a) Synchronous b) Asynchronous c) Synchronous as d) None			conferencing.			
6)	Telemedicine techn a) urban c) urban and rural	ique is used in	b)	_ areas. rural none			
7)	In robotic surgery th a) Actuator and ser c) Only scanner		,	Scanner and X-I	ay		
8)	a) HTTP	t of web browser. b) WWW	c)	HTML	d)	CGI	
9)	Because of incompl a) ES	ete entering of data b) HMIS		fails. KBS	d)	CPR	P.T.O.



10)	CORBA stands for a) Common Organization Request Broker Architecture b) Committee Of Request Based Assembly c) Computer Organization Request Broker Architecture d) Common Object Request Broker Architecture						
11)) Pre anaesthetic checkup is a function of a) Blood Bank Module b) Pharmacy Module c) Operation theater module d) Inventory Module 						
12)	While sending the data in tele-medicin data with the help of a) Multiplexer b) Counter	e the analog data is convert into digital c) Decoder d) Modem					
13)	Render means a) Convert a numeric representation of b) Convert visual representation into a c) Convert graphical image d) Convert large image into small imag	an object into a visual representation numeric representation of an object					
14)	Prospect of medical informatics includes a) Medical informatics b) Introduction of health care informatic c) Introduction of digital knowledge sys d) All the above	s					
15)	Among these which is not type of knowl a) Declarative knowledge c) Heuristic knowledge	edge in expert system ? b) Procedural knowledge d) Standard knowledge					
16)	DICOM stands for a) Digital Image Compression c) Data Integration Communication	b) Digital Image Communication d) None					
17)	HIMS fail due to a) Incomplete entry of data c) Both a) and b)	b) Lack of communication d) None					
18)	Expert systems generate alerts anda) help b) information	assist in diagnosis. c) reminders d) none of above					
19)	Medical information system deals with a) Only patient related information c) Only hospital related information	b) Only doctor related informationd) Only health related information					
20)	PACS having benefit of a) Reduced cost c) Film consumption	b) Simultaneous viewing of imagesd) All above					



Seat	
No.	

B.E. (Bio-medical Engg.) (Part – I) Examination, 2017 MEDICAL INFORMATICS

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) State and explain different application of medical informatics.
- 2) Explain needs and benefits of HMIS.
- 3) Explain in detail need and different technology used in surgical simulation.
- 4) Explain about radiology modules.
- 5) Write note on future of surgical simulation.
- 3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- 1) Explain in detail the need for medical informatics education/training field.
- 2) State and explain different reasons to faults the HMIS.
- 3) Write a note on:
 - a) Patient care module
 - b) Advantages of surgical simulation.

SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- 1) With a neat figure explain Artificial Intelligence (AI).
- 2) State and explain different patient counselling software.
- 3) What are the different needs of telemedicine?
- 4) What are the limitations of conventional surgery?
- 5) Write benefits and risk of ASP (Application Service Provider).
- 5. Attempt any two of the following:

 $(2\times10=20)$

- 1) Write and explain different application of telemedicine.
- 2) Write and explain different components and functionability of CPR.
- 3) Write in detail reliability and cost analysis of telemedicine.

|--|--|--|--|--|

a) Peltier

a) Pads

called as _____

					SLR-V	B – 3	3/U
Seat No.						Set	Р
				gineering) Exai		17	
•	d Date : Saturo 3.00 p.m. to 6.0	•	017		Max.	Marks :	: 100
1	Instructions :	minu one n 2) Answ	t es in Answer nark. /er MCQ/Obj Don't forge t	ulsory. It should book Page No. 3. ective type ques to mention, Q.P.	Each question tions on Pag	o carries e No. 3	s 3
Duratio	n : 30 Minutes	MC	Q/Objective	Гуре Questions		Marks	s : 20
	oose the corre				- 4: a l 4la	(1×20	•
1)	steady.	need	lie point electr	odes are stuck into	o tissue and th	en kep	ι
	a) Cutting	b)	Coagulation	c) Fulguration	d) Derivati	on	
2)			o a superficia	l tissue destruction	n without affec	ting	
	deep-seated ta) Cuttingc) Fulguration			b) Coagulation d) None of abov	re		
3)		-	nts used in su	ırgical diathermy ι	units in the ran	ge at	
		Hz.	15 _ 20	c) 5-10	d) 1-3		
4)	a tissue affec	current is	s a steadly flov cally.	w of direct current t	hat is passed t		
				c) Surging			
5)	frequency in u a) Amplifier c) Rectifier			lectrical oscillation b) Power amplif d) Oscillator		d	
6)	Ultrasonic ger	nerators a	are constructe	ed on the	effect.		

b) Seebeck

b) Sacs

7) In the capacitor plate method of short wave diathermy electrodes used are

d) Leads

d) Piezo electric

P.T.O.

c) Ohm's

c) Sutures



8)	In the five letter co that are paced.	de of pacemaker	the	first letter indicate	ates	s the	
	a) Muscles	b) Nerves	c)	Chambers	d)	Bones	
9)	determined by the _	of the	e inputs the current in the circuit is e pacemaker. b) External resistance d) External capacitance				
10)	The energy of musc						
10)	a) ATP			_		•	
11)	A defibrillator analy discharge pulse.		sur	e the	(content in the	
	a) Energy	b) Power	c)	Charging	d)	Potential	
12)	The electrodes for ein diameter.	external defibrillato	r ar	e usually metal o	disc	es about	
	a) 10-20 cm	b) 10 - 15 cm	c)	3 - 5 cm	d)	1-2 cm	
13)	The	lasers operate prin	nar	ily in the ultravio	let s	spiral region.	
	a) Excimer	b) Ruby	c)	CO ₂	d)	Nd-yag	
14)	ion la	aser photocoagula	ator	is suitable for p	hoto	coagulation of	
	the retina.						
	a) Sodium	b) Calcium	c)	Nitrogen	d)	Argon	
15)	Biological tissues temperature is mair	ntained at		°C.		-	
	a) 35°	b) 55°	c)	70°	d)	50°	
16)	is th	ne exchange of thi	ngs	dissolved in flui	d a	cross the	
	membrane due to d	lifference in amoui			o si	des.	
	a) Drift			Diffusion			
	c) Osmosis						
17)	The artificial kidney mass exchanger du	uring clinical use.					
	a) Separation	·	•	Mixed	a)	Exchanger	
18)		e used membrane f		•		0 "	
	a) Polymer	b) Cupraphan	•	-	•		
19)	The laser action depart a) Current	pends upon the pho b) Energy				d Radiation	
20)	A ruby laser is oper	ated in	<u></u>		۹/	Largo	
	a) Short	b) Big			u)	Large	



Seat	
No.	

B.E. (Part – I) (Biomedical Engineering) Examination, 2017 BIOMEDICAL INSTRUMENTATION – III

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain application techniques of short wave diathermy with neat figures.
- 2) Differentiate between internal and external pacemaker.
- 3) List various performance aspects of implantable pacemaker.
- 4) Define cut, coagulation, desiccation and fulguration modes of surgical diathermy.
- 5) Draw and explain various output current waveform of nerve muscle stimulation.

3. Attempt any two:

- 1) Discuss unipolar and bipolar modes of ESU. Draw and explain circuit of coagulation mode.
- 2) Draw circuit diagram of ultrasonic therapy unit and explain its working. Also mention its clinical applications.
- 3) Draw and explain working rate of generator and pace pulse generator circuit of pacemaker.



SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Define and differentiate between AC and DC defibrillator.
- 2) Explain any two types of dialyzers of dialysis machine.
- 3) Explain the principle of dialysis machine.
- 4) Draw and explain working of monitoring conductivity of dialysate.
- 5) Explain how capacitor discharges in INST mode of difibrillator.

5. Attempt any two questions:

- 1) Discuss principle of LASER and list various LASER equipment techniques and explain any two in detail.
- 2) Draw and explain working of dialysis machine. Mention the precautions that has to be taken in procedure.
- 3) Explain the need and working of heart rate variability meter. Mention its application.

Seat No.		Set	Q
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B.E. (Part – I) (Biomedical Engineering) Examination, 2017 **BIOMEDICAL INSTRUMENTATION - III**

Day and Date: Saturday, 6-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 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	on : 30 Minutes	•		Marks : 20
1. Ch	noose the correct a	answer:		(1×20=20)
1)		s the exchange of th o difference in amou	_	wo sides.
2)	mass exchanger	ney is a membrane during clinical use. b) Filter		vice that serves as a d) Exchanger
3)		the used membrane b) Cupraphan	•	
4)		depends upon the ph b) Energy		
5)		perated in b) Big		d) Large
6)	steady.	_ needle point electr b) Coagulation		o tissue and then kept d) Derivation
7)	deep-seated tiss a) Cutting c) Fulguration	efers to a superficia ue.	I tissue destruction b) Coagulation d) None of above	

8)	The frequency of currents used in surgical diathermy units in the range atMHz.			
	a) 10-20	b) 15-20	c) 5-10	d) 1 – 3
9)				at is passed through
	a tissue affects ch	emically.		
	a) Galvanic	b) Faradic	c) Surging	d) None of above
10)	Timed	produces the el	ectrical oscillation o	of the required
	frequency in urtras	• •		
	a) Amplifier		b) Power amplifie	r
	c) Rectifier		b) Power amplifie d) Oscillator	
11)		ors are constructed	a on the	
4.0\	•	•	c) Ohm's	,
12)	called as		•	electrodes used are
	a) Pads	b) Sacs	c) Sutures	d) Leads
13)	that are paced.	·	the first letter indic	
	a) Muscles	b) Nerves	c) Chambers	d) Bones
14)	In current pacema	ker throughout the	inputs the current i	in the circuit is
	determined by the	of the	pacemaker.	
	a) Internal resista	nce	b) External resista	ance
\	a) Internal resistac) Internal capacit	nce tance	b) External resistad) External capac	eitance
15)	a) Internal resistac) Internal capacitThe energy of mus	nce tance cle contraction is de	b) External resista d) External capac erived from following	sitance g except
·	a) Internal resistac) Internal capacitThe energy of musa) ATP	nce tance cle contraction is de b) Muscle fiber	b) External resista d) External capac erived from following c) Lactic acid	sitance g except d) Na+
·	 a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. 	nce tance cle contraction is de b) Muscle fiber yzer is used to mea	b) External resistand) External capacerived from following c) Lactic acid asure the	eitance g except d) Na ⁺ content in the
·	 a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. 	nce tance cle contraction is de b) Muscle fiber yzer is used to mea	b) External resista d) External capac erived from following c) Lactic acid	eitance g except d) Na ⁺ content in the
16)	 a) Internal resista c) Internal capacit The energy of musical a) ATP A defibrillator analidischarge pulse. a) Energy The electrodes for in diameter. 	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate	b) External resistand) External capacerived from following c) Lactic acid asure the c) Charging or are usually metal	citance g except d) Na+ content in the d) Potential discs about
16)	 a) Internal resista c) Internal capacit The energy of musical a) ATP A defibrillator analidischarge pulse. a) Energy The electrodes for in diameter. 	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate	b) External resistand) External capacerived from following c) Lactic acid asure thec) Charging	citance g except d) Na+ content in the d) Potential discs about
16) 17)	a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. a) Energy The electrodes for in diameter. a) 10 – 20 cm The	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate b) 10 – 15 cm lasers operate prin	b) External resistand) External capacerived from following c) Lactic acid asure the c) Charging or are usually metal	citance g except d) Na+ content in the d) Potential discs about d) 1 – 2 cm
16) 17)	 a) Internal resista c) Internal capacit The energy of musical a) ATP A defibrillator analidischarge pulse. a) Energy The electrodes for in diameter. a) 10 – 20 cm 	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate b) 10 – 15 cm lasers operate prin	b) External resistand) External capacerived from following c) Lactic acid asure the c) Charging or are usually metal c) 3 – 5 cm marily in the ultravio	citance g except d) Na+ content in the d) Potential discs about d) 1 - 2 cm elet spiral region.
16) 17)	a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. a) Energy The electrodes for in diameter. a) 10 – 20 cm The a) Excimer	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate b) 10 – 15 cm lasers operate prin b) Ruby	b) External resists d) External capace erived from following c) Lactic acid asure the c) Charging or are usually metal c) 3 – 5 cm marily in the ultravio	citance g except d) Na+ content in the d) Potential discs about d) 1 - 2 cm elet spiral region.
16) 17) 18)	a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. a) Energy The electrodes for in diameter. a) 10 – 20 cm The a) Excimer ion the retina.	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate b) 10 – 15 cm lasers operate prin b) Ruby laser photocoagula	b) External resists d) External capace erived from following c) Lactic acid asure the c) Charging or are usually metal c) 3 – 5 cm marily in the ultraviole c) CO ₂ ator is suitable for p	citance g except d) Na+ content in the d) Potential discs about d) 1 – 2 cm elet spiral region. d) Nd-yag ehoto coagulation of
16) 17) 18)	a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. a) Energy The electrodes for in diameter. a) 10 – 20 cm The a) Excimer ion	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate b) 10 – 15 cm lasers operate prin b) Ruby laser photocoagula	b) External resists d) External capace erived from following c) Lactic acid asure the c) Charging or are usually metal c) 3 – 5 cm marily in the ultravio	citance g except d) Na+ content in the d) Potential discs about d) 1 – 2 cm elet spiral region. d) Nd-yag ehoto coagulation of
16) 17) 18)	a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. a) Energy The electrodes for in diameter. a) 10 – 20 cm The a) Excimer ion the retina. a) Sodium Biological tissues	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate b) 10 – 15 cm lasers operate prin b) Ruby laser photocoagula b) Calcium	b) External resistand) External capace erived from following c) Lactic acid asure the c) Charging or are usually metal c) 3 – 5 cm marily in the ultravious c) CO ₂ ator is suitable for positive consistency thermal means of the consistency of the consis	citance g except d) Na+ content in the d) Potential discs about d) 1 – 2 cm elet spiral region. d) Nd-yag ehoto coagulation of
16) 17) 18)	a) Internal resista c) Internal capacit The energy of mus a) ATP A defibrillator anal discharge pulse. a) Energy The electrodes for in diameter. a) 10 – 20 cm The a) Excimer ion the retina. a) Sodium Biological tissues	nce tance cle contraction is de b) Muscle fiber yzer is used to mea b) Power external defibrillate b) 10 – 15 cm lasers operate prin b) Ruby laser photocoagula b) Calcium s are coagulated	b) External resistand) External capace erived from following c) Lactic acid asure the c) Charging or are usually metal c) 3 – 5 cm marily in the ultravious c) CO ₂ ator is suitable for positive consistency thermal means of the consistency of the consis	citance g except d) Na+ content in the d) Potential discs about d) 1 - 2 cm olet spiral region. d) Nd-yag ohoto coagulation of d) Argon



Seat	
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B.E. (Part – I) (Biomedical Engineering) Examination, 2017 BIOMEDICAL INSTRUMENTATION – III

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain application techniques of short wave diathermy with neat figures.
- 2) Differentiate between internal and external pacemaker.
- 3) List various performance aspects of implantable pacemaker.
- 4) Define cut, coagulation, desiccation and fulguration modes of surgical diathermy.
- 5) Draw and explain various output current waveform of nerve muscle stimulation.

3. Attempt any two:

- 1) Discuss unipolar and bipolar modes of ESU. Draw and explain circuit of coagulation mode.
- 2) Draw circuit diagram of ultrasonic therapy unit and explain its working. Also mention its clinical applications.
- 3) Draw and explain working rate of generator and pace pulse generator circuit of pacemaker.



-4-

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Define and differentiate between AC and DC defibrillator.
- 2) Explain any two types of dialyzers of dialysis machine.
- 3) Explain the principle of dialysis machine.
- 4) Draw and explain working of monitoring conductivity of dialysate.
- 5) Explain how capacitor discharges in INST mode of difibrillator.

5. Attempt any two questions:

- 1) Discuss principle of LASER and list various LASER equipment techniques and explain any two in detail.
- 2) Draw and explain working of dialysis machine. Mention the precautions that has to be taken in procedure.
- 3) Explain the need and working of heart rate variability meter. Mention its application.

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B.E. (Part – I) (Biomedical Engineering) Examination, 2017 BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 6-5-2017 Max. Marks : 100

Time: 3.00 p.m. to 6.00 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: 20		
1.	Ch	oose the correct an	swer:		(1×20=20)		
	1)	A defibrillator analydischarge pulse.	yzer is used to mea	asure the	content in the		
		a) Energy	b) Power	c) Charging	d) Potential		
	2)	The electrodes for in diameter.	external defibrillato	or are usually meta	al discs about		
		a) 10 – 20 cm	b) 10 – 15 cm	c) $3 - 5 \text{ cm}$	d) 1 – 2 cm		
	3)	The	lasers operate prir	marily in the ultrav	iolet spiral region.		
		a) Excimer	b) Ruby	c) CO ₂	d) Nd-yag		
	4)	ion	laser photocoagula	ator is suitable for	photo coagulation of		
		the retina.					
		a) Sodium	b) Calcium	c) Nitrogen	d) Argon		
	5)	Biological tissues are coagulated by thermal means of the requisite temperature is maintained at°C. a) 35° b) 55° c) 70° d) 50°					
		a) 35°	b) 55°	c) 70°	d) 50°		
	6)	6) is the exchange of things dissolved in fluid across the					
		membrane due to	difference in amou	nts of solutes on t	wo sides.		
		a) Drift		b) Diffusion			
		c) Osmosis		d) Ultrafilter acti	on		
	7)	The artificial kidner mass exchanger d		dev	vice that serves as a		
		a) Separation	_	c) Mixed	d) Exchanger		

8)	is t	he used membrane	for h	emodialysis.	
-,		b) Cupraphan			d) Sodium
9)	The laser action of	lepends upon the ph	enor	menon of stimu	lated
,		b) Energy			
10)	A ruby laser is op	erated in		bursts.	
,	a) Short	erated in b) Big	c) I	Long	d) Large
11)	In	_ needle point electro	odes	are stuck into t	issue and then kept
	steady.				
		b) Coagulation			
12)		efers to a superficial	tissu	ue destruction v	vithout affecting
	deep-seated tissu				
	a) Cutting		b) (Coagulation	
	c) Fulguration		d) I	None of above	
13)	The frequency of	currents used in su	rgica	ıl diathermy un	its in the range at
	IVI⊓Z.	b) 15-20	c) 1	5 _ 10	d) 1 _ 3
1 //\	a) 10 20	rantia a staadly flav	o) , of d	iroot ourront the	at is possed through
14)	 current is a steadly flow of direct current that is passed th a tissue affects chemically. 				at is passed tillough
		b) Faradic	c) (Surging	d) None of above
1 E \					
15)		produces the el	ecino	cai osciliation o	i trie required
	a) Amplifiar	asonic therapy unit.	h\	Dower emplifie	v
	a) Amplifier		9) I	Power amplille Oscilleter	
\					
16)		ators are constructed			
	•	b) Seebeck	•		•
17)			rt wa	ve diathermy e	electrodes used are
	called asa) Pads	b) Sacs	c) 9	Sutures	d) Leads
10\	,	,	,		,
10)		code of pacemaker	me i	iirst letter iriaic	ales the
	that are paced.	h) Norvos	۵) (Chambore	d) Ropes
	,	b) Nerves	,		,
19)	•	aker throughout the	•		n the circuit is
	_	e of the	-		
	a) Internal resista		,	External resista	
	c) Internal capac	eitance	d) l	External capac	itance
20)	The energy of mu	scle contraction is de	erive	d from following	g except
	a) ATP	b) Muscle fiber	c) I	Lactic acid	d) Na+



Seat	
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B.E. (Part – I) (Biomedical Engineering) Examination, 2017 BIOMEDICAL INSTRUMENTATION – III

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain application techniques of short wave diathermy with neat figures.
- 2) Differentiate between internal and external pacemaker.
- 3) List various performance aspects of implantable pacemaker.
- 4) Define cut, coagulation, desiccation and fulguration modes of surgical diathermy.
- 5) Draw and explain various output current waveform of nerve muscle stimulation.

3. Attempt any two:

- 1) Discuss unipolar and bipolar modes of ESU. Draw and explain circuit of coagulation mode.
- 2) Draw circuit diagram of ultrasonic therapy unit and explain its working. Also mention its clinical applications.
- 3) Draw and explain working rate of generator and pace pulse generator circuit of pacemaker.



SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Define and differentiate between AC and DC defibrillator.
- 2) Explain any two types of dialyzers of dialysis machine.
- 3) Explain the principle of dialysis machine.
- 4) Draw and explain working of monitoring conductivity of dialysate.
- 5) Explain how capacitor discharges in INST mode of difibrillator.

5. Attempt any two questions:

 $(10 \times 2 = 20)$

- 1) Discuss principle of LASER and list various LASER equipment techniques and explain any two in detail.
- 2) Draw and explain working of dialysis machine. Mention the precautions that has to be taken in procedure.
- 3) Explain the need and working of heart rate variability meter. Mention its application.

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B.E. (Part – I) (Biomedical Engineering) Examination, 2017 BIOMEDICAL INSTRUMENTATION – III

Day and Date : Saturday, 6-5-2017 Max. Marks : 100

Time: 3.00 p.m. to 6.00 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		
		MCQ/Objective T	ype Questions	
Duratio	n : 30 Minutes			Marks : 20
1. Ch	oose the correct ans	swer:		(1×20=20)
1)	Ultrasonic generato a) Peltier		on the c) Ohm's	
2)	In the capacitor pla	te method of shor	t wave diathermy e	lectrodes used are
	a) Pads	b) Sacs	c) Sutures	d) Leads
3)	In the five letter co that are paced.	de of pacemaker	the first letter indic	ates the
	a) Muscles	b) Nerves	c) Chambers	d) Bones
4)	In current pacemak determined by the _	of the	pacemaker.	
	a) Internal resistanc) Internal capacita		b) External resistad) External capac	
5)	The energy of musc	ele contraction is de	erived from following	except
	a) ATP	b) Muscle fiber	c) Lactic acid	d) Na ⁺
6)	A defibrillator analy discharge pulse.	zer is used to mea	sure the	content in the
	a) Energy	b) Power	c) Charging	d) Potential
7)	The electrodes for ein diameter.	external defibrillato	r are usually metal (discs about
	a) 10-20 cm	b) 10 – 15 cm	c) $3 - 5 \text{ cm}$	d) 1 – 2 cm

8)	The	_lasers operate pri	mar	ily in the ultra	violets	spiral region.
	a) Excimer	b) Ruby	c)	CO ₂	d)	Nd-yag
9)	ion	laser photocoagula	ator	is suitable fo	r phote	o coagulation of
	the retina.					
	a) Sodium	b) Calcium	c)	Nitrogen	d)	Argon
10)	temperature is ma	s are coagulated intained at		°C.		-
	a) 35°	b) 55°	c)	70°	d)	50°
11)	is	the exchange of thi	ings	dissolved in	fluid a	cross the
		difference in amou			two si	des.
	a) Drift		b)	Diffusion		
	c) Osmosis					
12)		ey is a membrane _		de	evice t	that serves as a
	_	during clinical use.	۵)	Mixad	al\	Evolunger
40\		b) Filter				Exchanger
13)	IS th	ne used membrane	tor	nemodialysis.	al\	Co di usa
		b) Cupraphan				
14)		epends upon the ph				
\		b) Energy			a)	Radiation
15)	A ruby laser is ope	erated in	- \	_ bursts.	-1\	Laure
		b) Big				
16)		needle point electro	ode	s are stuck int	o tissu	ue and then kept
	steady.	b) Coagulation	۵)	Eulguration	۷/	Dorivation
4 - 7\		-		_		
17)		fers to a superficial	TISS	ue destructio	n with	out affecting
	deep-seated tissu a) Cutting	c .	h)	Coagulation		
	c) Fulguration		-	None of abov	/e	
18)	, •	currents used in su	•			n the range at
10)	MHz.		gio	ar diatricitry		ir the range at
	a) 10-20	b) 15-20	c)	5 – 10	d)	1-3
19)		rent is a steadly flow				
,	a tissue affects ch	•				
	a) Galvanic	b) Faradic	c)	Surging	d)	None of above
20)	Timed	produces the el	ectr	ical oscillatior	of the	e required
		sonic therapy unit.				-
	a) Amplifier		b)	Power ampli	fier	
	c) Rectifier		-	Oscillator		



Seat	
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B.E. (Part – I) (Biomedical Engineering) Examination, 2017 BIOMEDICAL INSTRUMENTATION – III

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain application techniques of short wave diathermy with neat figures.
- 2) Differentiate between internal and external pacemaker.
- 3) List various performance aspects of implantable pacemaker.
- 4) Define cut, coagulation, desiccation and fulguration modes of surgical diathermy.
- 5) Draw and explain various output current waveform of nerve muscle stimulation.

3. Attempt any two:

- 1) Discuss unipolar and bipolar modes of ESU. Draw and explain circuit of coagulation mode.
- 2) Draw circuit diagram of ultrasonic therapy unit and explain its working. Also mention its clinical applications.
- 3) Draw and explain working rate of generator and pace pulse generator circuit of pacemaker.

-4-

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Define and differentiate between AC and DC defibrillator.
- 2) Explain any two types of dialyzers of dialysis machine.
- 3) Explain the principle of dialysis machine.
- 4) Draw and explain working of monitoring conductivity of dialysate.
- 5) Explain how capacitor discharges in INST mode of difibrillator.

5. Attempt any two questions:

- 1) Discuss principle of LASER and list various LASER equipment techniques and explain any two in detail.
- 2) Draw and explain working of dialysis machine. Mention the precautions that has to be taken in procedure.
- 3) Explain the need and working of heart rate variability meter. Mention its application.

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No.	Set	
NO.		

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 PRINCIPLES OF IMAGE PROCESSING

PRINCIPLES OF IMA	AGE PROCESSING
Day and Date: Monday, 8-5-2017 Time: 3.00 p.m. to 6.00 p.m.	Max. Marks : 100
in Answer Book Pag 2) Answer MCQ/Obje	ory. It should be solved in first 30 minutes ge No. 3. Each question carries one mark. ctive type questions on Page No. 3 only. ntion, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective T	ype Questions
Duration: 30 Minutes	Marks : 20
1. Choose the correct answer:	(1×20=20)
Spatial domain is denoted by	
a) $g(X, Y) = [f(X, Y)]$	b) $g(X, Y) = T[f(X, Y)]$
c) $g(X, Y) = T[f'(X, Y)]$	d) $g(X, Y) = T[f(Y)]$
2) Smoothing spatial filters are useful foa) Image enhancementc) Highlight gross details	b) Image restoration
3) In filters, there is no d convolution.a) Symmetric b) Asymmetric	
4) In image we notice the comon low side on intensity scale.a) Darkb) Colorful	nponents of histogram are concentrated c) Bridge d) None of above
5) The obtain image show us	the distribution of grey levels on the

6) In bit plane slicing the most of the information of an image is contained by

a) Mid	order	plane
--------	-------	-------

image.

a) Histogram

b) Highest order plane

b) Histogram equalization

c) Lowest order plane

c) Contrast stretching

d) All planes

d) All of above

7)	High pass filters are a) Contrast	e used for image b) Blurring	c) Sharpening	d)	Resizina
8)	Digitizing co-ordina a) Quantization	te value is called _			
	c) Sampling		d) Discrete Fourie		ansform
9)	Object	is the process o	•		
,	its descriptors.		3		,
	a) Stretching	b) Blurring	c) Tracking	d)	Recognition
10)	plots ho	ow many times (fre	equency) each inter	nsity	/ value in image
	occurs.		\		
	a) Quantization			-	_
11)	Smallest possible n				
	a) 3 × 3			a)	4 × 4
12)	is n			al\	Midlerial
40)	a) High level				
13)	Image quantised w	ith sufficient bright	en levels will lead to	0 00	ccurrence of
	a) Pixillation	b) Blurring	c) False contours	d)	None of above
14)	tool i	s used in tasks su	ch as zooming, shr	inki	ng, rotating etc.
			O ,		
	a) Sampling	b) Interpolation	-		Histogram
15)	a) SamplingDynamic rage of imageby		c) Filters	d)	
15)	Dynamic rage of ima	aging system is a r	c) Filters atio where the uppe	d) r lin	nit is determined
	Dynamic rage of ima	aging system is a ra b) Noise	c) Filters atio where the uppe c) Brightness	d) r lin	nit is determined
	Dynamic rage of image bya) Saturation	aging system is a rab) Noise	c) Filtersatio where the uppec) Brightnesspoints.	d) r lim d)	nit is determined Contrast
16)	Dynamic rage of image bya) Saturation A continuous image	aging system is a rable b) Noise e is digitised at b) Vertex	c) Filters atio where the uppe c) Brightness points. c) Contour	d) r lim d)	nit is determined Contrast
16)	Dynamic rage of image bya) Saturation A continuous image a) Random	aging system is a rable b) Noise e is digitised at b) Vertex nd background sho	c) Filters atio where the uppe c) Brightness points. c) Contour	d) r lim d) d)	nit is determined Contrast Sampling
16) 17)	Dynamic rage of image by a) Saturation A continuous image a) Random Transition objects a	aging system is a rate b) Noise e is digitised at b) Vertex nd background sho b) Step edges mation is used for s	c) Filters atio where the uppe c) Brightness points. c) Contour ows c) Sharp edges shape	d) r lim d) d)	Contrast Sampling Both a) and b)
16) 17)	Dynamic rage of image by a) Saturation A continuous image a) Random Transition objects a a) Ramp edges	aging system is a rate b) Noise e is digitised at b) Vertex nd background sho b) Step edges mation is used for s	c) Filters atio where the uppe c) Brightness points. c) Contour ows c) Sharp edges	d) r lim d) d)	Contrast Sampling Both a) and b)
16) 17) 18)	Dynamic rage of image by a) Saturation A continuous image a) Random Transition objects a a) Ramp edges Hit or miss transform a) Removal Structuring element	aging system is a rate b) Noise e is digitised at b) Vertex nd background sho b) Step edges mation is used for s b) Detection	c) Filters atio where the uppe c) Brightness points. c) Contour ows c) Sharp edges shape c) Compression	d) r lim d) d)	Contrast Sampling Both a) and b)
16) 17) 18)	Dynamic rage of imate by a) Saturation A continuous image a) Random Transition objects at a) Ramp edges Hit or miss transforma) Removal	aging system is a rate b) Noise e is digitised at b) Vertex nd background sho b) Step edges mation is used for s b) Detection t is also called	c) Filters atio where the uppe c) Brightness points. c) Contour ows c) Sharp edges shape c) Compression	d) r lim d) d) d)	Contrast Sampling Both a) and b) Sampling
16) 17) 18) 19)	Dynamic rage of image by a) Saturation A continuous image a) Random Transition objects a a) Ramp edges Hit or miss transform a) Removal Structuring element	aging system is a rate b) Noise e is digitised at b) Vertex nd background sho b) Step edges mation is used for s b) Detection t is also called b) Lines eferred to as	c) Filters atio where the uppe c) Brightness points. c) Contour ows c) Sharp edges shape c) Compression c) Subimage	d) r lim d) d) d) d) d)	Contrast Sampling Both a) and b) Sampling Noise

Set P



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 PRINCIPLES OF IMAGE PROCESSING

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Mention various properties of 2D-DFT in detail.
- 2) Define Gaussian noise and Salt Pepper noise.
- 3) Define and differentiate between point operation and neighbourhood operation.
- 4) Discuss the significance of chain coding with its application.
- 5) Define and explain sampling and quantization with each one example.

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Define and discuss various blurring and ringing effects. How they can be avoided?
- 2) Explain following image enhancement technique and mention their application.
 - a) Contrast stretching
 - b) Log transformation.
- 3) Explain various region based segmentation methods in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Differentiate between DFT and FFT transform with an example.
- 2) Explain Hit and Miss function and their role in image processing.
- 3) Explain opening and closing operation in detail with each of example.
- 4) Explain concept of skeletonization and mention its advantages.
- 5) Define moments and explain its importance in image processing.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Explain all image compression technique in detail with two example.
- 2) Define and explain dilation and erosion operation with their significance.
- 3) List various image reconstruction technique in CT scanning and explain any one in detail

Set P

Seat	Set	Q
No.	Set	G

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 PRINCIPLES OF IMAGE PROCESSING

Day and Date: Monday, 8-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 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

			INICO/ODJECTIVE I	ypt	z Wucznons		
Dura	atio	n : 30 Minutes					Marks : 20
1.	Ch	oose the correct ans	swer:				(1×20=20)
	1)	A continuous image a) Random	=			d)	Sampling
	2)	Transition objects a a) Ramp edges				d)	Both a) and b)
	3)	Hit or miss transfor a) Removal			•		Sampling
	4)	Structuring elemen a) Pixels				d)	Noise
	5)	Gaussian noise is ra) Red noise				d)	Normal noise
	6)	Spatial domain is do a) $g(X, Y) = [f(X, Y)]$			g(X, Y) = T[f(X)]	(, Y)]
		c) $g(X, Y) = T[f'(X)]$	(, Y)]	d)	g(X, Y) = T[f(Y)])]	
	7)	Smoothing spatial fa) Image enhancer c) Highlight gross	ment	b)	Image restorat		ls
	8)	Inf convolution. a) Symmetric					ection and Simple
		a) Symmetric	b) Asymmetric	U)	Lyuai	u)	Olitible

9)	In image we notice the components of histogram are concentrated on low side on intensity scale.					re concentrated
		b) Colorful	c)	Bridge	d)	None of above
10)	The obta	•	-	_	-	
	image.					
	a) Histogram		-	Histogram equa	aliza	ation
	c) Contrast stretch	_	-	All of above		
11)	In bit plane slicing t	he most of the info	orm	ation of an imag	e is	contained by
	a) Mid order plane		b)	Highest order p	lane	Э
	c) Lowest order pla	ine	d)	All planes		
12)	High pass filters are	used for image _				
	a) Contrast	b) Blurring	c)	Sharpening	d)	Resizing
13)	Digitizing co-ordina	te value is called $_$				
	a) Quantization		,	Fourier transfor		
	c) Sampling		•	Discrete Fourie		
14)	Object	is the process o	f as	ssigns a label to	an d	object based on
	its descriptors. a) Stretching	h) Blurring	c)	Tracking	۹)	Recognition
15)		,	•	_	•	_
13)	occurs.	ow many times (ne	qu	ericy) each inter	iSity	value in image
	a) Quantization	b) Sampling	c)	Histogram	d)	Segment
16)	Smallest possible n	eighbourhood in a	im	age must be of s	ize	
	a) 3 × 3	b) 2 × 2	c)	1 × 1	d)	4×4
17)	is no	ot process of imag	ер	rocessing.		
	a) High level	b) Low level	c)	Last level	d)	Mid level
18)	Image quantised wi	ith sufficient bright	en	levels will lead to	00	ccurrence of
	a) Pixillation	b) Blurring	c)	False contours	d)	None of above
19)	tool i	s used in tasks su	ch a	as zooming, shri	nki	ng, rotating etc.
	a) Sampling	b) Interpolation	c)	Filters	d)	Histogram
20)	Dynamic rage of ima	aging system is a ra	atic	where the uppe	r lim	nit is determined
	a) Saturation	b) Noise	c)	Brightness	d)	Contrast



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 PRINCIPLES OF IMAGE PROCESSING

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Mention various properties of 2D-DFT in detail.
- 2) Define Gaussian noise and Salt Pepper noise.
- 3) Define and differentiate between point operation and neighbourhood operation.
- 4) Discuss the significance of chain coding with its application.
- 5) Define and explain sampling and quantization with each one example.

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Define and discuss various blurring and ringing effects. How they can be avoided?
- 2) Explain following image enhancement technique and mention their application.
 - a) Contrast stretching
 - b) Log transformation.
- 3) Explain various region based segmentation methods in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Differentiate between DFT and FFT transform with an example.
- 2) Explain Hit and Miss function and their role in image processing.
- 3) Explain opening and closing operation in detail with each of example.
- 4) Explain concept of skeletonization and mention its advantages.
- 5) Define moments and explain its importance in image processing.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Explain all image compression technique in detail with two example.
- 2) Define and explain dilation and erosion operation with their significance.
- 3) List various image reconstruction technique in CT scanning and explain any one in detail

Set Q

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Seat	Set	R
No.	Set	• •

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 PRINCIPLES OF IMAGE PROCESSING

Day and Date : Monday, 8-5-2017 Max. Marks : 100 Time : 3.00 p.m. to 6.00 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 Ty	ype Questions	
Duratio	on : 30 Minutes	-		Marks: 20
1. Ch	oose the correct ans	swer:		(1×20=20)
1)	ize			
ŕ		=	c) 1 × 1	
2)	is n	ot process of imag	e processing.	
			c) Last level	d) Mid level
3)	Image quantised w	ith sufficient bright	en levels will lead to	o occurrence of
	a) Pixillation	b) Blurring	c) False contours	d) None of above
4)	tool	is used in tasks suc	ch as zooming, shri	nking, rotating etc.
,			c) Filters	
5) Dynamic rage of imaging system is a ratio where the upper limit is determine by				r limit is determined
		b) Noise	c) Brightness	d) Contrast
6)	A continuous image	e is digitised at	points.	
	a) Random	b) Vertex	c) Contour	d) Sampling
7)	Transition objects a	and background sho	ows	
	a) Ramp edges	b) Step edges	c) Sharp edges	d) Both a) and b)
8)	Hit or miss transfor	mation is used for s	shape	
	a) Removal	b) Detection	c) Compression	d) Sampling
9)	Structuring elemen	t is also called		
	a) Pixels	b) Lines	c) Subimage	d) Noise

10)	Gaussian noise is referred to as a) Red noise b) Black noise	c) White noise d) Normal noise		
11)	Spatial domain is denoted by			
,	a) $g(X, Y) = [f(X, Y)]$	b) $g(X, Y) = T[f(X, Y)]$		
	c) $g(X, Y) = T[f'(X, Y)]$	d) $g(X, Y) = T[f(Y)]$		
12)	Smoothing spatial filters are useful fo	r		
	a) Image enhancement	b) Image restoration		
	c) Highlight gross details	d) Highlight fine details		
13)	In filters, there is no d convolution.	lifference between correction and		
	a) Symmetric b) Asymmetric	c) Equal d) Simple		
14)	In image we notice the comon low side on intensity scale.	nponents of histogram are concentrated		
	a) Dark b) Colorful	c) Bridge d) None of above		
15)	The obtain image show us	the distribution of grey levels on the		
	image.			
	a) Histogram	b) Histogram equalization		
	c) Contrast stretching	d) All of above		
16)	In bit plane slicing the most of the info	ormation of an image is contained by		
	a) Mid order plane	b) Highest order plane		
	c) Lowest order plane	d) All planes		
17)	High pass filters are used for image $_$			
	a) Contrast b) Blurring	c) Sharpening d) Resizing		
18)	Digitizing co-ordinate value is called _			
	a) Quantization	b) Fourier transform		
	c) Sampling	d) Discrete Fourier transform		
19)	-	of assigns a label to an object based on		
	its descriptors.			
	a) Stretching b) Blurring	c) Tracking d) Recognition		
20)	plots how many times (fre	equency) each intensity value in image		
	occurs. a) Quantization b) Sampling	c) Histogram d) Segment		



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 PRINCIPLES OF IMAGE PROCESSING

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Mention various properties of 2D-DFT in detail.
- 2) Define Gaussian noise and Salt Pepper noise.
- 3) Define and differentiate between point operation and neighbourhood operation.
- 4) Discuss the significance of chain coding with its application.
- 5) Define and explain sampling and quantization with each one example.

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Define and discuss various blurring and ringing effects. How they can be avoided?
- 2) Explain following image enhancement technique and mention their application.
 - a) Contrast stretching
 - b) Log transformation.
- 3) Explain various region based segmentation methods in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Differentiate between DFT and FFT transform with an example.
- 2) Explain Hit and Miss function and their role in image processing.
- 3) Explain opening and closing operation in detail with each of example.
- 4) Explain concept of skeletonization and mention its advantages.
- 5) Define moments and explain its importance in image processing.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Explain all image compression technique in detail with two example.
- 2) Define and explain dilation and erosion operation with their significance.
- 3) List various image reconstruction technique in CT scanning and explain any one in detail

Set R

Seat		C
No.	Set	3

	B.E. (Biomedical Engineerin PRINCIPLES OF II	g) (Part – I) Examination, MAGE PROCESSING	2017
-	d Date : Monday, 8-5-2017 3.00 p.m. to 6.00 p.m.	Ma	ax. Marks : 100
ı	2) Answer MCQ/Ob	ulsory. It should be solved in firs Page No. 3. Each question carri Djective type questions on Pag Dention, Q.P. Set (P/Q/R/S) on	ies one mark. g e No. 3 only.
	MCQ/Objective	e Type Questions	
Duratio	on : 30 Minutes		Marks : 20
1. Ch	oose the correct answer :		(1×20=20)
1)	In bit plane slicing the most of the i	nformation of an image is cont	ained by
	a) Mid order planec) Lowest order plane	b) Highest order planed) All planes	
2)	High pass filters are used for image a) Contrast b) Blurring	c) Sharpening d) Resi	izing
3)	Digitizing co-ordinate value is called a) Quantization c) Sampling	d b) Fourier transform d) Discrete Fourier transfo	orm
4)	Object is the proces its descriptors.		
	a) Stretching b) Blurring		_
5)	plots how many times occurs.		_
_,	a) Quantization b) Sampling	, , , , , ,	
6)	Smallest possible neighbourhood i a) 3×3 b) 2×2	n a image must be of size c) 1×1 d) 4×4	
7)	is not process of im	age processing.	

b) Low level c) Last level

a) High level

d) Mid level

8)	B) Image quantised with sufficient brighte			ten levels will lead to occurrence of			
	a) Divillation	la). Discussion or	٠,١	Cala a a a mata coma	۱۱.	Name of above	
	a) Pixillation		-		-		
9)	tool						
	a) Sampling	b) Interpolation	c)	Filters	d)	Histogram	
10)	Dynamic rage of im by	aging system is a r	atic	where the uppe	r lin	nit is determined	
	a) Saturation	b) Noise	c)	Brightness	d)	Contrast	
11)	A continuous image	e is digitised at		points.			
	a) Random				d)	Sampling	
12)	Transition objects a	and background sh	ows	S			
	a) Ramp edges	b) Step edges	c)	Sharp edges	d)	Both a) and b)	
13)	Hit or miss transfor	mation is used for	sha	ipe			
	a) Removal	b) Detection	c)	Compression	d)	Sampling	
14)	Structuring elemen	t is also called					
	a) Pixels	b) Lines	c)	Subimage	d)	Noise	
15)	Gaussian noise is r	eferred to as					
	a) Red noise	b) Black noise	c)	White noise	d)	Normal noise	
16)	Spatial domain is de	enoted by					
	a) $g(X, Y) = [f(X, Y)]$			g(X, Y) = T[f(X, Y)]	Y)]	
	c) $g(X, Y) = T[f'(X)]$	(, Y)]	d)	g(X, Y) = T[f(Y)])]		
17)	Smoothing spatial f	ilters are useful for	r				
,	a) Image enhancer			Image restorati	on		
	c) Highlight gross		d) Highlight fine details				
18)	In f	ilters, there is no di	iffe	rence between c	orre	ection and	
	convolution.						
	a) Symmetric	b) Asymmetric	c)	Equal	d)	Simple	
19)	Inimage	we notice the com	por	nents of histogra	m a	re concentrated	
	on low side on inte	nsity scale.					
	a) Dark	b) Colorful	c)	Bridge	d)	None of above	
20)	The obta	ain image show us	the	distribution of g	rey	levels on the	
	image.						
	a) Histogram		,	Histogram equa	aliza	ation	
	c) Contrast stretch	ning	d)	All of above			



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 PRINCIPLES OF IMAGE PROCESSING

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Mention various properties of 2D-DFT in detail.
- 2) Define Gaussian noise and Salt Pepper noise.
- 3) Define and differentiate between point operation and neighbourhood operation.
- 4) Discuss the significance of chain coding with its application.
- 5) Define and explain sampling and quantization with each one example.

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Define and discuss various blurring and ringing effects. How they can be avoided?
- 2) Explain following image enhancement technique and mention their application.
 - a) Contrast stretching
 - b) Log transformation.
- 3) Explain various region based segmentation methods in detail.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Differentiate between DFT and FFT transform with an example.
- 2) Explain Hit and Miss function and their role in image processing.
- 3) Explain opening and closing operation in detail with each of example.
- 4) Explain concept of skeletonization and mention its advantages.
- 5) Define moments and explain its importance in image processing.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Explain all image compression technique in detail with two example.
- 2) Define and explain dilation and erosion operation with their significance.
- 3) List various image reconstruction technique in CT scanning and explain any one in detail

Set S

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	Seat No.		Set	Р
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B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

	•	HOSPITAL M	ÁNAGEMÉNT	·	
	d Date : Tuesday 3.00 p.m. to 6.00			Max. Mark	s: 100
1	,	Q. No. 1 is compuls in Answer Book Pa Answer MCQ/Obje Don't forget to me	ge No. 3. Each que ective type questio	estion carries one r o <mark>ns on Page No. 3</mark>	mark. only.
		MCQ/Objective	Type Questions		
Duratio	n : 30 Minutes	•		Mai	rks : 20
1. Ch	oose the correct	answer:		(1×	20=20)
1)	Defibrillator mad	chine is apart of OT			
	a) cardiac	b) respiratory	c) orthopedic	d) none of thes	е
2)		the color code of th cal wastes such as b	_	spitals to dispose	off
	a) Yellow	b) Black	c) Red	d) Blue	
3)		the element of direct b) Discipline		d) Delegation	
4)		ing is method of prov ement		ords re	
5)		d organization relatio			
	a) Nursing	b) CEO	c) HR	d) Administrato	r
6)		totreatm			
	a) adult	b) neonatal	c) child	d) aged	
7)		health is a function o			
	a) Promotion	•	c) Support	,	
8)	Preventive mair a) moderate	ntenance is carried o b) minimum		lure to a absolute d) zero	
9)	•	entity who has the dis b) sensitivity	•	-	



10)	care includes all except	hospital from indoor care to outpatient
	a) rising cost of hospital carec) economic importance	b) shortage of patient bedd) increase in patient beds
11)	Air change requirement/hour in OT is a) $10-12$ b) $16-18$	
12)	is the best suited for wa	alls ends ceiling of OT.
,	a) Ceramic tiles	b) Terrazo tiles
	c) Glaze tiles	d) Situ Mosaic finish
13)	are not part of hospital se	ervices.
	a) Essential services	b) Additional services
	c) Utility services	d) Administrative services
14)	is the skeleton of organiz	ration.
	a) Organizational function	b) Organization structure
	c) Decentralization	d) Co-ordination
15)	"Shopping window" of a hospital is	
	a) Operation theater	b) ICU
	c) OPD	d) Cafeteria
16)	A good health triad does not include	
	a) physical status	b) social status
	c) mental status	d) economic status
17)	All except one is the output indicator	•
	a) patient satisfaction	b) public relation
	c) quality of care	d) machine
18)	Supportive services of the hospital inc	•
	a) pharmacy b) laboratory	
19)	is not a basis of classifica	
	a) Speciality b) Functional	c) Size d) Shape
20)	The function of the OPD include	
	a) promotion of health	
	b) training of medical and nursing sta	Ш
	c) social services	
	d) all the above	



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

Day and Date: Tuesday, 9-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain various roles of CEO in hospital.
- 2) Explain the need and importance of maintenance and calibration of medical equipment in hospital with one example.
- 3) Define the concept of risk management and mention its significance in hospital management.
- 4) List various engineering departments in hospital and mention each of two function.
- 5) Explain the role of hospital administrator while handling the hospital in detail.

3. Attempt **any two** questions:

 $(10 \times 2 = 20)$

- 1) Explain the concept, need and importance of preventive maintenance with one example.
- 2) Describe the role of Biomedical engineer in hospital as well as in R and D departments.
- 3) Write short note on:
 - a) Classification of hospitals based on various factors and associated norms.
 - b) Importance of health insurance and medical legal aspects.

SECTION - II

4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) List various laboratories, equipments and discuss their role in hospital management.
- 2) What is the role and need of disaster management in hospital management?
- 3) Explain the need and ways of infection control in hospitals.
- 4) Discuss the importance of medical records in hospital.
- 5) Explain the role of housekeeping and dietary food services in hospitals in detail.



5. Attempt any two questions:

 $(10 \times 2 = 20)$

- 1) Draw layout of OPD and OT and explain importance of each.
- 2) List various equipments used in OT and ICU. Discuss maintenance procedure of any one equipment in each of.
- 3) Write a short note on:
 - a) Need and structure of blood bank.
 - b) Waste managements functions.

Seat No.		Set	Q
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B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

		HOO! HAE MA		CLINEIT		
•	d Date : Tuesday, 9- 3.00 p.m. to 6.00 p.n					Max. Marks : 100
ı	2) A I	No. 1 is compulse Answer Book Pag nswer MCQ/Objec on't forget to men	e N ctiv	lo. 3. Each quesi e type question :	tion s o i	carries one mark. n Page No. 3 only.
Duratio	n : 30 Minutes	MCQ/Objective T	yp€	Questions		Marks : 20
1. Cho	oose the correct ans	swer:				(1×20=20)
1)	A good health triad a) physical status c) mental status	does not include	•	social status economic statu	S	
2)	All except one is the a) patient satisfaction c) quality of care	-	b)	ospital system _ public relation machine		
3)	Supportive services a) pharmacy			<u>-</u>		
4)	is not a a) Speciality				d)	Shape
5)	The function of the a) promotion of head b) training of medic c) social services d) all the above	alth	aff			
6)	Defibrillator machina) cardiac	ne is apart of OT b) respiratory	c)	orthopedic	d)	none of these
7)	is the human anatomical a) Yellow		ody			s to dispose off Blue
8)	a) Evaluation		_		d)	Delegation

-2-



9)	Functional nursing a) patient carec) care management		iding b) caring of records d) equipment care			
10)	To create a good or department of hosp	rganization relatior pital.	n is a function of			
44\	a) Nursing			u) Auministrator		
11)	PICU is related to _ a) adult	treatme	ents.	d) aged		
40\				u) ageu		
12)	a) Promotion			d) Unaradation		
40\						
13)	Preventive mainter a) moderate					
14)	Capability to identital validity	ty who has the dise	ease is done by me	easuring		
15)	care includes all exa) rising cost of ho	ccept espital care	f hospital from indoor care to outpatient b) shortage of patient bed d) increase in patient beds			
16)	Air change requirer a) 10 – 12	ment/hour in OT is b) 16 – 18	%.	d) 58-60		
17)	is the		alls ends ceiling of	OT.		
18)	are no	ot part of hospital s	ervices.			
,	a) Essential servicesc) Utility services	•				
19)	is the	skeleton of organiz	zation.			
·	a) Organizational fc) Decentralization	unction	b) Organization sd) Co-ordination	structure		
20)	"Shopping window" a) Operation theate c) OPD		b) ICU d) Cafeteria			



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

Day and Date: Tuesday, 9-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain various roles of CEO in hospital.
- 2) Explain the need and importance of maintenance and calibration of medical equipment in hospital with one example.
- 3) Define the concept of risk management and mention its significance in hospital management.
- 4) List various engineering departments in hospital and mention each of two function.
- 5) Explain the role of hospital administrator while handling the hospital in detail.

3. Attempt any two questions:

 $(10 \times 2 = 20)$

- 1) Explain the concept, need and importance of preventive maintenance with one example.
- 2) Describe the role of Biomedical engineer in hospital as well as in R and D departments.
- 3) Write short note on:
 - a) Classification of hospitals based on various factors and associated norms.
 - b) Importance of health insurance and medical legal aspects.

SECTION - II

4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) List various laboratories, equipments and discuss their role in hospital management.
- 2) What is the role and need of disaster management in hospital management?
- 3) Explain the need and ways of infection control in hospitals.
- 4) Discuss the importance of medical records in hospital.
- 5) Explain the role of housekeeping and dietary food services in hospitals in detail.



5. Attempt any two questions:

- 1) Draw layout of OPD and OT and explain importance of each.
- 2) List various equipments used in OT and ICU. Discuss maintenance procedure of any one equipment in each of.
- 3) Write a short note on:
 - a) Need and structure of blood bank.
 - b) Waste managements functions.

No.	Seat No.		Set	R
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B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

	HOSPITAL MA	NAGEMENT	
-	d Date : Tuesday, 9-5-2017 3.00 p.m. to 6.00 p.m.	Max.	Marks : 100
I	2) Answer MCQ/Object	ory. It should be solved in first 3 te No. 3. Each question carries ctive type questions on Page Intion, Q.P. Set (P/Q/R/S) on Top	one mark. Vo. 3 only.
	MCQ/Objective T	ype Questions	
Duratio	n : 30 Minutes		Marks : 20
1. Ch	oose the correct answer :		(1×20=20)
1)	Air change requirement/hour in OT is a) $10-12$ b) $16-18$	c) 28-30 d) 58-60)
2)	a) Ceramic tiles c) Glaze tiles	alls ends ceiling of OT. b) Terrazo tiles d) Situ Mosaic finish	
3)	are not part of hospital sa) Essential servicesc) Utility services		
4)	is the skeleton of organizational function c) Decentralization		
5)	"Shopping window" of a hospital is a) Operation theater c) OPD	b) ICU d) Cafeteria	
6)	A good health triad does not include a) physical status c) mental status	b) social statusd) economic status	
7)	All except one is the output indicator (a) patient satisfaction c) quality of care	of hospital system b) public relation d) machine	
8)	Supportive services of the hospital incap pharmacy b) laboratory		

9)	is not a	a basis of classifica	tio	n of hospital.		
	a) Speciality				d)	Shape
10)	The function of the	OPD include				
	a) promotion of he	alth				
	b) training of medi	cal and nursing sta	aff			
	c) social services					
	d) all the above					
11)	Defibrillator machi	ne is apart of OT				
	a) cardiac	b) respiratory	c)	orthopedic	d)	none of these
12)	is the	e color code of the	e ba	ag used in hosp	itals	s to dispose off
	human anatomical	wastes such as bo	ody	parts.		
	a) Yellow	b) Black	c)	Red	d)	Blue
13)	is th	e element of directi	ing	in hospital.		
	a) Evaluation	b) Discipline	c)	Planning	d)	Delegation
14)	Functional nursing					
	a) patient carec) care management		b)	caring of record	ds	
	c) care manageme	ent	d)	equipment care	!	
15)	To create a good o	rganization relatior	n is	a function of		
	department of hosp					
	a) Nursing				d)	Administrator
16)	PICU is related to _	treatme	ents	3.		
	a) adult	b) neonatal	c)	child	d)	aged
17)	of hea					
	a) Promotion	b) Restriction	c)	Support	d)	Upgradation
18)	Preventive mainte	nance is carried ou	ıt to	reduce the failu	re t	o a absolute
	a) moderate	b) minimum	c)	maximum	d)	zero
19)	Capability to identi	ty who has the dise	eas	e is done by mea	asu	ring
	a) validity	b) sensitivity	c)	specificity	d)	repeatability
20)	Concept behind ch	nanging the role of	hos	spital from indoo	r ca	are to outpatient
	care includes all ex	•				
	a) rising cost of ho	•	,	shortage of pati		
	c) economic impo	rtance	d)	increase in pati	ent	beds
	c) economic impo	tarioo	u)	moroaco in pau	٠	2040



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

Day and Date: Tuesday, 9-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain various roles of CEO in hospital.
- 2) Explain the need and importance of maintenance and calibration of medical equipment in hospital with one example.
- 3) Define the concept of risk management and mention its significance in hospital management.
- 4) List various engineering departments in hospital and mention each of two function.
- 5) Explain the role of hospital administrator while handling the hospital in detail.

3. Attempt **any two** questions:

 $(10 \times 2 = 20)$

- 1) Explain the concept, need and importance of preventive maintenance with one example.
- 2) Describe the role of Biomedical engineer in hospital as well as in R and D departments.
- 3) Write short note on:
 - a) Classification of hospitals based on various factors and associated norms.
 - b) Importance of health insurance and medical legal aspects.

SECTION - II

4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) List various laboratories, equipments and discuss their role in hospital management.
- 2) What is the role and need of disaster management in hospital management?
- 3) Explain the need and ways of infection control in hospitals.
- 4) Discuss the importance of medical records in hospital.
- 5) Explain the role of housekeeping and dietary food services in hospitals in detail.



5. Attempt any two questions:

- 1) Draw layout of OPD and OT and explain importance of each.
- 2) List various equipments used in OT and ICU. Discuss maintenance procedure of any one equipment in each of.
- 3) Write a short note on:
 - a) Need and structure of blood bank.
 - b) Waste managements functions.

Seat No.		Set	S
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B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

	-	HOSPITAL M	ANA	GEMENT			
	d Date : Tuesday, 9 3.00 p.m. to 6.00 p.					Max. Marks : 1	00
	2) A	Q. No. 1 is compul s n Answer Book Pa A nswer MCQ/Obje D on't forget to me	ge N ectiv	lo. 3. Each qu e type questi	estion ons o i	carries one mark n Page No. 3 only	•
		MCQ/Objective	Туре	Questions			
Duratio	on : 30 Minutes	-				Marks:	20
1. Ch	oose the correct an	nswer:				(1×20=2	20)
1)	PICU is related to	treatm	ents	j.			
	a) adult	b) neonatal	c)	child	d)	aged	
2)	of he						
	a) Promotion	b) Restriction	c)	Support	d)	Upgradation	
3)	Preventive mainte						
	a) moderate	b) minimum	c)	maximum	d)	zero	
4)	Capability to ident	•		-		-	
	a) validity						
5)	Concept behind ch		f hos	spital from inc	loor ca	are to outpatient	
	care includes all ea a) rising cost of he	•	b)	shortage of r	natient	hed	
	c) economic impo						
6)	Air change require						
,	a) 10 – 12			28 – 30	d)	58-60	
7)	is th	ne best suited for v	valls	ends ceiling	of OT.		
	a) Ceramic tiles		•	Terrazo tiles			
	c) Glaze tiles		d)	Situ Mosaic	finish		
8)		ot part of hospital					
	a) Essential servi		,	Additional se			
	c) Utility services		a)	Administrati	ve ser	vices	



9)	is the s	keleton of organiz	atio	on.		
	a) Organizational fu	ınction		Organization st	ruc	ture
4.0\	c) Decentralization		a)	Co-ordination		
10)	"Shopping window"		h)	ICH		
	a) Operation theatec) OPD	:1	,	ICU Cafeteria		
11)	A good health triad	does not include	ω,	Carotoria		
,	a) physical status		b)	social status		
	c) mental status		ď)	economic statu	S	
12)	All except one is the					
	a) patient satisfaction	on	p)	public relation		
\	c) quality of care		-	machine		
13)	Supportive services					
1 1\	a) pharmacy	•	-		u)	lauriury
14)	a) Speciality			•	٩)	Shape
15)	The function of the (Ο,	0.20	u,	Chapo
10)	a) promotion of hea					
	b) training of medic		ff			
	c) social services	_				
	d) all the above					
16)	Defibrillator machin	-				
	a) cardiac					
17)	is the				itals	s to dispose off
	human anatomical va) Yellow		-	Red	d)	Blue
18)		element of direction			u)	Bido
10)	a) Evaluation		_		d)	Delegation
19)	Functional nursing is	s method of provid	linc	1	ĺ	· ·
,	a) patient care	•	_	caring of record	ls	
	c) care managemen	nt	d)	equipment care		
20)	To create a good org	_	is	a function of		
	department of hospi		٠,	LID	-1\	Λ alma in interest a m
	a) Nursing	b) CEO	C)	HR	a)	Administrator



Seat	
No.	

B.E. (Biomedical Engineering) (Part – I) Examination, 2017 HOSPITAL MANAGEMENT

Day and Date: Tuesday, 9-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Explain various roles of CEO in hospital.
- 2) Explain the need and importance of maintenance and calibration of medical equipment in hospital with one example.
- 3) Define the concept of risk management and mention its significance in hospital management.
- 4) List various engineering departments in hospital and mention each of two function.
- 5) Explain the role of hospital administrator while handling the hospital in detail.

3. Attempt **any two** questions:

 $(10 \times 2 = 20)$

- 1) Explain the concept, need and importance of preventive maintenance with one example.
- 2) Describe the role of Biomedical engineer in hospital as well as in R and D departments.
- 3) Write short note on:
 - a) Classification of hospitals based on various factors and associated norms.
 - b) Importance of health insurance and medical legal aspects.

SECTION - II

4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) List various laboratories, equipments and discuss their role in hospital management.
- 2) What is the role and need of disaster management in hospital management?
- 3) Explain the need and ways of infection control in hospitals.
- 4) Discuss the importance of medical records in hospital.
- 5) Explain the role of housekeeping and dietary food services in hospitals in detail.



5. Attempt any two questions:

- 1) Draw layout of OPD and OT and explain importance of each.
- 2) List various equipments used in OT and ICU. Discuss maintenance procedure of any one equipment in each of.
- 3) Write a short note on:
 - a) Need and structure of blood bank.
 - b) Waste managements functions.

				3LR-VD - 3/3
Seat No.				Set P
	B.E. (Biomedic	•	ng) (Part – II) Exa ₋ IMAGING – II	ımination, 2017
•	nd Date : Tuesday, 3.00 p.m. to 6.00 p			Max. Marks: 100
		minutes in Ans one mark. Answer MCQ /	wer Book Page No. 3. Objective type ques	be solved in first 30 Each question carries Stions on Page No. 3 Set (P/Q/R/S) on Top
Durati	on : 30 Minutes	MCQ/Objecti	ve Type Questions	Marks : 20
1 CI	hoose the correct a	nswer ·		(1×20=20)
		ne CT image are	associated with b) Rotate-Station	tube detector
2	•		•	bits of information. d) 16
3) recor a) Back projection c) Fourier transfo	n	ods is used by most m b) Iterative met d) Filtered back	hod
4) The full width at ha) spatial resolutc) Noise		f a CT scanner is use b) Contrast res d) Calibration a	olution
5	The Hounsfield va) Window widthc) U of H₂O	alue of a pixel is	s directly related to who by Field of view d) Window level	/ size
6	-		e primary beam of a C	T scanner operating at d) 120 KeV
7	,	enerator usually try	y located in modern C b) Outside the d) Inside opera	T scanners scan room



8)	Process of which electrons are producalled as	uced at cathode of CT X-ray tube is
	a) Rectification	b) Anode Heel effect
	c) Thermionic emission	d) Isotropic emission
9)	An accurate CT scanner is capable of s	spatial resolution of uptolp/mm.
	a) 10 b) 20	c) 100 d) 20
10)	The MR imaging in multiple sclerosis	shows lesion in
	a) white matter	b) gray matter
	c) thalamus	d) basal ganglia
11)	imaging technique gives max	kimum radiation exposure to the patient.
	a) Chest X-ray	b) CT
	c) MRI	d) Bone scan
12)	has maximum ionization	•
	a) Electron	b) Proton
	c) Helium	d) Gamma
13)	Phosphorous 32 emits	
	a) Beta particles	b) Alpha
4.4	c) X-rays	d) Neutron
14)	The most accurate investigation for as	_
	a) Multislice CTc) MRI	b) Nuclear scan d) MRS
15\	,	,
15)	The value of a CT number in Hounsfie a) Matrix size	b) Slice thickness
	c) KV	d) Tissue density
16)	Resolution is the characteristic that is	,
10)	a) Image noise	b) Image blurring
	· · · · · · · · · · · · · · · · · · ·	d) Visibility of anatomical detector
17)	modality doesn't uniforn	
,	a) Radiography b) CT	c) PET d) MRI
18)	The best modality to image the spinal	nervous system is
-,	a) Myelography b) CT	c) MRI d) MRS
19)	A pixel is defined as	,
,	•	b) volume element
	c) a picture element	d) miniature image
20)	is not used commonly ι	used in CT scintillation detector.
-	a) Ceramic rare earth	b) Nal
	c) Silver halide	d) Bismuth germinate
		Col



Seat	
No.	

B.E. (Biomedical Engineering) (Part – II) Examination, 2017 MEDICAL IMAGING – II

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four question:

 $(4 \times 5 = 20)$

- 1) Explain water suppression techniques and mention its medical applications.
- 2) List various types of CT detectors and explain any one of it in detail.
- 3) Define CT number of bone whose attenuation coefficient is 0.40 cm⁻¹ and attenuation coefficient of water is 0.190. (Magnification constant 1000).
- 4) Explain working of spiral CT with necessary figure.
- 5) Discuss various artifacts that occurs in CT imaging.

3. Attempt any two questions:

- 1) Explain following techniques with their advantages in image reconstruction.
 - a) Iteration method
 - b) Fourier transform.
- 2) Explain the principle and working of Magnet Resonance Spectroscopy. Mention its any two clinical application.
- 3) Compare between four generations for CT scanning with suitable diagram. List the advantages of spiral CT over conventional CT.



4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Define and explain working of electrical impedance tomography in short.
- 2) Discuss spin echotechniques of MRI.
- 3) Explain working of MDCT imaging.
- 4) Define image contrast and resolution concepts of image processing.
- 5) Discuss various types of magnets used in MRI imaging modality.
- 5. Attempt any two questions:

 $(10 \times 2 = 20)$

- 1) Explain the need and procedure for CT angiography technique in detail.
- 2) Explain basic principle and working of MRI with necessary diagram.
- 3) List various hybrid imaging modalities and explain any one of it in detail. Mention its advantages.

P.T.O.

						S	LK-V	NB-3	/3
Seat No.								Set ($\overline{\mathbf{c}}$
	B.E. (Biomedic	•	ering) (Pa CAL IMAGI	-		na	tion, 2	2017	
-	nd Date : Tuesday, : 3.00 p.m. to 6.00 p						Max	. Marks : [·]	100
	2)	Q. No. 1 is minutes in A one mark. Answer MC only. Don't of Page.	Answer Book CQ/Objectiv	k Page N V e type d	lo. 3. Ea questio	ch ns	questic on Pa	on carries ge No. 3	
		MCQ/Obj	ective Type	Questio	ns				
Durati	on : 30 Minutes							Marks:	: 20
1. C	hoose the correct a	ınswer:						(1×20=	:20)
1) Resolution is thea) Image noisec) Unsharpness	characterist	b)	t directly Image b Visibility	lurring			tector	
2	a) Radiography	-		ionizing PET			MRI		
3	The best modalit a) Myelography	y to image th b) CT	-	vous sy: MRI			MRS		
4	 A pixel is defined a) portion of CR⁻ c) a picture elem 	T display	•	volume e miniatur					
5	is :	not used con	nmonly used	d in CT s	cintillati	on	detecto	or.	
	a) Ceramic rarec) Silver halide	earth	•	Nal Bismuth	germina	ate			
6	 Ring artifacts on the relationship. 						tube	detector	
	a) Rotate-Nutatec) Rotate-Rotate		•	Rotate-S Translat		-			
7) In the binary numb		•				ts of info	ormation.	
	´a) 2	b) 4		8			16		
8				-			CT sca	anners.	
	a) Back projection		,	Iterative			otion		
	c) Fourier transfe	ווווכ	u)	Filtered	nack pr	oje	CHOH	P ."	T.O.



9)	The full width at half maximum of a C a) spatial resolution c) Noise	b)	canner is used to describe Contrast resolution Calibration accuracy
10)	The Hounsfield value of a pixel is dire a) Window width c) U of H ₂ O	b)	related to which of following Field of view size Window level
11)	The average photon energy of the prima tube potential of 120 KVP is		
	a) 50 KeV b) 70 KeV	,	,
12)	High frequency generator usually loca		
	a) Inside the gantry	•	Outside the scan room
	c) Beneath CT table	d)	Inside operation console
13)	Process of which electrons are producalled as	luce	ed at cathode of CT X-ray tube is
	a) Rectification	b)	Anode Heel effect
	c) Thermionic emission	d)	Isotropic emission
14)	An accurate CT scanner is capable of s	spa	tial resolution of upto $\underline{\hspace{1cm}}$ lp/mm.
	a) 10 b) 20	c)	100 d) 20
15)	The MR imaging in multiple sclerosis	sho	ows lesion in
	a) white matter	b)	gray matter
	c) thalamus	d)	basal ganglia
16)	imaging technique gives max	xim	um radiation exposure to the patient.
	a) Chest X-ray	b)	CT
	c) MRI	d)	Bone scan
17)	has maximum ionization	n po	otential.
	a) Electron	b)	Proton
	c) Helium	d)	Gamma
18)	Phosphorous 32 emits		
·	a) Beta particles	b)	Alpha
	c) X-rays	d)	Neutron
19)	The most accurate investigation for a	sse	essing ventricular function is
	a) Multislice CT	b)	Nuclear scan
	c) MRI	d)	MRS
20)	The value of a CT number in Hounsfie	eld i	unit is determined by
•	a) Matrix size	b)	Slice thickness
	c) KV	d)	Tissue density



Seat	
No.	

B.E. (Biomedical Engineering) (Part – II) Examination, 2017 MEDICAL IMAGING – II

Day and Date: Tuesday, 16-5-2017

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four question:

 $(4 \times 5 = 20)$

Marks: 80

- 1) Explain water suppression techniques and mention its medical applications.
- 2) List various types of CT detectors and explain any one of it in detail.
- 3) Define CT number of bone whose attenuation coefficient is 0.40 cm⁻¹ and attenuation coefficient of water is 0.190. (Magnification constant 1000).
- 4) Explain working of spiral CT with necessary figure.
- 5) Discuss various artifacts that occurs in CT imaging.

3. Attempt any two questions:

- 1) Explain following techniques with their advantages in image reconstruction.
 - a) Iteration method
 - b) Fourier transform.
- 2) Explain the principle and working of Magnet Resonance Spectroscopy. Mention its any two clinical application.
- 3) Compare between four generations for CT scanning with suitable diagram. List the advantages of spiral CT over conventional CT.



4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Define and explain working of electrical impedance tomography in short.
- 2) Discuss spin echotechniques of MRI.
- 3) Explain working of MDCT imaging.
- 4) Define image contrast and resolution concepts of image processing.
- 5) Discuss various types of magnets used in MRI imaging modality.
- 5. Attempt any two questions:

 $(10 \times 2 = 20)$

- 1) Explain the need and procedure for CT angiography technique in detail.
- 2) Explain basic principle and working of MRI with necessary diagram.
- 3) List various hybrid imaging modalities and explain any one of it in detail. Mention its advantages.

P.T.O.

				OLII VD	0.0
Seat No.				5	Set R
	B.E. (Biomedia	_	ring) (Part – II) Ex AL IMAGING – II	amination, 201	7
-	d Date : Tuesday, 3.00 p.m. to 6.00 p			Max. Ma	arks : 100
,	2)	minutes in A one mark. Answer MC e	compulsory. It should nswer Book Page No. 3 Q/Objective type que orget to mention, Q.P	3. Each question ca estions on Page I	arries No. 3
		MCQ/Obje	ctive Type Questions		
Duratio	n : 30 Minutes			N	larks : 20
1. Ch	oose the correct a	nswer:		(1×20=20)
1)	a) Chest X-ray c) MRI	g technique gi	ves maximum radiation b) CT d) Bone scan	exposure to the pa	tient.
2)	a) Electron c) Helium	s maximum ic	nization potential. b) Proton d) Gamma		
3)	Phosphorous 32 (a) Beta particles c) X-rays	emits	b) Alpha d) Neutron		
4)	The most accurate a) Multislice CT c) MRI	e investigation	on for assessing ventri b) Nuclear sca d) MRS		
5)	The value of a CT a) Matrix size c) KV	number in H	ounsfield unit is deterr b) Slice thickn d) Tissue dens	ness	
6)	Resolution is the a) Image noise c) Unsharpness	characteristi	that is not directly pro b) Image blurr d) Visibility of	•	or
7)		-	uniform of ionizing rac		
8)	a) RadiographyThe best modalitya) Myelography	b) CT / to image the b) CT	c) PET e spinal nervous syster c) MRI	d) MRI m is d) MRS	P.T.O.



9)	A pixel is defined as a) portion of CRT display	b)	volume element
	c) a picture element		miniature image
10)	is not used commonly ι	use	d in CT scintillation detector.
	a) Ceramic rare earth	,	Nal
	c) Silver halide	d)	Bismuth germinate
11)	Ring artifacts on the CT image are associationship.		
	a) Rotate-Nutate		Rotate-Stationary
	c) Rotate-Rotate	•	Translate-Rotate
12)	In the binary number system, abyte seri		
	a) 2 b) 4	,	8 d) 16
13)	reconstruction methods is		•
	a) Back projectionc) Fourier transform	b)	Iterative method
4.4	•	-	Filtered back projection
14)	The full width at half maximum of a C		
	a) spatial resolutionc) Noise	,	Contrast resolution Calibration accuracy
15\	,	•	•
15)	The Hounsfield value of a pixel is dire a) Window width	-	Field of view size
	c) U of H ₂ O	,	Window level
16)	The average photon energy of the prim	,	
.0,	a tube potential of 120 KVP is	iai y	boam of a of boarmor operating at
	a) 50 KeV b) 70 KeV	c)	100 KeV d) 120 KeV
17)	High frequency generator usually loca	ated	in modern CT scanners
,	a) Inside the gantry		Outside the scan room
	c) Beneath CT table	d)	Inside operation console
18)	Process of which electrons are producalled as	luce	ed at cathode of CT X-ray tube is
	a) Rectification	b)	Anode Heel effect
	c) Thermionic emission	d)	Isotropic emission
19)	An accurate CT scanner is capable of s	spat	ial resolution of uptolp/mm.
	a) 10 b) 20	c)	100 d) 20
20)	The MR imaging in multiple sclerosis	sho	ws lesion in
	a) white matter	•	gray matter
	c) thalamus	d)	basal ganglia



Seat	
No.	

B.E. (Biomedical Engineering) (Part – II) Examination, 2017 MEDICAL IMAGING – II

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four question:

 $(4 \times 5 = 20)$

- 1) Explain water suppression techniques and mention its medical applications.
- 2) List various types of CT detectors and explain any one of it in detail.
- 3) Define CT number of bone whose attenuation coefficient is 0.40 cm⁻¹ and attenuation coefficient of water is 0.190. (Magnification constant 1000).
- 4) Explain working of spiral CT with necessary figure.
- 5) Discuss various artifacts that occurs in CT imaging.

3. Attempt any two questions:

- 1) Explain following techniques with their advantages in image reconstruction.
 - a) Iteration method
 - b) Fourier transform.
- 2) Explain the principle and working of Magnet Resonance Spectroscopy. Mention its any two clinical application.
- 3) Compare between four generations for CT scanning with suitable diagram. List the advantages of spiral CT over conventional CT.



-4-

SECTION - II

4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Define and explain working of electrical impedance tomography in short.
- 2) Discuss spin echotechniques of MRI.
- 3) Explain working of MDCT imaging.
- 4) Define image contrast and resolution concepts of image processing.
- 5) Discuss various types of magnets used in MRI imaging modality.

5. Attempt any two questions:

 $(10 \times 2 = 20)$

- 1) Explain the need and procedure for CT angiography technique in detail.
- 2) Explain basic principle and working of MRI with necessary diagram.
- 3) List various hybrid imaging modalities and explain any one of it in detail. Mention its advantages.

						3L	U- A D —	3/3
Seat No.							Set	S
		B.E. (Biomedi	cal Engineerin MEDICAL	• .	-	aminatio	n, 2017	
-		Date : Tuesday, .00 p.m. to 6.00 p				I	Max. Mark	s : 100
	li	2)	Q. No. 1 is comminutes in Answone mark. Answer MCQ/Oonly. Don't forgoof Page.	er Book I bjective	Page No. 3 type que	. Each que stions o n	estion carri n Page No .	es . 3
			MCQ/Objectiv	e Type C	uestions			
Dura	tior	n : 30 Minutes					Mar	ks : 20
1. (Cho	ose the correct a	nswer:				(1×2	20=20)
		The average phot a tube potential o a) 50 KeV	f 120 KVP is	-	eam of a C 00 KeV		r operating 20 KeV	at
	2)	High frequency g a) Inside the gan c) Beneath CT ta	enerator usually l try	located ir b) O		CT scanne scan roor	ers n	
	(Process of which called as a) Rectification c) Thermionic er	·	b) A	at cathod node Heel otropic en	effect	K-ray tube	is
		An accurate CT se a) 10	canner is capable b) 20	of spatia c) 10		of upto d) 20	-	m.
		The MR imaging a) white matter c) thalamus	in multiple sclero	b) g	rs lesion in ray matter asal gangli			
		imaginga) Chest X-ray				exposure t d) Bo		nt.
,		ha: a) Electron				d) Ga	amma	
		, Phosphorous 32		,		·		

a) Beta particles b) Alpha

c) X-rays d) Neutron



9)	The most accurate investigation for a a) Multislice CT c) MRI	b)	essing ventricular function is Nuclear scan MRS	
10)	The value of a CT number in Hounsfie a) Matrix size c) KV	ield unit is determined by b) Slice thickness d) Tissue density		
11)	Resolution is the characteristic that is a) Image noise c) Unsharpness	b)	ot directly proportional to Image blurring Visibility of anatomical detector	
12)	modality doesn't uniformal Radiography b) CT			
13)	The best modality to image the spina a) Myelography b) CT	l ne	ervous system is	
14)	A pixel is defined as a) portion of CRT display c) a picture element	b) d)	volume element miniature image	
15)	a) Ceramic rare earth c) Silver halide	b)	d in CT scintillation detector. Nal Bismuth germinate	
16)	Ring artifacts on the CT image are asso relationship.	•	_	
	a) Rotate-Nutatec) Rotate-Rotate	,	Rotate-Stationary Translate-Rotate	
17)	In the binary number system, abyte seria) 2 b) 4	ies (ofbits of information. 8 d) 16	
18)	reconstruction methods is a) Back projection c) Fourier transform	b)		
19)	The full width at half maximum of a C a) spatial resolution c) Noise	CT scanner is used to describe b) Contrast resolution d) Calibration accuracy		
20)	The Hounsfield value of a pixel is dire a) Window width c) U of H ₂ O	b)	y related to which of following Field of view size Window level	



Seat	
No.	

B.E. (Biomedical Engineering) (Part – II) Examination, 2017 MEDICAL IMAGING – II

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four question:

 $(4 \times 5 = 20)$

- 1) Explain water suppression techniques and mention its medical applications.
- 2) List various types of CT detectors and explain any one of it in detail.
- 3) Define CT number of bone whose attenuation coefficient is 0.40 cm⁻¹ and attenuation coefficient of water is 0.190. (Magnification constant 1000).
- 4) Explain working of spiral CT with necessary figure.
- 5) Discuss various artifacts that occurs in CT imaging.

3. Attempt any two questions:

- 1) Explain following techniques with their advantages in image reconstruction.
 - a) Iteration method
 - b) Fourier transform.
- 2) Explain the principle and working of Magnet Resonance Spectroscopy. Mention its any two clinical application.
- 3) Compare between four generations for CT scanning with suitable diagram. List the advantages of spiral CT over conventional CT.



4. Attempt any four questions:

 $(4 \times 5 = 20)$

- 1) Define and explain working of electrical impedance tomography in short.
- 2) Discuss spin echotechniques of MRI.
- 3) Explain working of MDCT imaging.
- 4) Define image contrast and resolution concepts of image processing.
- 5) Discuss various types of magnets used in MRI imaging modality.
- 5. Attempt any two questions:

- 1) Explain the need and procedure for CT angiography technique in detail.
- 2) Explain basic principle and working of MRI with necessary diagram.
- 3) List various hybrid imaging modalities and explain any one of it in detail. Mention its advantages.

Seat	Set F	0
No.		

B.E. (Part – II) (Biomedical Eng INSTALLATION, MAINTEN	_	• • • • • • • • • • • • • • • • • • • •			
Day and Date : Thursday, 18-5-2017 Time : 3.00 p.m. to 6.00 p.m.				Max.	Marks : 100
Instructions:1) Q. No. 1 is compulse in Answer Book Page 2) Answer MCQ/Object Don't forget to men 3) Figures to the right in 4) Assume data where 5) Use legible handwrit	ne No ctive ntion, indica ever r	o. 3. Each quest e type question , Q.P. Set (P/Q) ate full marks. necessary.	tion o n s or / R/S)	earries one n Page No on Top o	e mark. o. 3 only.
MCQ/Objective T Duration: 30 Minutes	Гуре	Questions			Marks : 20
1. Choose the correct answer:					(20×1=20)
 NICU stand for a) Neonatal Intensive Care Unit c) Neuro Intensive Care Unit 2) Spirometer is used to measure 	•	Nephro Intensi None	ve C	are Unit	
a) Lung capacity b) Lung passage	; c)	Lung weight	d)	Air	
3) Voltages in x-rays in measured ina) Milliampb) KVP	c)	Millivolt	d)	KV	
4) Maintenance record should be maintain of maintenance of the equipm a) Servicing c) Repairing	ment. b)				entire
5) All the sides of an X-ray machine chaml a) 3" thick b) 9" thick		nust be 6" thick	d)	12" thick	
Autoclave uses a) Medium pressure stream c) Low pressure stream	b)	High pressure Both a and c	strea	m	

7) Sterilizations is done using _____ mixed with chemicals.

b) Running water

d) Cool water with chemical

a) Boiling water

c) Cooled water

8)	ECG machine is used to monitor a) Lung activity b) Heart activity	c) Brain activity d) Muscle	activity
9)	Flow meter is used to measure a) Small diameter tubes c) Medium diameter tubes	b) Large diameter tubesd) None	
10)	Non invasive device used to measure of a) Spirometer c) Pulse oximeter	xygen saturation of patients' bloo b) Pulse recorder d) Pulse stabilizer	od
11)	Sphygmomanometer is used to measure a) ${\rm O_2}$ b) ${\rm CO_2}$	e c) Heart rate d) Blood i	Pressure
12)	machine is used to remove a) Defibrillator c) Suction machines	e unwanted fluid from body caviti b) Ventilators d) Anesthesia machine	es.
13)	The flow transducer on sid a) Expiration b) a and c		atient.
14)	a) CT is a mode of synchrony votal b) Cm/s/cm		
15)	In blood flow measurement flow rate "Q a) Acceleration c) Amplitude		
16)	works at QRS Values. a) Cardioverter c) Pacemaker	b) Defibrillator d) Heart lung machine	
17)	QCI is the a) Quality and Certified Implementation b) Quality Control and Implementation c) Quality Council of India d) None	n	
18)	Battery used in patient monitoring systema) 3 volts b) 6 volts	ms is of c) 9 volts d) 12 volts	S
19)	CPAP stands for a) Coronary Positive Airway Pressure b) Continuous Pulmonary Airway Pressur c) Continuous Positive Airway Pressur d) Cardiac Positive Airway Pressure		
20)	UPS systems are essential for clean an a) Repairing b) Servicing	d stable supply during c) Maintenance d) Calibra	ıtion



Seat	
No.	

B.E. (Part – II) (Biomedical Engineering) Examination, 2017 INSTALLATION, MAINTENANCE AND SERVICING

Day and Date: Thursday, 18-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Assume data wherever necessary.
- 3) Draw diagrams/sketches wherever necessary.
- 4) **Use** legible handwriting, use blue/black pen **only**.

SECTION - I

2. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Discuss the role of biomedical Engineer in a hospital.
- 2) Explain needs and advantages of drawing insurance of medical equipment's in hospital.
- 3) What care should be taken before the installation of biomedical equipment?
- 4) Draw a labelled diagram of a ventilator with all its specifications.
- 5) What kind of tests and checkups must be performed before the final acceptance of the instrument?
- 3. Answer **any two** of following questions:

 $(2\times10=20)$

- 1) Give the Pre installation techniques of the auto analyzer in detail.
- 2) Explain installation and maintenance procedure of any two cardiac equipment's.
- 3) Explain the following modes of operation of the synchronous ventilators
 - a) CPAP mode
 - b) S-mode
 - c) S/T mode
 - d) PC mode
 - e) Timed mode.

Set P



4. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Draw any five pictorial safety instructions of the electrosurgical unit and explain each of them.
- 2) Explain the need and the function of medical gas management.
- 3) What is an incubator? Explain its significances.
- 4) Define and differentiate between CMC and AMC in detail.
- 5) Explain trouble shooting methods.
- 5. Answer any two of following questions:

 $(2\times10=20)$

- 1) Explain the operation theater with respect to the following.
 - a) Location
 - b) Space requirement for OT
 - c) Design of OT.
- 2) Differentiate between ICU, NICU and ICCU in terms of life saving equipments.
- 3) a) Calibration procedure of PH meter
 - b) ISO and NABH certifications.

Seat	Set	Ø
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B.E. (Part – II) (Biomedical Engineering) Examination, 2017 INSTALLATION, MAINTENANCE AND SERVICING

INSTALLATION, MA	INTENANCE AND SERVICING
Day and Date: Thursday, 18-5-2017	Max. Marks : 100
Time: 3.00 p.m. to 6.00 p.m.	
in Answer Boo 2) Answer MCG Don't forget t 3) Figures to the 4) Assume data	npulsory. It should be solved in first 30 minutes k Page No. 3. Each question carries one mark. (Objective type questions on Page No. 3 only. o mention, Q.P. Set (P/Q/R/S) on Top of Page. right indicate full marks. wherever necessary. Industring, use blue/black only.
MCQ/Obje	ctive Type Questions
Duration : 30 Minutes	Marks: 20
1. Choose the correct answer:	(20×1=20)
1) works at QRS Val	es.
a) Cardioverter	h) Defibrillator

2) QCI is the

c) Pacemaker

- a) Quality and Certified Implementation
- b) Quality Control and Implementation
- c) Quality Council of India
- d) None
- 3) Battery used in patient monitoring systems is of
 - a) 3 volts
- b) 6 volts
- c) 9 volts

d) Heart lung machine

d) 12 volts

- 4) CPAP stands for
 - a) Coronary Positive Airway Pressure
 - b) Continuous Pulmonary Airway Pressure
 - c) Continuous Positive Airway Pressure
 - d) Cardiac Positive Airway Pressure
- 5) UPS systems are essential for clean and stable supply during
 - a) Repairing
- b) Servicing
- c) Maintenance
- d) Calibration

- 6) NICU stand for
 - a) Neonatal Intensive Care Unit
- b) Nephro Intensive Care Unit
- c) Neuro Intensive Care Unit
- d) None

7)	Spirometer is used to					
	a) Lung capacity	b) Lung passage	c)	Lung weight	d)	Air
8)	Voltages in x-rays in		٠,١	NA:III: IA	۱۱.	1217
٥,		b) KVP	-		-	
9)	Maintenance record of mainter	should be maintain nance of the equipm			ent '	to indicate entire
	a) Servicingc) Repairing		•	Implanted polyvi History	nyl	tubes
10)	All the sides of an X-	ray machine chamb	er r	nust be		
	a) 3" thick	b) 9" thick	c)	6" thick	d)	12" thick
11)	Autoclave uses					
	a) Medium pressure		,	High pressure st	rea	m
	c) Low pressure str		,	Both a and c		
12)	Sterilizations is done	using			ıls.	
	a) Boiling waterc) Cooled water		,	Running water Cool water with	chc	amical
13\	ECG machine is use	d to monitor	u)	Oool water with	CITC	imoai
10)	a) Lung activity		c)	Brain activity	d)	Muscle activity
14)	Flow meter is used to		,	•	,	•
,	a) Small diameter to		b)	Large diameter t	ube	es
	c) Medium diamete	r tubes	d)	None		
15)	Non invasive device	used to measure ox			atie	ents' blood
	a) Spirometer		,	Pulse recorder		
16\	c) Pulse oximeter	r is used to messure	-	Pulse stabilizer		
10)	Sphygmomanometer a) O ₂	b) CO ₂		Heart rate	d)	Blood Pressure
17)	-	e is used to remove				
.,	a) Defibrillator			Ventilators		ay davinoo.
	c) Suction machine	es .	ď)	Anesthesia mac	hine	Э
18)	The flow transducer	on side	e m	easures the gas f	low	to the patient.
	a) Expiration	b) a and c	c)	Inspiration	d)	None
19)		ode of synchrony ve				
	a) CT	b) Cm/s/cm	,	CPAP	,	None
20)	In blood flow measur	ement flow rate "Q =			s fo	r
	a) Accelerationc) Amplitude		,	Constant Area of cross se	ctio	n
	-, ,pa.a		٠,		J J	



Seat	
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B.E. (Part – II) (Biomedical Engineering) Examination, 2017 INSTALLATION, MAINTENANCE AND SERVICING

Day and Date: Thursday, 18-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Assume data wherever necessary.
- 3) Draw diagrams/sketches wherever necessary.
- 4) **Use** legible handwriting, use blue/black pen **only**.

SECTION - I

2. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Discuss the role of biomedical Engineer in a hospital.
- 2) Explain needs and advantages of drawing insurance of medical equipment's in hospital.
- 3) What care should be taken before the installation of biomedical equipment?
- 4) Draw a labelled diagram of a ventilator with all its specifications.
- 5) What kind of tests and checkups must be performed before the final acceptance of the instrument?

3. Answer any two of following questions:

 $(2\times10=20)$

- 1) Give the Pre installation techniques of the auto analyzer in detail.
- 2) Explain installation and maintenance procedure of any two cardiac equipment's.
- 3) Explain the following modes of operation of the synchronous ventilators
 - a) CPAP mode
 - b) S-mode
 - c) S/T mode
 - d) PC mode
 - e) Timed mode.

Set Q



4. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Draw any five pictorial safety instructions of the electrosurgical unit and explain each of them.
- 2) Explain the need and the function of medical gas management.
- 3) What is an incubator? Explain its significances.
- 4) Define and differentiate between CMC and AMC in detail.
- 5) Explain trouble shooting methods.
- 5. Answer any two of following questions:

 $(2\times10=20)$

- 1) Explain the operation theater with respect to the following.
 - a) Location
 - b) Space requirement for OT
 - c) Design of OT.
- 2) Differentiate between ICU, NICU and ICCU in terms of life saving equipments.
- 3) a) Calibration procedure of PH meter
 - b) ISO and NABH certifications.

Seat	Set	R
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B.E. (Part – II) (Biomedical Engineering) Examination, 2017 INSTALLATION, MAINTENANCE AND SERVICING

Day and Date: Thursday, 18-5-2017 Max. Marks
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Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks.
- 4) Assume data wherever necessary.
- 5) Use legible handwriting, use blue/black only.

,	_	_	-
	MCQ/Objectiv	e Type Questions	
Duration: 30 Minutes			Marks : 20
1. Choose the correct answ	ver:		(20×1=20)
1) Sphygmomanometer	r is used to mea	sure	
a) O ₂	b) CO ₂	c) Heart rate	d) Blood Pressure
2) machina) Defibrillatorc) Suction machine		ove unwanted fluid fro b) Ventilators d) Anesthesia m	·
3) The flow transducera) Expiration		side measures the ga c) Inspiration	•
4) is a m	ode of synchron	y ventilator.	
a) CT	b) Cm/s/cm	c) CPAP	d) None
5) In blood flow measura) Accelerationc) Amplitude	ement flow rate	"Q = VA" where A sta b) Constant d) Area of cross	
6) works	at QRS Values.		
a) Cardioverter		b) Defibrillator	
c) Pacemaker		d) Heart lung ma	achine
7) QCI is the a) Quality and Certi b) Quality Control a c) Quality Council o	nd Implementat		

8)	Battery used in patient monitoring syste a) 3 volts b) 6 volts	
9)	CPAP stands for a) Coronary Positive Airway Pressure b) Continuous Pulmonary Airway Pre c) Continuous Positive Airway Pressu d) Cardiac Positive Airway Pressure	ssure
10)	UPS systems are essential for clean an a) Repairing b) Servicing	d stable supply during c) Maintenance d) Calibration
11)	NICU stand for a) Neonatal Intensive Care Unit c) Neuro Intensive Care Unit	b) Nephro Intensive Care Unitd) None
12)	Spirometer is used to measure a) Lung capacity b) Lung passage	c) Lung weight d) Air
13)	Voltages in x-rays in measured in a) Milliamp b) KVP	c) Millivolt d) KV
14)	Maintenance record should be maintain of maintenance of the equipment of t	ned for each equipment to indicate entire nent.
	a) Servicingc) Repairing	b) Implanted polyvinyl tubesd) History
15)	All the sides of an X-ray machine chamle a) 3" thick b) 9" thick	ber must be c) 6" thick d) 12" thick
16)	Autoclave uses a) Medium pressure stream c) Low pressure stream	b) High pressure streamd) Both a and c
17)	Sterilizations is done using a) Boiling water c) Cooled water	_ mixed with chemicals. b) Running water d) Cool water with chemical
18)	ECG machine is used to monitor a) Lung activity b) Heart activity	c) Brain activity d) Muscle activity
19)	Flow meter is used to measure a) Small diameter tubes c) Medium diameter tubes	b) Large diameter tubesd) None
20)	Non invasive device used to measure of a) Spirometer c) Pulse oximeter	bxygen saturation of patients' blood b) Pulse recorder d) Pulse stabilizer



Seat	
No.	

B.E. (Part – II) (Biomedical Engineering) Examination, 2017 INSTALLATION, MAINTENANCE AND SERVICING

Day and Date: Thursday, 18-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Assume data wherever necessary.
- 3) Draw diagrams/sketches wherever necessary.
- 4) **Use** legible handwriting, use blue/black pen **only**.

SECTION - I

2. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Discuss the role of biomedical Engineer in a hospital.
- 2) Explain needs and advantages of drawing insurance of medical equipment's in hospital.
- 3) What care should be taken before the installation of biomedical equipment?
- 4) Draw a labelled diagram of a ventilator with all its specifications.
- 5) What kind of tests and checkups must be performed before the final acceptance of the instrument?
- 3. Answer **any two** of following questions:

 $(2\times10=20)$

- 1) Give the Pre installation techniques of the auto analyzer in detail.
- 2) Explain installation and maintenance procedure of any two cardiac equipment's.
- 3) Explain the following modes of operation of the synchronous ventilators
 - a) CPAP mode
 - b) S-mode
 - c) S/T mode
 - d) PC mode
 - e) Timed mode.

Set R



4. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Draw any five pictorial safety instructions of the electrosurgical unit and explain each of them.
- 2) Explain the need and the function of medical gas management.
- 3) What is an incubator? Explain its significances.
- 4) Define and differentiate between CMC and AMC in detail.
- 5) Explain trouble shooting methods.
- 5. Answer any two of following questions:

 $(2\times10=20)$

- 1) Explain the operation theater with respect to the following.
 - a) Location
 - b) Space requirement for OT
 - c) Design of OT.
- 2) Differentiate between ICU, NICU and ICCU in terms of life saving equipments.
- 3) a) Calibration procedure of PH meter
 - b) ISO and NABH certifications.

Seat	
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a) Defibrillator

c) Suction machines

Set S

• • • • • • • • • • • • • • • • • • • •	gineering) Examination, 2017 NANCE AND SERVICING
Day and Date : Thursday, 18-5-2017 Time : 3.00 p.m. to 6.00 p.m.	Max. Marks : 100
in Answer Book Pag 2) Answer MCQ/Obje Don't forget to me 3) Figures to the right 4) Assume data where	
MCQ/Objective Duration : 30 Minutes	Type Questions Marks: 20
 Choose the correct answer : Autoclave uses 	(20×1=20)
a) Medium pressure stream c) Low pressure stream	b) High pressure streamd) Both a and c
2) Sterilizations is done usinga) Boiling waterc) Cooled water	mixed with chemicals.b) Running waterd) Cool water with chemical
3) ECG machine is used to monitora) Lung activityb) Heart activity	c) Brain activity d) Muscle activity
4) Flow meter is used to measurea) Small diameter tubesc) Medium diameter tubes	b) Large diameter tubesd) None
5) Non invasive device used to measure aa) Spirometerc) Pulse oximeter	oxygen saturation of patients' blood b) Pulse recorder d) Pulse stabilizer
6) Sphygmomanometer is used to measua) O₂b) CO₂	re c) Heart rate d) Blood Pressure
	ve unwanted fluid from body cavities.

b) Ventilators

d) Anesthesia machine



0)	The flour translers				دا ــ	الموالوم وطلاحا
8)	The flow transducer (a) Expiration					
9)	is a m	ode of synchrony v	entil/	ator.		
	a) CT	b) Cm/s/cm			d)	None
10)	In blood flow measur a) Acceleration c) Amplitude	ement flow rate "Q	b)	A" where A stand Constant Area of cross se		
11)	•	at OBS Values	,			
,	a) Cardioverter c) Pacemaker	at Grio Valuos.	,	Defibrillator Heart lung mack	nine	
12)	QCI is the					
	a) Quality and Certib) Quality Control ac) Quality Council od) None	nd Implementation				
13)	Battery used in patie a) 3 volts				d)	12 volts
14)	CPAP stands for	,	,		,	
1-1)	a) Coronary Positivb) Continuous Pulmc) Continuous Posid) Cardiac Positive	nonary Airway Pre tive Airway Pressu	ssur	е		
15)	UPS systems are es	sential for clean ar	nd sta	able supply durin	a	
,	a) Repairing				_	Calibration
16)	NICU stand for a) Neonatal Intensivec) Neuro Intensive			Nephro Intensiv None	e C	are Unit
17)	Spirometer is used to	measure				
,	a) Lung capacity		e c)	Lung weight	d)	Air
18)	Voltages in x-rays in	measured in				
	a) Milliamp	b) KVP	c)	Millivolt	d)	KV
19)	Maintenance record of mainter	should be maintain nance of the equipr		• •	ent '	to indicate entire
	a) Servicing		b)	Implanted polyv	inyl	tubes
	c) Repairing		d)	History		
20)	All the sides of an X-	ray machine cham	ber r	nust be		
	a) 3" thick	b) 9" thick	c)	6" thick	d)	12" thick



Seat	
No.	

B.E. (Part – II) (Biomedical Engineering) Examination, 2017 INSTALLATION, MAINTENANCE AND SERVICING

Day and Date: Thursday, 18-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

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

- 2) Assume data wherever necessary.
- 3) Draw diagrams/sketches wherever necessary.
- 4) **Use** legible handwriting, use blue/black pen **only**.

SECTION - I

2. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Discuss the role of biomedical Engineer in a hospital.
- 2) Explain needs and advantages of drawing insurance of medical equipment's in hospital.
- 3) What care should be taken before the installation of biomedical equipment?
- 4) Draw a labelled diagram of a ventilator with all its specifications.
- 5) What kind of tests and checkups must be performed before the final acceptance of the instrument?
- 3. Answer **any two** of following questions:

 $(2\times10=20)$

- 1) Give the Pre installation techniques of the auto analyzer in detail.
- 2) Explain installation and maintenance procedure of any two cardiac equipment's.
- 3) Explain the following modes of operation of the synchronous ventilators
 - a) CPAP mode
 - b) S-mode
 - c) S/T mode
 - d) PC mode
 - e) Timed mode.



4. Answer any four of following questions:

 $(4 \times 5 = 20)$

- 1) Draw any five pictorial safety instructions of the electrosurgical unit and explain each of them.
- 2) Explain the need and the function of medical gas management.
- 3) What is an incubator? Explain its significances.
- 4) Define and differentiate between CMC and AMC in detail.
- 5) Explain trouble shooting methods.
- 5. Answer any two of following questions:

 $(2\times10=20)$

- 1) Explain the operation theater with respect to the following.
 - a) Location
 - b) Space requirement for OT
 - c) Design of OT.
- 2) Differentiate between ICU, NICU and ICCU in terms of life saving equipments.
- 3) a) Calibration procedure of PH meter
 - b) ISO and NABH certifications.

Sea No						Set P
		B.E. (Bi) (Part – II) Examir _ MICROSYSTEMS	•	
•		d Date : Saturo 3.00 p.m. to 6.0	lay, 20-5-2017 00 p.m.		Max. M	larks : 100
		Instructions :	Answer Book Pa 2) Answer MCQ/O	pulsory. It should be solve age No. 3. Each question bjective type questions on, Q.P. Set (P/Q/R/S)	n carries one mar s on Page No. 3 (′k. <mark>only. Don't</mark>
			MCQ/Object	ive Type Questions		
Dura	atior	n : 30 Minutes				Marks: 20
l.	Cho	oose the correc	t answer :			20
	1)	The microsyste a) m	ems contains b) cm	sized devices. c) mm	d) μm	
	2)	a) Dimension	application of Silicor al stability at high te tability at high temp lb)	mperature `		
	3)	The gallium ar a) Equal		numbers galliu c) 20	m and arsenic a d) 40	toms.
	4)	•	•	sed for positive resists a b) 2 component		

c) Both a) and b)

- a) Automatic Pressure Chemical Vapor Deposition
- b) Atmospheric Pressure Chemical Vapor Deposition
- c) Arsenic Phosphate Chemical Vapor Deposition
- d) None

6)	is a common carrier	gas for depositing	silicon nitride	on silicon
	substrate in CVD process.			

- a) O_2
- b) NO
- c) NH₃

d) None

- d) CO_2
- 7) "Epitaxial deposition has a high risk of explosion as a result of the use of Hydrogen as a carrier gas at a high Temperature"; whether this statement is true or false?
 - a) TRUE

b) FALSE

c) Either TRUE or FALSE

d) None

8)	a) Positive					v of UV light. None
	a) Substrate					
10)	SLIGA means a) Sacrificial LIGA	b) Silicon LIGA	c)	Standard LIGA	d)	None
11)	Metal Oxide gas se a) Pressure				d)	Bio
12)	In μ TAS M and N in used in a system.					
	a) Sensors and coc) Silicon's and ca			Sensors and su All of the above		ates
13)	Analyte phase (the a) Gas				d)	Chemical
14)	In μTAS Type D (a) Pressure thermal		b)	n as Thermo pneum Micro electro th	atic	actuation
			_			
15)	a) Micro Mechanic	I biosensor the med al Bend al Rotation	b)	Micro Mechanic	al T	wist
	a) Micro Mechanicc) Micro MechanicThe complementarDNA from the basisa) Enzymes	eal Bend eal Rotation y relations betweer s of specificity	b) d) n ade b)	Micro Mechanic Micro Mechanic enosine and thy biosensors. Nucleic Acids	cal T cal E	wist Balance
16)	a) Micro Mechanicc) Micro MechanicThe complementarDNA from the basisa) Enzymesc) Cells and viruse	eal Bend eal Rotation y relations betweer s of specificity es	b) d) n ade b) d)	Micro Mechanic Micro Mechanic enosine and thy biosensors. Nucleic Acids Biomimetic	cal T cal E	wist Balance
16)	a) Micro Mechanicc) Micro MechanicThe complementarDNA from the basisa) Enzymes	eal Bend eal Rotation y relations between s of specificity es is used to sense the	b) d) n ade b) d) d) e inte	Micro Mechanic Micro Mechanic enosine and thyr _ biosensors. Nucleic Acids Biomimetic ensity of light.	cal T cal E mine	wist Balance and cytosine in
16) 17)	 a) Micro Mechanic c) Micro Mechanic The complementar DNA from the basis a) Enzymes c) Cells and viruse sensor 	eal Bend eal Rotation y relations between s of specificity es is used to sense the b) Chemical ng is type of	b) d) n ade b) d) e inte c) b)	Micro Mechanic Micro Mechanic enosine and thyr _ biosensors. Nucleic Acids Biomimetic ensity of light.	cal T cal E mine d)	wist Balance and cytosine in Acoustic
16) 17) 18)	a) Micro Mechanic c) Micro Mechanic The complementar DNA from the basis a) Enzymes c) Cells and viruse sensor a) Thermal Micro contact printin a) Photolithograph	eal Bend eal Rotation y relations between s of specificity es is used to sense the b) Chemical ng is type of	b) d) n ade b) d) e inte c) b) d) very s	Micro Mechanic Micro Mechanic enosine and thyr biosensors. Nucleic Acids Biomimetic ensity of light. Optical Soft Lithograph Surface Micron	cal T cal E mine d) y nach	wist Balance and cytosine in Acoustic ining
16) 17) 18)	a) Micro Mechanic c) Micro Mechanic The complementar DNA from the basis a) Enzymes c) Cells and viruse sensor a) Thermal Micro contact printin a) Photolithograph c) Etching For type A diabetes	eal Bend eal Rotation y relations between s of specificity es is used to sense the b) Chemical ng is type of y s patients drug deliv b) Glucose	b) d) n ade b) d) e inte c) b) d) very s c)	Micro Mechanic Micro Mechanic enosine and thyr biosensors. Nucleic Acids Biomimetic ensity of light. Optical Soft Lithograph Surface Micron system is used to Sugar	cal T cal E mine d) y nach d) del d)	wist Balance and cytosine in Acoustic ining liver All



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 BIOMEDICAL MICROSYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

II. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Explain the components of microsystems.
- 2) List the properties of silicon.
- 3) Classify methods of epitaxial deposition. Explain Vapor Phase Epitaxy (VPE).
- 4) Explain the etch stop techniques in detail.
- 5) Draw and explain the design steps of Surface micromachining.

III. Solve any two questions:

 $(10 \times 2 = 20)$

- 1) List application of polymers for MEMS and Microsystems.
- 2) Explain types of Enhanced CVD each in detail.
- 3) Explain LIGA process in detail.

SECTION - II

IV. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Classification biosensors based on transduction and explain.
- 2) Classify μ TAS. Explain elements of μ TAS with neat diagram.
- 3) With neat diagram explain thermo pneumatic actuation.
- 4) Define pressure sensor. Explain packaged pressure sensors.
- 5) Write a short note on injection molding.



V. Solve any two questions:

- 1) Explain fabrication of microstructure on a processed Si wafer using compression molding technique.
- 2) Classify micro-valves used in $\,\mu$ TAS and explain each with diagram.
- 3) Write a short note on:
 - i) Cantilever based biosensor.
 - ii) Cell and protein array.

Seat No.	Set	Q

	B.E. (Bio	medical Engg.) (BIOMEDICAL I	Part – II) Examii MICROSYSTEMS		n, 2017
-	d Date : Saturda 3.00 p.m. to 6.00				Max. Marks: 100
1	•) Answer MCQ/Obje	No. 3. Each question	n carrie s on P a	s one mark. age No. 3 only. Don't
Duration	n : 30 Minutes	MCQ/Objective	Type Questions		Marks : 20
I. Cho	oose the correct a	ınswer :			20
1)	•	tary relations betweensis of specificity		-	and cytosine in
2)		or is used to sense to b) Chemical		d)	Acoustic
3)	Micro contact pri a) Photolithogra c) Etching	0 ,.	b) Soft Lithograp d) Surface Micro	•	ning
4)	For type A diabe a) Insulin	tes patients drug del	ivery system is used c) Sugar		
5)	•	technique is used to	_	lano so	
6)	The microsysten	ns contains b) cm	sized devices.	,	μm
7)	a) Dimensional	plication of Silicon C stability at high temp bility at high tempera)	erature		
8)	The gallium arse	nide contains b) Unequal	numbers galliuc) 20	ım and d)	



9)	In photolithography the material used a) PMMA c) Both a) and b)	I for positive resists are b) 2 component of DQN resist d) None
10)	APCVD is a) Automatic Pressure Chemical Vab) Atmospheric Pressure Chemical Vapo) Arsenic Phosphate Chemical Vapo) None	Vapor Deposition
11)	-	for depositing silicon nitride on silicon
	substrate in CVD process.	-\ NIII \ 00
4.0\	=	c) NH_3 d) CO_2
12)		explosion as a result of the use of Hydrogen e"; whether this statement is true or false? b) FALSE d) None
13)	photoresist become more	e soluble under the shadow of UV light.
	a) Positive b) Negative	c) Both d) None
14)	is used in LIGA to create a) Substrate b) Mask	necessary void space in the depth. c) Sacrificial layers d) Photo resist
15)	SLIGA means	
	a) Sacrificial LIGA b) Silicon LIGA	c) Standard LIGA d) None
16)	Metal Oxide gas sensor is one type o	
	a) Pressure b) Chemical	
17)		and No. of respectively
	used in a system.a) Sensors and componentsc) Silicon's and carbides	
18)	Analyte phase (the input sample) of	μTAS is usually
ŕ	a) Gas b) Liquid	c) Both a) and b) d) Chemical
19)	In $\;\mu\text{TAS}\;$ Type D micro valve is also a) Pressure thermal c) Thermal	b known as valve. b) Thermo pneumatic actuation d) Micro electro thermo fluidic
20)		echanism of transduction is recognized by
	a) Micro Mechanical Bendc) Micro Mechanical Rotation	b) Micro Mechanical Twistd) Micro Mechanical Balance
	of whole Mechanical Hetation	d) Miloto Medianical Dalance



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 BIOMEDICAL MICROSYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

II. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Explain the components of microsystems.
- 2) List the properties of silicon.
- 3) Classify methods of epitaxial deposition. Explain Vapor Phase Epitaxy (VPE).
- 4) Explain the etch stop techniques in detail.
- 5) Draw and explain the design steps of Surface micromachining.

III. Solve any two questions:

 $(10 \times 2 = 20)$

- 1) List application of polymers for MEMS and Microsystems.
- 2) Explain types of Enhanced CVD each in detail.
- 3) Explain LIGA process in detail.

SECTION - II

IV. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Classification biosensors based on transduction and explain.
- 2) Classify μ TAS. Explain elements of μ TAS with neat diagram.
- 3) With neat diagram explain thermo pneumatic actuation.
- 4) Define pressure sensor. Explain packaged pressure sensors.
- 5) Write a short note on injection molding.



V. Solve any two questions:

 $(10 \times 2 = 20)$

- 1) Explain fabrication of microstructure on a processed Si wafer using compression molding technique.
- 2) Classify micro-valves used in μ TAS and explain each with diagram.
- 3) Write a short note on:
 - i) Cantilever based biosensor.
 - ii) Cell and protein array.

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110.		

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 BIOMEDICAL MICROSYSTEMS

Day and Date: Saturday, 20-5-2017	Max. Marks: 100
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Time: 3.00 p.m. to 6.00 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.

	MC	Q/Objective Type	Questions		
Duration	n : 30 Minutes			Marks:	20
I. Cho	oose the correct answer :				20
1)	Metal Oxide gas sensor is a) Pressure b) 0	s one type of Chemical c)	sensor. Optical	d) Bio	
2)	In μ TAS M and N indicate used in a system.	es No. of	and No. of	respectively	
	a) Sensors and componec) Silicon's and carbides	•		estrates	
3)	Analyte phase (the input sa) Gas b) L	sample) of μTAS Liquid c)	-	d) Chemical	
4)	In μ TAS Type D micro α a) Pressure thermal c) Thermal	b)		tic actuation	
5)	In Cantilever based biose a) Micro Mechanical Ber c) Micro Mechanical Rot	nd b)	Micro Mechanica	al Twist	
6)	The complementary relation DNA from the basis of spea) Enzymes c) Cells and viruses	ecificityb)	=	ine and cytosine in	
7)	a) Thermal b) C			d) Acoustic	
8)	Micro contact printing is ty a) Photolithography c) Etching	b)	Soft Lithography Surface Microma	achining	

9)	For type A diabetes a) Insulin	patients drug delive b) Glucose	•	ed to deliver d) All
10)	•	,	,	Nano scales as small
	as 30 nm.			
	a) LIGA	b) PVD	c) CVD	d) Soft Lithography
11)	The microsystems of			
	a) m	b) cm	c) mm	d) μm
12)	One principal applic a) Dimensional stab b) Chemical stabilit c) Both a) and b) d) None	oility at high temper	ature `	
13)	The gallium arsenida a) Equal			ium and arsenic atoms. d) 40
14)	In photolithography	the material used fo	r positive resists	are
	a) PMMA		b) 2 componer	nt of DQN resist
	c) Both a) and b)		d) None	
15)	APCVD is	O		
	a) Automatic Press	•	•	
	b) Atmospheric Prec) Arsenic Phospha		•	
	d) None	ato onomical vapor	Боробіної	
16)	,	nmon carrier gas for	depositing silico	on nitride on silicon
,	substrate in CVD pro	_	1 3	
	a) O ₂	b) NO	c) NH ₃	d) CO ₂
17)	as a carrier gas at a a) TRUE	high Temperature";	whether this sta b) FALSE	ult of the use of Hydrogen tement is true or false?
	c) Either TRUE or I		d) None	
18)	a) Positive			shadow of UV light. d) None
19)	is used i	n LIGA to create ne	cessary void spa	ace in the depth.
	a) Substrate	b) Mask	c) Sacrificial la	yers d) Photo resist
20)	SLIGA means a) Sacrificial LIGA	b) Silicon LIGA	c) Standard Lle	GA d) None



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 BIOMEDICAL MICROSYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

II. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Explain the components of microsystems.
- 2) List the properties of silicon.
- 3) Classify methods of epitaxial deposition. Explain Vapor Phase Epitaxy (VPE).
- 4) Explain the etch stop techniques in detail.
- 5) Draw and explain the design steps of Surface micromachining.

III. Solve any two questions:

 $(10 \times 2 = 20)$

- 1) List application of polymers for MEMS and Microsystems.
- 2) Explain types of Enhanced CVD each in detail.
- 3) Explain LIGA process in detail.

SECTION - II

IV. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Classification biosensors based on transduction and explain.
- 2) Classify μ TAS. Explain elements of μ TAS with neat diagram.
- 3) With neat diagram explain thermo pneumatic actuation.
- 4) Define pressure sensor. Explain packaged pressure sensors.
- 5) Write a short note on injection molding.



V.	Solve	any	two	questions	:
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 $(10 \times 2 = 20)$

- 1) Explain fabrication of microstructure on a processed Si wafer using compression molding technique.
- 2) Classify micro-valves used in $\,\mu$ TAS and explain each with diagram.
- 3) Write a short note on:
 - i) Cantilever based biosensor.
 - ii) Cell and protein array.

	1	
Seat	0-4	
No.	Set	S
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	B.E. (Biomedical BIOME	Engg.) (Part - EDICAL MICR		tion, 2017
-	d Date : Saturday, 20-5-20 3.00 p.m. to 6.00 p.m.	017		Max. Marks: 100
	2) Answer	Book Page No. 3.	Each question ca type questions o	arries <mark>one</mark> mark. o <mark>n Page No. 3 only. Don't</mark>
Duration	MCQ n : 30 Minutes)/Objective Type	Questions	Marks : 20
I. Cho	oose the correct answer :			20
1)	is a common c substrate in CVD process.		_	
2)	 a) O₂ b) No "Epitaxial deposition has a last a carrier gas at a high To a) TRUE c) Either TRUE or FALSE 	emperature"; who	sion as a result of	the use of Hydrogen
3)	a) Positive b) Ne	come more solub egative c)		dow of UV light. d) None
4)	a) Substrate b) Ma	A to create neces lask c)		
5)	SLIGA means a) Sacrificial LIGA b) Si	ilicon LIGA c)	Standard LIGA	d) None
6)	Metal Oxide gas sensor is a) Pressure b) Ch		sensor. Optical	d) Bio
7)	 In μ TAS M and N indicates used in a system. a) Sensors and componer c) Silicon's and carbides 	nts b)		
8)	Analyte phase (the input sa	•	is usually	d) Chemical
9)	In µTAS Type D micro va a) Pressure thermal c) Thermal	ralve is also know b)		valve. tic actuation

-2-



10)	In Cantilever based biosa a) Micro Mechanical Be c) Micro Mechanical Ro	nd b)	Micro Mechanica	al Twist
11)	The complementary relationship to the DNA from the basis of span a) Enzymes c) Cells and viruses	pecificityb)	•	nine and cytosine ir
12\	sensor is use	,		
12)	a) Thermal b)		-	d) Acoustic
13)	Micro contact printing is an an experience of the printing is an e	b)	Soft Lithography Surface Microma	
14)	For type A diabetes patie	ents drug delivery s	system is used to	deliver
	a) Insulin b)	Glucose c)	Sugar	d) All
15)	The techniquas 30 nm.	ue is used to create	e structure at Nan	no scales as small
	a) LIGA b)	PVD c)	CVD	d) Soft Lithography
16)	The microsystems conta	ins si	ized devices.	
,	=	cm c)		d) μm
17)	One principal application a) Dimensional stabilityb) Chemical stability at Ic) Both a) and b)d) None	at high temperatur	, ,	
18)	The gallium arsenide cora) Equal b)	ntains Unequal c)	numbers gallium 20	and arsenic atoms. d) 40
19)	In photolithography the na) PMMA c) Both a) and b)	b)	ositive resists are 2 component of I None	
20)	APCVD is a) Automatic Pressure b) Atmospheric Pressur	Chemical Vapor D	•	



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 BIOMEDICAL MICROSYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

II. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Explain the components of microsystems.
- 2) List the properties of silicon.
- 3) Classify methods of epitaxial deposition. Explain Vapor Phase Epitaxy (VPE).
- 4) Explain the etch stop techniques in detail.
- 5) Draw and explain the design steps of Surface micromachining.

III. Solve any two questions:

 $(10 \times 2 = 20)$

- 1) List application of polymers for MEMS and Microsystems.
- 2) Explain types of Enhanced CVD each in detail.
- 3) Explain LIGA process in detail.

SECTION - II

IV. Solve any four questions:

 $(5 \times 4 = 20)$

- 1) Classification biosensors based on transduction and explain.
- 2) Classify μ TAS. Explain elements of μ TAS with neat diagram.
- 3) With neat diagram explain thermo pneumatic actuation.
- 4) Define pressure sensor. Explain packaged pressure sensors.
- 5) Write a short note on injection molding.



V.	Solve	any	two	questions	:
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 $(10 \times 2 = 20)$

- 1) Explain fabrication of microstructure on a processed Si wafer using compression molding technique.
- 2) Classify micro-valves used in $\,\mu$ TAS and explain each with diagram.
- 3) Write a short note on:
 - i) Cantilever based biosensor.
 - ii) Cell and protein array.

Seat	
No.	

Set P

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 TISSUE ENGINEERING

Day and Date: Tuesday, 23-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 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.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose correct answer: (20x1=20)

- 1) Hydrogen and potassium ions are secreted into the tubular fluid in the
 - a) renal corpuscle

b) proximal convoluted tubule

c) nephron loop

- d) distal convoluted tubule
- 2) Connective tissue exists in different forms (within the human body) from liquids to very hard solids of the presence of the
 - a) Cartilage

b) Collagen and elastin

c) Extracellular matrix

- d) Cells are surrounded by membranes
- 3) Which of the following is a function of epithelial tissue?
 - a) Conduction of action potentials
 - b) Secretion and absorption of molecules
 - c) Support and covering of other tissue types
 - d) Contraction and relaxation
- 4) What is the most common cause of renal dysfunction in Cirrhosis?
 - a) Spontaneous Bacterial Peritonitis
- b) Hypovolemia due to Haematemesis
- c) Intrinsic Renal Disease
- d) Hepatorenal Syndrome
- 5) According to the sliding filament mechanism of skeletal-muscle contraction, during contraction
 - a) The thick filaments stay the same size but the thin filaments shorten
 - b) The sarcomeres shorten
 - c) The thin filaments stay the same size but the thick filaments shorten
 - d) Both thick and thin filaments shorten
- 6) Which of the following is an important function of ATP in skeletal muscle?
 - a) It is required for the dissociation of actin from myosin
 - b) It is hydrolyzed by the ATPase that pumps calcium ions into the sarcoplasmic reticulum
 - c) It is used for the phosphorylation of myosin
 - d) a and b
- 7) What is sarcomere?
 - a) Parts between two H line
- b) Parts between two A

c) Parts between two Z

d) Parts between two I band



8)	The layer of connective called the	ve tissue that separa	tes	the muscle tissue	into	small sections is
	a) aponeuroses	b) epimysium	c)	perimysium	d)	endomysium
9)	Which of these statem a) All motor units act b) Muscle contraction c) The cross bridges d) Dystrophin is not r	together n continues for long p bind to the actin and	erio shc	ds after nervous st orten the sarcomere	timu es	
10)	The basic unit of contra) myosin	raction is the b) actin	c)	Z-Lines	d)	sarcomeres
11)	 What is a pluripotent s a) Cells found in the incell types except p b) Stem cells derived differentiate into al c) Any progenitor cell d) None of the above 	nner mass of blastocy blacental cells I from adult tissue, co I the different cell type I found in human emb	ord es	blood and bone m		
12)	Which of the following a) Severe hyperglyca b) Plasma levels of a c) The digestion and d) The plasma oncot	aemia develops mmonia will rise absorption of fats is ir				
13)	In foetal and embryon a) spleen and liver c) kidneys and lungs		b)	formed in liver and kidneys pancreas and live	r	
14)	Method of removal of I		n nc	n-electrical shock	wav	es are bombarded
	on stones is classified a) angioplasty		c)	endoscopy	d)	angiography
15)	Each kidney containsa) 1 thousand nephroc) 1 billion nephrons			1 million nephrons 1 hundred nephro		
16)	Kind of dialysis in whice a) hypotonic dialysis c) abdominal dialysis		b)	nped through dialyz peritoneal dialysis haemodialysis		s classified as
17)	Collagen is a) Lipid	b) Fibrous protein	c)	Globular protein	d)	Carbohydrate
,	Skeletal muscles are a) striated muscles c) reflexive muscles		ď)	impulsive muscles adipose muscles		
19)	Each muscle fiber is can perimysium	lirectly surrounded by b) fascia		nnective tissue cal endomysium		the epimysium
20)	Junction between two a) node of Ranvier	neurons is called as b) loop of Henle	c)	synapse	d)	dendrit



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 TISSUE ENGINEERING

Day and Date: Tuesday, 23-5-2017

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

II. Solve any four: (4×5=20)

- 1) Define scaffolds. What are the desired properties for the suitable scaffold in tissue engineering?
- 2) Demonstrate the continuous nutrient transport in the bioreactor with an example.
- 3) Explain the nerve regeneration with diagram.
- 4) What do you understand by the potency of the stem cells? Briefly describe the types of potency of stem cells.
- 5) Explain the development studies of cartilage.

III. Solve any two: (2×10=20)

- 1) Explain about the importance of stromal cells and tissue composition.
- 2) Explain the different methodology and devices for shear stress effect on cellular function.
- 3) Define tissue engineering. Mention the basic clinical goals and fundamental challenges in tissue engineering.

SECTION - II

IV. Solve any four: (4×5=20)

- 1) Describe the concept of bio-artificial kidney.
- 2) Explain the hepatocyte transplantation.
- 3) Explain about the reconstruction of connective tissue.
- 4) Explain about the hematopoietic growth factors for bone marrow.
- 5) Describe the methods of cell seeding in scaffolds.

V. Solve any two: (2×10=20)

- 1) Explain about the injury and repair mechanism of skeletal muscles.
- 2) What are the defining characteristics of stem cells? Describe the adult and embryonic stem cells.
- 3) Explain about the in-vitro neural circuits and bio sensors.
- 4) What is bone marrow transplantation? Explain autologous and allogeneic bone marrow transplantation.

Set P

Seat	Set	Q
No.		

B.F. (Biomedical Enga.) (Part – II) Examination, 2017

	TISSUE EN	GINEERING	
-	Date : Tuesday, 23-5-2017 .00 p.m. to 6.00 p.m.	Max. Marks : 10	0
	Answer Book Page N 2) Answer MCQ/Objec t	ory. It should be solved in first 30 minutes in lo. 3. Each question carries one mark. tive type questions on Page No. 3 only. Don't O.P. Set (P/Q/R/S) on Top of Page.	
Duration	MCQ/Objective : 30 Minutes	Type Questions Marks : 20	0
I. Cho	pose correct answer:	(20×1=20))
1)	Kind of dialysis in which blood of patient is a) hypotonic dialysis c) abdominal dialysis	s pumped through dialyzer is classified as b) peritoneal dialysis d) haemodialysis	
2)	Collagen is a) Lipid b) Fibrous protein	n c) Globular protein d) Carbohydrate	
3)	Skeletal muscles are also known as a) striated muscles c) reflexive muscles	b) impulsive musclesd) adipose muscles	
4)	Each muscle fiber is directly surrounded a) perimysium b) fascia	by connective tissue called the c) endomysium d) epimysium	
5)	Junction between two neurons is called a a) node of Ranvier b) loop of Henle		
6)	Hydrogen and potassium ions are secrete a) renal corpuscle c) nephron loop	ed into the tubular fluid in the b) proximal convoluted tubule d) distal convoluted tubule	
7)	Connective tissue exists in different forms hard solids of the presence of the a) Cartilage	s (within the human body) from liquids to very b) Collagen and elastin	
	c) Extracellular matrix	d) Cells are surrounded by membranes	
8)	 Which of the following is a function of epit a) Conduction of action potentials b) Secretion and absorption of molecules c) Support and covering of other tissue t d) Contraction and relaxation 	S	
9)	What is the most common cause of renal a) Spontaneous Bacterial Peritonitis c) Intrinsic Renal Disease	dysfunction in Cirrhosis?b) Hypovolemia due to Haematemesisd) Hepatorenal Syndrome	



1-V E	3-3/6	-2-		
10)	According to the sliding filamer contraction			
	a) The thick filaments stay theb) The sarcomeres shortenc) The thin filaments stay thed) Both thick and thin filament	same size but tl		
11)	Which of the following is an impa. It is required for the dissociable by the ATPa c) It is used for the phosphory d) a and b	iation of actin fro se that pumps ca	om myosin alcium ions into the s	
12)	What is sarcomere? a) Parts between two H line c) Parts between two Z	,	Parts between two Parts between two	
13)	The layer of connective tissue called the a) aponeuroses b) epin	•	the muscle tissue perimysium	into small sections is d) endomysium
14)	Which of these statements is can all motor units act together b) Muscle contraction continuc; The cross bridges bind to tan d) Dystrophin is not needed to	correct regarding es for long perion he actin and sho	g muscle contraction ods after nervous st orten the sarcomere	imulation ceases
15)	The basic unit of contraction is a) myosin b) actin		Z-Lines	d) sarcomeres
16)	 What is a pluripotent stem cell a) Cells found in the inner mass cell types except placental b) Stem cells derived from addifferentiate into all the differentiate into all the differe	ss of blastocyst the cells dult tissue, corderent cell types	blood and bone ma	
17)	Which of the following stateme a) Severe hyperglycaemia de b) Plasma levels of ammonia c) The digestion and absorption d) The plasma oncotic pressure.	evelops will rise on of fats is impa		
18)	In foetal and embryonic life, red a) spleen and liver c) kidneys and lungs	b)	formed in liver and kidneys pancreas and liver	r
19)	Method of removal of kidney st on stones is classified as a) angioplasty b) litho		on-electrical shock v endoscopy	vaves are bombarded d) angiography
20)	Each kidney contains approxing a) 1 thousand nephrons c) 1 billion nephrons	nately b)	1 million nephrons 1 hundred nephror	



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 TISSUE ENGINEERING

Day and Date: Tuesday, 23-5-2017

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

II. Solve any four: (4×5=20)

- 1) Define scaffolds. What are the desired properties for the suitable scaffold in tissue engineering?
- 2) Demonstrate the continuous nutrient transport in the bioreactor with an example.
- 3) Explain the nerve regeneration with diagram.
- 4) What do you understand by the potency of the stem cells? Briefly describe the types of potency of stem cells.
- 5) Explain the development studies of cartilage.

III. Solve any two: (2×10=20)

- 1) Explain about the importance of stromal cells and tissue composition.
- 2) Explain the different methodology and devices for shear stress effect on cellular function.
- 3) Define tissue engineering. Mention the basic clinical goals and fundamental challenges in tissue engineering.

SECTION - II

IV. Solve any four: (4×5=20)

- 1) Describe the concept of bio-artificial kidney.
- 2) Explain the hepatocyte transplantation.
- 3) Explain about the reconstruction of connective tissue.
- 4) Explain about the hematopoietic growth factors for bone marrow.
- 5) Describe the methods of cell seeding in scaffolds.

V. Solve any two: (2×10=20)

- 1) Explain about the injury and repair mechanism of skeletal muscles.
- 2) What are the defining characteristics of stem cells? Describe the adult and embryonic stem cells.
- 3) Explain about the in-vitro neural circuits and bio sensors.
- 4) What is bone marrow transplantation? Explain autologous and allogeneic bone marrow transplantation.

Set Q

Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 **TISSUE ENGINEERING**

Day and Date: Tuesday, 23-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 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: 20

I. Choose correct answer:

 $(20 \times 1 = 20)$

- 1) What is a pluripotent stem cell?
 - a) Cells found in the inner mass of blastocyst that can differentiate into over 200 different cell types except placental cells
 - b) Stem cells derived from adult tissue, cord blood and bone marrow and that do not differentiate into all the different cell types
 - c) Any progenitor cell found in human embryos
 - d) None of the above
- 2) Which of the following statements about liver failure are correct?
 - a) Severe hyperglycaemia develops
 - b) Plasma levels of ammonia will rise
 - c) The digestion and absorption of fats is impaired
 - d) The plasma oncotic pressure will rise
- 3) In foetal and embryonic life, red blood cells are formed in
 - a) spleen and liver

b) liver and kidneys

c) kidneys and lungs

- d) pancreas and liver
- 4) Method of removal of kidney stones in which non-electrical shock waves are bombarded on stones is classified as
 - a) angioplasty
- b) lithotripsy
- c) endoscopy
- d) angiography

- 5) Each kidney contains approximately
 - a) 1 thousand nephrons

b) 1 million nephrons

c) 1 billion nephrons

- d) 1 hundred nephrons
- 6) Kind of dialysis in which blood of patient is pumped through dialyzer is classified as
 - a) hypotonic dialysis

b) peritoneal dialysis

c) abdominal dialysis

d) haemodialysis

- 7) Collagen is
 - a) Lipid
- b) Fibrous protein c) Globular protein d) Carbohydrate



8)	8) Skeletal muscles are also known as a) striated muscles b) impulsive muscles c) reflexive muscles d) adipose muscles	
9)	9) Each muscle fiber is directly surrounded by connective tissue calleda) perimysiumb) fasciac) endomysiumd)	the epimysium
10)	10) Junction between two neurons is called asa) node of Ranvierb) loop of Henlec) synapsed)	dendrit
11)	 11) Hydrogen and potassium ions are secreted into the tubular fluid in the a) renal corpuscle b) proximal convoluted c) nephron loop d) distal convoluted tub 	tubule
12)	 12) Connective tissue exists in different forms (within the human body) that does not be a cartilage b) Collagen and elastin c) Extracellular matrix d) Cells are surrounded 	
13)	13) Which of the following is a function of epithelial tissue? a) Conduction of action potentials b) Secretion and absorption of molecules c) Support and covering of other tissue types d) Contraction and relaxation	, sy membranec
14)	 14) What is the most common cause of renal dysfunction in Cirrhosis? a) Spontaneous Bacterial Peritonitis b) Hypovolemia due to c) Intrinsic Renal Disease d) Hepatorenal Syndror 	
15)	 15) According to the sliding filament mechanism of skeletal-muscle contraction a) The thick filaments stay the same size but the thin filaments shor b) The sarcomeres shorten c) The thin filaments stay the same size but the thick filaments shor d) Both thick and thin filaments shorten 	ten
16)	 Which of the following is an important function of ATP in skeletal musta. a) It is required for the dissociation of actin from myosin b) It is hydrolyzed by the ATPase that pumps calcium ions into the sarce. c) It is used for the phosphorylation of myosin d) a and b 	
17)	 17) What is sarcomere? a) Parts between two H line b) Parts between two A c) Parts between two Z d) Parts between two I 	
18)	18) The layer of connective tissue that separates the muscle tissue int called the	
19)	 a) aponeuroses b) epimysium c) perimysium d) 19) Which of these statements is correct regarding muscle contraction? a) All motor units act together b) Muscle contraction continues for long periods after nervous stime c) The cross bridges bind to the actin and shorten the sarcomeres d) Dystrophin is not needed to strengthen the contracting muscle ce 	ulation ceases
20)	20) The basic unit of contraction is the	sarcomeres



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 TISSUE ENGINEERING

Day and Date: Tuesday, 23-5-2017

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

II. Solve any four: (4×5=20)

- 1) Define scaffolds. What are the desired properties for the suitable scaffold in tissue engineering?
- 2) Demonstrate the continuous nutrient transport in the bioreactor with an example.
- 3) Explain the nerve regeneration with diagram.
- 4) What do you understand by the potency of the stem cells? Briefly describe the types of potency of stem cells.
- 5) Explain the development studies of cartilage.

III. Solve any two: (2×10=20)

- 1) Explain about the importance of stromal cells and tissue composition.
- 2) Explain the different methodology and devices for shear stress effect on cellular function.
- 3) Define tissue engineering. Mention the basic clinical goals and fundamental challenges in tissue engineering.

SECTION - II

IV. Solve any four: (4×5=20)

- 1) Describe the concept of bio-artificial kidney.
- 2) Explain the hepatocyte transplantation.
- 3) Explain about the reconstruction of connective tissue.
- 4) Explain about the hematopoietic growth factors for bone marrow.
- 5) Describe the methods of cell seeding in scaffolds.

V. Solve any two: (2×10=20)

- 1) Explain about the injury and repair mechanism of skeletal muscles.
- 2) What are the defining characteristics of stem cells? Describe the adult and embryonic stem cells.
- 3) Explain about the in-vitro neural circuits and bio sensors.
- 4) What is bone marrow transplantation? Explain autologous and allogeneic bone marrow transplantation.

Set R



Cook	
Seat	
No.	

Set S

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 TISSUE ENGINEERING

Day	y and Date :	Tuesday, 23-5-2017	Max. Marks: 100
	0.00		

Time: 3.00 p.m. to 6.00 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 : 20

- I. Choose correct answer: (20×1=20)
 - 1) Which of the following is an important function of ATP in skeletal muscle?a) It is required for the dissociation of actin from myosin
 - b) It is hydrolyzed by the ATPase that pumps calcium ions into the sarcoplasmic reticulum
 - c) It is used for the phosphorylation of myosin
 - d) a and b
 - 2) What is sarcomere?
 - a) Parts between two H line
- b) Parts between two A

c) Parts between two Z

- d) Parts between two I band
- 3) The layer of connective tissue that separates the muscle tissue into small sections is called the
 - a) aponeuroses
- b) epimysium
- c) perimysium
- d) endomysium
- 4) Which of these statements is correct regarding muscle contraction?
 - a) All motor units act together
 - b) Muscle contraction continues for long periods after nervous stimulation ceases
 - c) The cross bridges bind to the actin and shorten the sarcomeres
 - d) Dystrophin is not needed to strengthen the contracting muscle cell
- 5) The basic unit of contraction is the
 - a) myosin
- b) actin
- c) Z-Lines
- d) sarcomeres

- 6) What is a pluripotent stem cell?
 - a) Cells found in the inner mass of blastocyst that can differentiate into over 200 different cell types except placental cells
 - b) Stem cells derived from adult tissue, cord blood and bone marrow and that do not differentiate into all the different cell types
 - c) Any progenitor cell found in human embryos
 - d) None of the above

-2-



7)	Which of the following statements about live	r fa	ilure are correct?	
	a) Severe hyperglycaemia develops			
	b) Plasma levels of ammonia will risec) The digestion and absorption of fats is in	ทกล	ired	
	d) The plasma oncotic pressure will rise	пра	in Cu	
8)	In foetal and embryonic life, red blood cells a	are	formed in	
	a) spleen and liver	b)	liver and kidneys	
	c) kidneys and lungs	,	pancreas and live	
9)	Method of removal of kidney stones in which on stones is classified as	n no	n-electrical shock v	waves are bombarded
	a) angioplasty b) lithotripsy	c)	endoscopy	d) angiography
10)	Each kidney contains approximately			
•	a) 1 thousand nephrons		1 million nephrons	
	c) 1 billion nephrons	,	1 hundred nephroi	
11)	Kind of dialysis in which blood of patient is p		ıped through dialyz peritoneal dialysis	
	a) hypotonic dialysisc) abdominal dialysis		haemodialysis	
12)	Collagen is	J.,		
,	a) Lipid b) Fibrous protein	c)	Globular protein	d) Carbohydrate
13)	Skeletal muscles are also known as			
	a) striated musclesc) reflexive muscles		impulsive muscles adipose muscles	3
1/1	Each muscle fiber is directly surrounded by	,	•	ad tha
•	a) perimysium b) fascia		endomysium	d) epimysium
15)	Junction between two neurons is called as a) node of Ranvier b) loop of Henle	c)	synapse	d) dendrit
16)	Hydrogen and potassium ions are secreted			
	a) renal corpuscle		proximal convolute	
4 - 7\	c) nephron loop	,	distal convoluted t	
17)	Connective tissue exists in different forms (hard solids of the presence of the			
	a) Cartilagec) Extracellular matrix		Collagen and elast	
10\	•	•		ded by membranes
10)	Which of the following is a function of epithe a) Conduction of action potentials	ııaı	ussue :	
	b) Secretion and absorption of molecules			
	c) Support and covering of other tissue typ	es		
10\	d) Contraction and relaxation	, of	unation in Cirrhadia	2
19)	What is the most common cause of renal dy a) Spontaneous Bacterial Peritonitis		Hypovolemia due	
	c) Intrinsic Renal Disease		Hepatorenal Synd	
20)	According to the sliding filament mechanism	n of	skeletal-muscle co	ntraction, during
	contraction	+ +	ha thin filamanta al	hartan
	a) The thick filaments stay the same size bb) The sarcomeres shorten	ul I	ne unn maments si	IOITEIT
	c) The thin filaments stay the same size but	ıt th	e thick filaments sh	norten
	d) Both thick and thin filaments shorten			



Seat	
No.	

B.E. (Biomedical Engg.) (Part – II) Examination, 2017 TISSUE ENGINEERING

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Set S