

(6 pages)

Reg. No. : .....

Code No. : 6179

Sub. Code : PELM 11/  
PECM 11

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

First Semester

Electronics/Electronics and communication

SOLID STATE ELECTRONIC DEVICES

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. A semiconductor is formed by \_\_\_\_\_ bonds.
  - (a) Covalent
  - (b) Electrovalent
  - (c) Co-ordinate
  - (d) None of the above

2. A semiconductor has \_\_\_\_\_ temperature coefficient of resistance.
- (a) Positive                      (b) Zero  
(c) Negative                      (d) None of the above
3. In a semiconductor, the energy gap between the valence band and conduction band is about
- (a) 5 eV                              (b) 10 eV  
(c) 15 eV                              (d) 1 eV
4. The resistivity of a semiconductor \_\_\_\_\_ conductors and insulators
- (a) More than that of    (b) Lies between that of  
(c) Less than that of    (d) None of the above
5. MOSFET has greatest application in digital circuit due to
- (a) Low power consumption  
(b) Less noise  
(c) Small amount of space it takes on a chip  
(d) All of the above
6. Which internally connected region is heavily doped with an impurity by forming double PN junctions in JFET?
- (a) Source                              (b) Drain  
(c) Gate                                      (d) Channel

7. \_\_\_\_\_ has more sophisticated structure than p-i-n photodiode.
- (a) Avalanche photodiode
  - (b) P-n junction diode
  - (c) Zener diode
  - (d) Varactor diode
8. Determine the Responsivity of optical power of  $0.4\mu\text{W}$  and photocurrent of  $0.284\mu\text{A}$ .
- (a) 0.735                      (b) 0.54
  - (c) 0.56                        (d) 0.21
9. AC power in a load can be controlled by using
- (a) Two SCR's in parallel opposition
  - (b) Two SCR's in series
  - (c) Three SCR's in series
  - (d) Four SCR's in series.
10. An SCR is made up of silicon because
- (a) Silicon has large leakage current than germanium
  - (b) Silicon has small leakage current than germanium
  - (c) Silicon has small leakage voltage than germanium
  - (d) Silicon has large leakage voltage than germanium

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) What are cubic lattices?

Or

(b) Explain Growth of Single Crystal Ingots.

12. (a) 12. a. What is Fermi Level?

Or

(b) Explain about drift and resistance.

13. (a) What is Short channel Effects?

Or

(b) Explain the equivalent circuit of MOSFET.

14. (a) Write short notes on Lasers.

Or

(b) Write about Photodiodes.

15. (a) Explain tunnel diode.

Or

(b) Explain Semiconductor Controlled Rectifier.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain Lattice Matching in Epitaxial Growth.

Or

- (b) Explain potential well equation in detail.

17. (a) Write in detail about electrons and holes in detail.

Or

- (b) Explain Variation of Energy Bands with Alloy Composition.

18. (a) Give the basic operation of fabrication of GaAs MOSFET.

Or

- (b) Write notes on MOS capacitance Measurements.

19. (a) Write in detail about Light Emitting Diodes.

Or

- (b) Explain basic semiconductor laser in detail.

20. (a) Explain IMPATT diode in detail.

Or

(b) Explain insulated gate Bipolar Transistor.

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(8 pages)

Reg. No. : .....

Code No. : 6180

Sub. Code : PELM 12/  
PECM 12

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

First Semester

Electronics / Electronics and Communication – Core

APPLIED MATHEMATICS

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The rank of matrix  $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$  is

(a) 3

(b) 2

(c) 1

(d) 0

2. If  $A = \begin{bmatrix} 1 & -1 & 0 \\ 3 & 2 & -1 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}$  find  $(AB)^T$ .

(a)  $\begin{bmatrix} -2 \\ 4 \end{bmatrix}$  (b)  $[-2, 4]$

(c)  $\begin{bmatrix} 2 \\ -4 \end{bmatrix}$  (d)  $[2, -4]$

3. If  $U = (x^2 + y^2 + z^2)^{-1/2}$ , then  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2}$  is

(a)  $\frac{-1}{2}$  (b)  $-1$

(c)  $0$  (d)  $1$

4. If the function  $U = \ln \left( \frac{x^3 + x^2 y - y^3}{x - y} \right)$  then

$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$  is

(a)  $2e^u$  (b)  $2e$

(c)  $2$  (d)  $\frac{1}{2}$



5. Evaluate  $\int_0^a \int_0^b \frac{dx dy}{xy}$  is

(a)  $\log a$

(b)  $\log b$

(c)  $\log\left(\frac{a+b}{a}\right)$

(d)  $\log(a+b)$

6. Evaluate  $\int_0^2 \frac{dx}{x^2+4}$  is

(a)  $\frac{\pi}{8}$                       (b)  $\frac{\pi}{2}$

(c)  $\frac{\pi}{4}$                         (d)  $\pi$

7. If the Laplace transform of function  $F(t)$  is

$\frac{s+3}{(s+1)(s+2)}$ , then  $f(0)$  is

(a)  $\frac{3}{2}$                         (b)  $\frac{1}{2}$

(c) 0                            (d) 1

8.  $L(e^{at} \cos wt)$  is equal to

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

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

(c)  $\frac{a}{(s-a)^2 + w^2}$

(d)  $\frac{s}{(s-a)^2 + w^2}$

9. The function  $f(x) = x$  in  $(-\pi, \pi)$  of period  $2\pi$

gives the series,  $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$  is equal to

(a)  $\frac{\pi}{2}$                       (b)  $\frac{\pi^2}{4}$

(c)  $\frac{\pi}{4}$                         (d)  $\frac{\pi^2}{16}$

10. The function  $f(x) = \begin{cases} -2, & -\pi < x < 0 \\ 2, & 0 < x < \pi \end{cases}$ . The value of  $a_n$  in the Fourier series expansion of  $f(x)$  is

(a) 2                              (b) 0

(c) 4                              (d) 5

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Find the rank of matrix

(i) 
$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ -2 & 0 & 5 & 7 \end{bmatrix}$$

(ii) 
$$\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}.$$

Or

(b) Verify Cayley-Hamilton theorem and hence

find the inverse of matrix  $A = \begin{bmatrix} 3 & 1 & -1 \\ 1 & 3 & 1 \\ -1 & 1 & 3 \end{bmatrix}$ .

12. (a) Expand  $e^x \cos y$  as Taylor's series.

Or

(b) Show that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 2u \log u$ , where

$\log u = \frac{x^3 + y^3}{3x + 4y}$  using Euler theorem.

13. (a) Evaluate  $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx dy}{1+x^2+y^2}$ .  
Or
- (b) Evaluate  $\iint r^3 dr d\theta$  over the area bounded between the circles  $r = 2\cos\theta$ ,  $r = 4\cos\theta$ .
14. (a) Explain and prove shifting theorem.  
Or
- (b) Prove the Laplace transform of  $L[F'(t)] = SL[F(t)] - F(0)$ .
15. (a) Write the formula for Fourier constants for  $f(x)$  in  $(C, C+2l)$ .  
Or
- (b) Find the Fourier sine series for  $f(x) = K$  in  $0 < x < \pi$ .

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

16. (a) Verify Cayley Hamilton theorem to find the value of

$$A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + 2$$

Where  $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ .

Or

- (b) Find the characteristic equation of  $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$  using two methods.

17. (a) If  $u = \log(\tan x + \tan y + \tan z)$  show that  $\sin 2x \frac{\partial u}{\partial x} + \sin 2y \frac{\partial u}{\partial y} + \sin 2z \frac{\partial u}{\partial z} = 2$ .

Or

- (b) Find the maximum and minimum value of  $f(x, y) = x^3 y^2 (1 - x - y)$ .

18. (a) Evaluate the  $\iint \frac{dy dx}{1 + x^2 + y^2}$  over the area lying in the first quadrant bounded by  $x = 0$ ,  $x = 1$ ,  $y = 0$  and the rectangular hyperbola  $y^2 - x^2 = 1$ .

Or

- (b) Find the area lying b/w the parabola  $y = 4x - x^2$  and the line  $y = x$ .

19. (a) State and prove the periodic function.

Or

- (b) Find the Inverse Laplace transform function of  $F(s) = \frac{8 - (s+2)(4s+10)}{(s+1)(s+2)^2}$ .

20. (a) Find the half range cosine series for the function  $f(x) = x^2$  in  $0 \leq x \leq \pi$  and hence find the sum of the series  $1 - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$

Or

- (b) Find the half range sine series for  $f(x) = x(\pi - x)$  in  $(0, \pi)$ . Deduce that  $\frac{1}{1^3} - \frac{1}{3^3} + \frac{1}{5^3} - \dots = \frac{\pi^3}{32}$ .

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Reg. No. : .....

**Code No. : 6181**      **Sub. Code : PELM 13/  
PECM 13**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022

First Semester

Electronics/Electronics and Communication – Core

SIGNALS AND SYSTEMS

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer:

1. Laplace transform any function changes it domain to s-domain.
  - (a) True
  - (b) False
  - (c) 0
  - (d) None of these

2. Laplace of function  $f(t)$  is given by?

(a)  $f(s) = \int_{-\alpha}^{\alpha} f(t)e^{-st} dt$

(b)  $f(t) = \int_{-\alpha}^{\alpha} f(t)e^{-t} dt$

(c)  $f(s) = \int_{-\alpha}^{\alpha} f(t)e^{-t} dt$

(d)  $f(t) = \int_{-\alpha}^{\alpha} f(t)e^{-st} dt$

3. In a \_\_\_\_\_ signal we can't define the value of signal at any instant of time?

- (a) Continuous                      (b) Discrete  
(c) Both (a) and (b)              (d) None of the above

4. The output of the system are called \_\_\_\_\_.

- (a) Excitation                      (b) Response  
(c) Both (a) and (b)              (d) None of the above



5. The signal is said to be even when it satisfies the condition \_\_\_\_\_.
- (a)  $x(t) = x(t)$                       (b)  $x(t) = x(2t)$
- (c)  $x(t) = x(-t)$                       (d)  $x(t) = -x(-t)$
6. When two periodic sinusoids added then the result is \_\_\_\_\_.
- (a) Sinusoidal signal      (b) Periodic Signal
- (c) Both (a) and (b)      (d) None of the above
7. \_\_\_\_\_ System is a memory less system.
- (a) Static                      (b) Dynamic
- (c) Both (a) and (b)      (d) None of the above
8. A system is said to be \_\_\_\_\_ if its response is dependent upon the present and past input and does not upon future input.
- (a) Casual                      (b) Non causal
- (c) Time variant              (d) None of the above

9. The continuous impulse is a \_\_\_\_\_ signal.
- (a) Ramp
  - (b) Power
  - (c) Energy
  - (d) Neither energy nor power
10. By using \_\_\_\_\_ we can find the zero state response of the system.
- (a) Convolution                      (b) Correlation
  - (c) Both (a) and (b)              (d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Determine whether the following systems are  
Time                      invariant                      or                      Not  
 $y(t) = tx(t)$  and  $y(n) = x(n^2)$

Or

- (b) Define system and explain its classification.

12. (a) State Parseval' theorem for continuous time periodic signal.

Or

- (b) Relate time Reversal and time Scaling property of CTFS.

13. (a) Explain about the frequency shifting property in DTFS.

Or

- (b) Explain the frequency response of discrete time LTI system.

14. (a) State and prove initial value theorem of Z-transform.

Or

- (b) (i) Determine the Z-transform of following functions.  $x(n) = n a^n u(n)$

- (ii) State and prove the time shifting convolution properties of Z-transform.

15. (a) Write a short note on function of a random variable.

Or

- (b) Explain the types of random process in LTI system.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. (a) Verify whether the following system is

- (i) static/dynamic
- (ii) causal/non casual
- (iii) linear/non linear
- (iv) Time variant/time invariant.
- (v) stable/unstable

$$y(n) = 2x(n-1) + x(2n)$$

Or

(b) Explain the discrete convolution and its properties.

17. (a) Illustrate the Fourier series representation of DT periodic signals.

Or

(b) Explain the sampling theorem.

18. (a) State and prove a condition for a discrete time LTI system to be stable.

Or

(b) Explain the frequency response of discrete time LTI systems.

19. (a) Explain the inverse Laplace transform

Or

(b) Find the inverse Laplace transform of

$$X(s) = s^2 - 5s + 7 / (s + 2)^3$$

20. (a) Explain the meaning of the following terms with respect to random variable processes.

(i) Wide-Sense stationary process.

(ii) Cross-Power spectral density.

Or

(b) Explain in detail about cross correlation.

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Reg. No. : .....

Code No. : 6515

Sub. Code : ZECM 11/  
ZELM 11

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

First Semester

Electronics/Electronics and Communication

ELECTRONIC PROPERTIES OF MATERIALS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The SI unit of conductivity is \_\_\_\_\_  
(a) Meter                      (b) Ohm meter  
(c) Ohm                         (d) 1/ohm meter
  
2. Which material has 98% electrical conductivity?  
(a) Gold                        (b) Aluminium  
(c) Silver                      (d) Brass

3. What is the relation between  $\epsilon_r$  and  $X$ ?
- (a)  $\epsilon_r = X$                       (b)  $\epsilon_r = 1 + X$   
(c)  $\epsilon_r = 1 - X$                     (d)  $\epsilon_r = X - 1$
4. If the dipole moment of a water drop is  $4 \times 10^{-30}$  m and radius is 1 mm, What is the Polarization of the drop?
- (a)  $5.6 \times 10^{-13} \text{ m}^{-2}$             (b)  $7.4 \times 10^{-13} \text{ m}^{-2}$   
(c)  $8.4 \times 10^{-13} \text{ m}^{-2}$             (d)  $9.4 \times 10^{-13} \text{ m}^{-2}$
5. The absorption of Photons in a Photodiode is dependent on \_\_\_\_\_
- (a) Absorption Co-efficient  
(b) Properties of materials  
(c) Charge carries at junction  
(d) Amount light
6. In optical fiber communication, the only weakly absorbing materials over wavelength band required is?
- (a) GaAs                                (b) Silicon  
(c) GaS6                                (d) Germanium

7. The threshold for indirect absorption occurs at wave length \_\_\_\_\_
- (a)  $3.01 \mu m$                       (b)  $2.09 \mu m$   
(c)  $0.92 \mu m$                       (d)  $1.09 \mu m$
8. A material with one dimension in Nano range and other two dimensions are large is called \_\_\_\_\_
- (a) Micro material  
(b) Quantum wire  
(c) Quantum well  
(d) Quantum dot
9. The color of the nano gold particles is \_\_\_\_\_
- (a) Yellow  
(b) Orange  
(c) Red  
(d) Variable
10. The melting point of particles in nano form \_\_\_\_\_
- (a) Increases  
(b) Decreases  
(c) Remains same  
(d) Increases then decreases



PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain conductivity in detail.

Or

(b) Explain Fermi surfaces.

12. (a) Define ferro electricity.

Or

(b) Define antiferro electricity.

13. (a) Explain Electronic intern bond and intra bond transitions.

Or

(b) Explain Refraction.

14. (a) Explain diamagnetism.

Or

(b) Explain coercive force.

15. (a) Explain the prime materials in nanotechnology.

Or

- (b) Explain the Quantum confinement of nanomaterials.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b)  
Each answer should not exceed 600 words.

16. (a) Explain conductivity and super conductivity in detail.

Or

- (b) Explain conduction in metal oxides and amorphous materials.

17. (a) Explain about local Electric field at an atom.

Or

- (b) Explain ferro electricity and ferro elasticity.

18. (a) Explain the Relation between optical properties and band structure.

Or

- (b) Explain bond structure determination from optical spectra reflection.

19. (a) Explain about neutron magnetic scattering.

Or

(b) Explain in detail about Ferromagnetic and anti ferrimagnetic order.

20. (a) Explain about nanoparticles and biomaterials.

Or

(b) Explain in detail about Microstructure and defects in monocrystalline materials.

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Reg. No. : .....

Code No. : 6516

Sub. Code : ZELM 12/  
ZECM 12

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

First Semester

Electronics / Electronics and Communication — Core

MATHEMATICAL METHODS AND NETWORK  
ANALYSIS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The degree of the differential equation

$$\left(\frac{d^2y}{dx}\right)^2 + \left(\frac{dy}{dx}\right)^2 = x \sin dy/dx \text{ is } \text{—————}$$

(a) 1

(b) 2

(c) 3

(d) Not defined

2. The radius of a circle is increasing at the rate of 0.4cm/s. The rate of increasing of its circumference is \_\_\_\_\_
- (a)  $0.4 \pi \text{ Cm/s}$                       (b)  $0.8 \pi \text{ Cm/s}$   
(c)  $0.8 \text{ Cm/s}$                         (d) None of these
3. Laplace transform of  $\cos(at) u(t)$  is \_\_\_\_\_
- (a)  $s/a^2 + s^2$                         (b)  $a/a^2 + s^2$   
(c)  $s^2/a^2 + s^2$                         (d)  $a^2/a^2 + s^2$
4. If the phase angle at gain cross over frequency is estimated to be  $-105^\circ$ , what will be the value of phase margin of the system?
- (a)  $23^\circ$                                 (b)  $45^\circ$   
(c)  $60^\circ$                                 (d)  $75^\circ$
5. The Fourier series expansion of an even period function contains
- (a) only cosine terms  
(b) cosine terms and a constant  
(c) only sine terms  
(d) sine terms and a constant

6. Any waveform can be expressed in Fourier series if \_\_\_\_\_
- (a) sampling conditions are satisfied
  - (b) Dirichet conditions are satisfied
  - (c) Maxwell's conditions are satisfied
  - (d) None of the above conditions is required to be satisfied
7. The Fourier series expansion of an even period function contains
- (a) only cosine terms
  - (b) cosine terms and a constant
  - (c) only sine terms
  - (d) sine terms and a constant
8. The Fourier series expansion of an odd periodic function contains \_\_\_\_\_
- (a) cosine terms                      (b) constant terms only
  - (c) sine terms                         (d) none of the above
9. The complex exponential Fourier coefficient of a real valued time signal has \_\_\_\_\_
- (a) odd symmetry                      (b) even symmetry
  - (c) conjugate symmetry (d) none of the above

10. The inverse laplace transform of  $\left(\frac{1}{s+1}\right)$  is

- \_\_\_\_\_
- (a)  $e^{-t}$                       (b)  $e^t$   
(c) 1                              (d)  $e^1$

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Verify Cayley – Hamilton theorem for  
 $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ . Find  $A^{-1}$ .

Or

(b) Show that  $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$  has complex eigen value.

12. (a) Find the general solution of the following differential equation  $\frac{dt}{dx} = (1+x^2)(1+t^2)$ .

Or

(b) State the nature of Quadratic form.

13. (a) Explain the types of data.

Or

(b) Explain discrete probability distribution.

14. (a) What are the measures of central tendency?

Or

(b) What are Z-Transform?

15. (a) State Dirichlet conditions.

Or

(b) What is RMS Value?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

16. (a) Let  $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$  then show that  $A^2 - 4A + 7I = 0$  using this result calculate  $A^5$ .

Or

(b) If  $A = \begin{bmatrix} 3 & 1 & 2 \\ 1 & 0 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & -1 \\ 2 & 1 \\ 3 & 1 \end{bmatrix}$ , find AB.



17. (a) Calculate  $\iint_R \frac{x}{y^2} dx dy$ , where  $R = [1, 2] \times [4, 6]$  separating variables.

Or

- (b) Calculate the volume of solid bounded by curves  $y = x^2$ ,  $y = 1$ ,  $z = 0$ ,  $z = 2y$ .

18. (a) Explain the measures of central tendency.

Or

- (b) Explain probability distribution with an example.

19. (a) Explain zeros and poles in detail.

Or

- (b) Explain state variable method of circuit analysis.

20. (a) Express  $f(x) = \sin\left(\frac{\pi x}{l}\right)$  as half range cosine series for  $0 \leq x \leq l$ .

Or

- (b) Explain RMS values in detail.



2. In a BJT as collector to base voltage increases the emitter current \_\_\_\_\_.
- (a) Remains same
  - (b) Increases slightly
  - (c) Decreases slightly
  - (d) Depends upon doping of the emitter region
3. Find the output voltage of an ideal Op-Amp. If  $V_1$  and  $V_2$  are the two input voltages
- (a)  $V_0 = V_1 - V_2$
  - (b)  $V_0 = A \times (V_1 - V_2)$
  - (c)  $V_0 = A \times (V_1 + V_2)$
  - (d)  $V = V_1 \times V_2$
4. How will be the output voltage obtained for an ideal op-amp?
- (a) amplifiers the difference between the two input voltages
  - (b) amplifier individual voltage input voltage
  - (c) amplifier product of two input voltage
  - (d) none of the mentioned

5. Which cell can be used instead of a photocell to obtain active transducer in photosensitive devices?
- (a) Photovoltaic cell
  - (b) Photo diode
  - (c) Photo sensor
  - (d) All of the mentioned
6. The current to voltage converter photosensitive device can be used as \_\_\_\_\_.
- (a) Light intensity meter
  - (b) Light radiating meter
  - (c) Light deposition meter
  - (d) None of the mentioned
7. What is the input in the PLD is given through \_\_\_\_\_
- (a) OR gates                      (b) NAND gates
  - (c) AND gates                    (d) NOR gates
8. Vertical and horizontal directions in FPGA are separated by \_\_\_\_\_.
- (a) A channel                      (b) A line
  - (c) A flip flop                    (d) A strobe

9. The following logic families have the shortest propagation delay \_\_\_\_\_.
- (a) AS-TTL                      (b) S-TTL  
(c) HCMOS                      (d) HS-TTL
10. A JFET is similar in operation to \_\_\_\_\_ valve.
- (a) diode                      (b) pentode  
(c) triode                      (d) tetrode

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) What is PSPICE?
- Or
- (b) What is the use of probe in PSPICE?
12. (a) Explain BJT differential amplifier.
- Or
- (b) Explain FET multistage amplifier.
13. (a) State the op-amp characteristics.
- Or
- (b) Explain active filters using op-amp.

14. (a) Explain voltage to frequency converter.

Or

(b) Explain current to voltage converter.

15. (a) Explain about finite state machine.

Or

(b) Explain the implementation of stop watch.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Write in detail about circuit design and analysis using PSPICE.

Or

(b) Explain schematic attributes and types of analysis in PSPICE.

17. (a) Design and analyze current sources.

Or

(b) Design and analyze current mirrors in detail.

18. (a) Explain differentiator using Op-Amp.

Or

(b) Explain in detail about non-sinusoidal circuits using op-amp.

19. (a) Explain frequency to voltage converter.

Or

(b) Explain the PLL and its circuit application.

20. (a) Explain sequence detector in detail.

Or

(b) Explain FPGA in detail.

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(6 pages)

Reg. No. : .....

**Code No. : 6518**

**Sub. Code : ZELM 14/  
ZECM 14**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

First Semester

Electronics/Electronics and Communications – Core

**ADVANCED MICROPROCESSOR**

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. A memory connected to a microprocessor has 20 address lines and 16 data lines. What will be the memory capacity?
  - (a) 8 KB
  - (b) 2 MB
  - (c) 16 MB
  - (d) 64 KB



2. What is the word length of the Pentium – II microprocessor?
  - (a) 8 – bit
  - (b) 32 – bit
  - (c) 64 bit
  - (d) 16 bit
  
3. Which of the following is a non-vectored input?
  - (a) TRAP
  - (b) RST-7.5
  - (c) RST-6.5
  - (d) INTR
  
4. Which of the following addressing modes is used by 8085 microprocessor for array and list operation?
  - (a) Base Register
  - (b) Direct
  - (c) Indexed
  - (d) Immediate

5. What is stored in the H and L general purpose register?
- (a) Opcode
  - (b) Address of memory
  - (c) Address of next instruction
  - (d) Temporary data
6. Which of the following is a software interrupt?
- (a) TRAP
  - (b) INTR
  - (c) RST-6.5
  - (d) RST-5
7. What is the vectored address of RST-5?
- (a) 0010H
  - (b) 0032H
  - (c) 0028H
  - (d) 0030H
8. How many address lines are required to connect a 4 KB RAM to a microprocessor?
- (a) 10
  - (b) 16
  - (c) 12
  - (d) 20
9. Conditional instructions are independent of which of the following flag?
- (a) Z
  - (b) AC
  - (c) CY
  - (d) P

10. Which of the following interfacing IC is a DMA controller?
- (a) 8257/37
  - (b) 8155
  - (c) 8253/54
  - (d) 8279

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) What is CISC microprocessor?

Or

- (b) What are the data formats of Intel X86 family processors?

12. (a) Write short notes on special Pentium registers.

Or

- (b) Write the new Pentium instructions.

13. (a) Explain RISC properties and evaluation.

Or

- (b) What is power PC 601? Explain.

14. (a) Draw the architecture of MIPS RX000 family and explain.

Or

- (b) List the special features of MIPS R4000.

15. (a) Write about MC88110 in detail.

Or

- (b) Write about MC88200.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. (a) Draw and explain Intel X86 family architecture.

Or

- (b) Explain the interrupts segmentation in Intel X86 family in detail.

17. (a) Explain about Pentium memory management in detail.

Or

- (b) Explain in detail about Pentium pro and its special features.

18. (a) Compare RISC (Vs) CISC.

Or

(b) Explain in detail about IBM Rs. 6,000.

19. (a) Explain MIPS R400 with necessary diagrams.

Or

(b) Explain the architecture of sun-SPARC family.

20. (a) Explain EPIC architecture.

Or

(b) Explain in detail about network processors.

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(6 pages)

Reg. No. : .....

Code No. : 6519

Sub. Code : ZELM 21/  
ZECM 21

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022

Second Semester

Electronics/Electronics and Communication – Core

ELECTROMAGNETICS, MICROWAVE  
AND ANTENNA

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions

Choose the correct answer :

1. Which of the following effect proves the wave nature of light?  
(a) photoelectric effect    (b) common effect  
(c) pair production        (d) polarization

2. The potential inside a charged hollow sphere is \_\_\_\_\_
- (a) zero
  - (b) same as that on the surface
  - (c) less than that of the surface
  - (d) none of these
3. Waveguides can carry \_\_\_\_\_ modes.
- (a) TE
  - (b) TM
  - (c) mixed
  - (d) all
4. The dominant TE mode in rectangular waveguide is \_\_\_\_\_
- (a)  $TE_{01}$
  - (b)  $TE_{11}$
  - (c)  $TE_{20}$
  - (d)  $TE_{10}$
5. Which of the following devices cannot be used as microwave oscillator \_\_\_\_\_ diode.
- (a) IMPATT
  - (b) PN junction
  - (c) TRAPATT
  - (d) BARRITI
6. Tunnel diode can also be used as \_\_\_\_\_ power microwave oscillator.
- (a) High
  - (b) Low
  - (c) Medium
  - (d) It can be used irrespective of any power

7. What should be the length of transmitting antenna for radiating radio waves of 900 MHz.
- (a) 16.7 cm
  - (b) 1.67 cm
  - (c) 8.3 cm
  - (d) none of the mentioned.
8. What is the length of the antenna needed to a signal of 500 KHz frequency?
- (a) 6 km
  - (b) 150 km
  - (c) 600 m
  - (d) 1 km
9. The steradian is the measuring unit of \_\_\_\_\_.
- (a) Point angle
  - (b) Linear angle
  - (c) Plane angle
  - (d) Solid angle
10. If an antenna draws 12A current and radiates 4K W then what will be its radiation resistance?
- (a) 22.22 ohm
  - (b) 27.77 ohm
  - (c) 33.33 ohm
  - (d) 39.77 ohm



PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b)  
Each answer should not exceed 250 words

11. (a) Write short notes on Maxwell's equation.

Or

- (b) What is meant by skin depth? Explain shortly.

12. (a) Define: E and H plane

Or

- (b) Explain about the Phase shifters.

13. (a) Describe the Microwave switches.

Or

- (b) Write an essay about the Power Thermistor.

14. (a) Write a short note on Yagi-Uda antenna.

Or

- (b) Explain with working of Cognitive Radio.

15. (a) State: VSWR.

Or

- (b) Explain. Polarization.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words

16. (a) Briefly explain about the correspondence of field and circuit equations.

Or

- (b) Explain in detail about single and double stubs use of Smith's chart.

17. (a) With a neat diagram, explain about Magic "T" microwave couplers.

Or

- (b) Explain in detail about circulators and isolators with neat sketch.

18. (a) Explain in detail about the Klystron and Magnetron with necessary diagram.

Or

- (b) Explain the following terms:

- (i) IMPATT
- (ii) TRAPATT

19. (a) Summarize about working principles of broadside and end fire arrays with suitable diagram.

Or

- (b) Give detailed notes on Microstrip antennas with suitable diagram.

20. (a) (i) What do you understand by Radiation pattern?  
(ii) Describe about the Radiation pattern and radiation resistance.

Or

- (b) Briefly explain about the basic principles of Fris transmission equation with suitable diagram.
-

(6 pages)

Reg. No. : .....

**Code No. : 6520**

**Sub. Code : ZELM 22**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Second Semester

Electronics — Core

**SIGNALS AND SYSTEMS**

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

**PART A — (10 × 1 = 10 marks)**

Answer ALL questions.

Choose the correct answer :

1. Which of the following is an example of amplitude scaling?
  - (a) Electronic amplifier
  - (b) Electronic attenuator
  - (c) Both amplifier and attenuator
  - (d) Adder

2. Which of the following is an example of physical device which adds the signals?
- (a) Radio                      (b) Audio mixer  
(c) Frequency divider    (d) Subtractor
3.  $Y(t) = x(2t)$  is \_\_\_\_\_.
- (a) Compressed signal  
(b) Expanded signal  
(c) Shifted signal  
(d) Amplitude scaled signal by a factor of 2
4. In discrete signal, if  $y[n] = [k*n]$  and  $k > 1$  then
- (a) Some samples are lost from  $x[n]$   
(b) Some samples are added to  $x[n]$   
(c) It has no effect on samples  
(d) Samples will be increased with factor  $k$ .
5. For the system,  $y(t) = \{x(t)\}$  which of the following holds true?
- (a) System is linear, time-invariant, causal and stable  
(b) System is time-invariant, causal and stable  
(c) System is causal and stable  
(d) System is stable

6. For the system,  $y(t) = [x(t)]$  which of the following holds true?
- (a) System is linear, time-invariant, casual and stable.
  - (b) System is linear, time-invariant and causal
  - (c) System is linear, time-invariant and stable
  - (d) System is linear, casual and stable
7. The impulse response of a continuous time LTI system is  $H(t) = (2e^{-2t} - e_{t-100100})u(t)$ . The system is \_\_\_\_\_.
- (a) Casual and stable
  - (b) Casual but not stable
  - (c) State but not causal
  - (d) Neither casual or stable
8. The impulse response of a continuous time LTI systems  $H(t) = e^{-t}u(3-t)$  The system is
- (a) Casual and stable
  - (b) Casual but not stable
  - (c) Stable but not casual
  - (d) Neither casual nor stable

9. The impulse response of a continuous time LTI system is  $H(t) = e^{-t}u(t - 2)$  The system is
- (a) Casual and stable
  - (b) Casual but not stable
  - (c) Stable but not casual
  - (d) Neither causal nor stable
10. For the system,  $y(t) = x(t-5) - x(3-t)$  which of the following holds true?
- (a) System is linear, time-invariant, causal and stable
  - (b) System is time-invariant, causal and stable
  - (c) System is Linear, time-invariant and stable
  - (d) System is linear, time-invariant and causal.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write short notes on complex exponentials.

Or

- (b) What is linear time invariant system?

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[P.T.O.]

12. (a) Write short notes on parsevels theorem.

Or

(b) Write short notes on frequency response of LTI systems.

13. (a) Write short notes on discrete time fourier series.

Or

(b) Write short notes on discrete time fourier transforms.

14. (a) What is poles and zeros? Explain.

Or

(b) What is Z transform?

15. (a) Explain the independence of a random variable.

Or

(b) Explain auto correlation.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain complex exponentials in detail.

Or

(b) Explain convolution integral.



17. (a) Explain sampling theorem in detail.

Or

(b) Write in detail about frequency response of LTI systems.

18. (a) Explain DFT properties in detail.

Or

(b) Explain in detail about frequency response of discrete time LTI systems.

19. (a) Explain z transform and its inverse.

Or

(b) Explain application of z transform for the analysis of discrete time LTI systems.

20. (a) Explain white noise.

Or

(b) Explain power spectral density.

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(6 pages)

Reg. No. : .....

**Code No. : 6521**

**Sub. Code : ZELM 23**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Second Semester

Electronics — Core

**ADVANCED POWER ELECTRONICS**

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

**PART A — (10 × 1 = 10 marks)**

Answer ALL questions.

Choose the correct answer :

1. Buck-Boost acts as Buck converter for duty cycle is equal to
  - (a) 9
  - (b) 7
  - (c) 6
  - (d) 4

2. Inductor and capacitor in Buck converter are used to
  - (a) increase the cost
  - (b) decrease the cost
  - (c) filter out the harmonics
  - (d) increase the harmonics
  
3. SMPS stands for
  - (a) Switched Mode Power Supply
  - (b) Start Mode Power Supply
  - (c) Store Mode Power Supply
  - (d) Single Mode Power Supply
  
4. SMPS is used for
  - (a) obtaining Controlled ac Power Supply
  - (b) obtaining Controlled dc Power Supply
  - (c) storage of dc power
  - (d) switch from one source to another
  
5. Solid State Relays (SSRs) have a
  - (a) coil and contact arrangement
  - (b) optocoupler
  - (c) scr
  - (d) none of the mentioned

6. A single-phase full bridge diode rectifier delivers power to a constant load current of 10 A. The average and rms values of the source currents will be respectively.
- (a) 5A, 10A
  - (b) 10A, 10A
  - (c) 5A, 5A
  - (d) 10A, 5A
7. In pulse width modulated inverters, the output voltage is controlled by controlling the
- (a) input frequency
  - (b) modulating index
  - (c) amplification factor
  - (d) none of the mentioned
8. Increasing the number of pulses (N) \_\_\_\_\_.
- (a) reduces the output voltage amplitude
  - (b) reduces the inverter efficiency
  - (c) improves the inverter efficiency
  - (d) none of the mentioned

9. Usually \_\_\_\_\_ batteries are used in the UPS systems
- (a) NC (b) Li-On  
(c) Lead acid (d) All of the mentioned
10. The negative polarity is used in the monopolar link because it
- (a) uses less conductor size  
(b) is safer  
(c) produces less radio interference  
(d) has less resistance

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write short notes on BOOST converters.
- Or
- (b) Explain continuous and discontinuous current mode.
12. (a) Write short notes on SMPS.
- Or
- (b) Write short notes on voltage mode control SMPS.

13. (a) Write short notes on advantages of resonant converter over PWM converters.

Or

- (b) Write short notes switching locus diagram.

14. (a) What are the applications of single phase bridges?

Or

- (b) What are the disadvantages of SPWM?

15. (a) Explain the power factor correction.

Or

- (b) Explain actual power factor.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the cuk converters in detail

Or

- (b) Explain full bridge with bipolar and unipolar switching.

17. (a) Explain the basic block schematics of SMPS in detail.

Or

(b) Write in detail about half bridge basics of SMPS control.

18. (a) Explain series and parallel resonant converters in detail.

Or

(b) Explain in detail about the switching locus diagram.

19. (a) Explain bipolar and unipolar PWM.

Or

(b) Explain current mode control schemes in detail.

20. (a) Explain in detail about high frequency inductor and transformers.

Or

(b) Explain electronic ballast.

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(6 pages)

Reg. No. : .....

**Code No. : 6522**

**Sub. Code : ZELM 24/  
ZECM 24**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Second Semester

Electronics/Electronics and Communication – Core

**MICROCONTROLLERS, EMBEDDED SYSTEM AND  
IOT APPLICATION**

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following file extension that is loaded in a microcontroller for executing any instruction?
  - (a) .c
  - (b) .txt
  - (c) .hex
  - (d) .doc



2. 8051 microcontrollers are manufactured by which of the following companies?
  - (a) Atmel
  - (b) Philips
  - (c) Intel
  - (d) All of the mentioned
  
3. Which bit/s should be necessarily cleared in OPTION (SFR) register in order to turn on the weak internal pull-ups of port B?
  - (a) RPO
  - (b) RPBU
  - (c) RBIF
  - (d) All of the above
  
4. How many clock pulses are confined by each machine cycle of Peripheral-Interface Controllers?
  - (a) 4
  - (b) 8
  - (c) 12
  - (d) 16
  
5. Where do the conversion interrupt flag (ADIF) end after an accomplishment of analog-to-digital (ADC) conversion process?
  - (a) INTCON
  - (b) ADCON0
  - (c) OPTION
  - (d) None of the above

6. Where is the exact specified location of an interrupt flag associated with analog-to-digital converter?
- (a) INTCON                      (b) ADCON0  
(c) ADRES                        (d) PCLATH
7. Each port line of a port can individually source a current of upto
- (a) 0.2 mA                        (b) 0.25 mA  
(c) 0.5 mA                        (d) 0.75 mA
8. Each port line of a port can individually sink a current of upto
- (a) 2 mA                          (b) 8 mA  
(c) 5 mA                          (d) 1 mA
9. What is Arduino?
- (a) Programming language  
(b) Image editing software  
(c) Open-source electronics platform  
(d) Text editor
10. What language is a typical Arduino code based on?
- (a) Assembly Code                (b) Python  
(c) Java                            (d) C/C++

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain different modes of Timer for 8051 microcontroller.

Or

- (b) List main feature of 8051 microcontroller.

12. (a) List out the various programming pins in PIC micro controller.

Or

- (b) Give the role of watch dog timer in PIC micro controller.

13. (a) What are modes of operation of timers in PIC micro controller?

Or

- (b) Explain in detail about the compare mode of the PIC micro controller with a neat diagram.

14. (a) Write short notes on Synchronous Serial Port Module.

Or

- (b) Write a detailed note on the FLASH and EEPROM memories.

15. (a) Write short notes on Arduino IDE.

Or

- (b) List out the different types of variables using in arduino programming.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Draw and explain the Architecture of 8051.

Or

- (b) Define and describe the directives of 8051 Microcontroller.

17. (a) With a neat diagram discuss in detail about the architecture of PIC micro controller.

Or

- (b) Discuss in detail about the function of various port pin of PIC micro controller.

18. (a) What are interrupts available in PIC micro controller explain in detail?

Or

- (b) Write short notes on (i) Code Template  
(ii) Interrupt Constrains.

19. (a) Discuss in detail about UART in PIC micro controller.

Or

- (b) Draw and explain the architecture of on chip DAC of PIC micro controller in detail.

20. (a) Write a simple program to Change the amount of time the LED is off to 1 second. (Leaving the amount of time the LED is on at  $\frac{1}{2}$  second).

Or

- (b) Explain the working of digital versus analog pins in Arduino Platform.
-

(6 pages)

Reg. No. : .....

**Code No. : 6523**

**Sub. Code : ZELM 31**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Third Semester

Electronics — Core

VIRTUAL INSTRUMENTATION

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Virtual instrumentation is the use of customizable  
\_\_\_\_\_ hardware
  - (a) Software and modular measurement
  - (b) Software
  - (c) Application
  - (d) Kernal

2. Virtual Instrumentation in the \_\_\_\_\_
  - (a) Mechanical Process
  - (b) Engineering Process
  - (c) Medical Process
  - (d) All the above
  
3. For implementing state diagrams that allow future application scalability, the best choice for a base structure is?
  - (a) Sequence structure
  - (b) Case structure
  - (c) Formula node
  - (d) Object-Oriented structure
  
4. Clicking on the \_\_\_\_\_ button allows you to bypass a node in the Block Diagram without single-stepping through the node.
  - (a) Step Into                      (b) Step Over
  - (c) Step Out                      (d) Step Through
  
5. If possible, a Sequence structure should be replaced with a(n):
  - (a) Event structure              (b) For loop
  - (c) State machine                (d) While loop

6. The Wait function can be added to While Loops:
  - (a) To free up available memory
  - (b) To allocate memory used by the CPU
  - (c) To allow the processor time to complete other tasks.
  - (d) To reserve which processor the code is running on.
  
7. Which of the following cannot be used to transfer data?
  - (a) Semaphores                      (b) Queues
  - (c) Notifiers                        (d) Local variables
  
8. The Error list shows all of the following EXCEPT:
  - (a) Items with errors
  - (b) Errors and warnings
  - (c) Details about the warnings
  - (d) Error Codes
  
9. Which of the following statements is NOT valid:
  - (a) You can make a Cluster of Clusters.
  - (b) You can make an Array of Arrays.
  - (c) You can make a Cluster of Arrays.
  - (d) You can make an Array of Clusters.



10. Which data type is not accepted by the ease selector terminal on a case structure?
- (a) Arrays
  - (b) Enumerated type values
  - (c) Strings
  - (d) Integers

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) Explain the Evolutions of Virtual Instrumentation.

Or

- (b) Write short notes on Graphical Programming.

12. (a) Write short notes on Graphical user interfaces.

Or

- (b) Write a simple program based on Owned and labels.

13. (a) Explain while loop with suitable example.

Or

- (b) Discuss in detail about Bundle and Unbundle.

14. (a) List out the basic features of multi paradigm programming.

Or

- (b) How to create a sub-matrix explain?

15. (a) Write a simple program to solving linear equations.

Or

- (b) Explain array operations in LabView.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)  
Each answer should not exceed 600 words.

16. (a) Draw and explain the block diagram of VI.

Or

- (b) Discuss in detail about the data flow techniques.

17. (a) Explain G Programming with suitable example.

Or

- (b) Write short notes on Front panel objects.

18. (a) Write a simple program based on Arrays and Clusters.

Or

- (b) What is local variable and global variable in LabView with suitable example?

19. (a) Differentiate chart and graph in LabView.

Or

- (b) Explain How we create transpose a 1D array in Labview.

20. (a) Write a simple program Matrix inverse using LabView.

Or

- (b) Explain matrix arithmetic operations in Lab View.
-

(6 pages)

Reg. No. : .....

Code No. : 6524

Sub. Code : ZELM 32/  
ZECM 32

M.Sc.(CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Third Semester

Electronics/Electronics and Communication

MOBILE, OPTICAL AND DATA COMMUNICATION  
SYSTEMS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following is the world's first cellular system to specify digital modulation and network level architecture?
  - (a) GSM
  - (b) AMPS
  - (c) CDMA
  - (d) IS-54



6. Multimode step index fiber has a large core diameter of range is \_\_\_\_\_
- (a) 100 to 300  $\mu m$       (b) 100 to 300 nm  
(c) 200 to 500  $\mu m$       (d) 200 to 500 nm
7. Which type of Ethernet framing is used for TCP/IP and DEC net?
- (a) Ethernet 802.3      (b) Ethernet 802.2  
(c) Ethernet II      (d) Ethernet SNAP
8. Which NetWare protocol works on layer 3-network layer –of the OSI model?
- (a) IPX      (b) NCP  
(c) SPX      (d) NetBIOS
9. Protocol is a set of
- (a) Formats  
(b) Procedures  
(c) Formats and Procedures  
(d) None of the mentioned

10. The time required to transmit frame depends on
- (a) Frame size
  - (b) Channel capacity
  - (c) Frame size and Channel capacity
  - (d) None of the mentioned

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) Draw and explain the function of Mobile Communication systems?

Or

- (b) What is base station explain its functions?

12. (a) List out the fundamentals of Wireless network?

Or

- (b) Draw and explain the architecture of OSI models?

13. (a) What are the 3 basic components of an optic fiber system?

Or

- (b) What are the advantages of fiber optics?

14. (a) What is IEEE 802.3 and what are the types of Ethernet?

Or

- (b) What is the difference between IEEE 802.3 and IEEE 802.11?

15. (a) Write short notes on Mobile computing?

Or

- (b) Explain which type of network is used in ATM?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)  
Each answer should not exceed 600 words.

16. (a) Draw the explain the architecture of EDGE?

Or

- (b) Discuss in detail about the Hands-Off considerations in mobile communication?

17. (a) Discuss in detail about the overview of Telecommunication network management?

Or

- (b) Write short notes on IP/Mobile TV?



18. (a) Differentiate ray optics and wave optics?

Or

(b) Explain what is mode theory in optical fiber?

19. (a) Discuss in detail about the Different Types of Network Topologies.

Or

(b) Explain what is the purpose of a data link control in networking?

20. (a) Discuss in detail about the working principle of Internet?

Or

(b) What is packet switched network explain with suitable example?

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(7 pages)

**Reg. No. :** .....

**Code No. : 6525**

**Sub. Code : ZELM 33/  
ZECM 33**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Third Semester

Electronics/Electronics and Communication

DIGITAL SIGNAL AND IMAGE PROCESSING

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Filter parameter optimization technique is used for designing of which of the following?
  - (a) FIR in time domain
  - (b) FIR in frequency domain
  - (c) IIR in time domain
  - (d) IIR in frequency domain

2. In this types of designing, the system function of IIR filter is expressed in which form?
- (a) Parallel form
  - (b) Cascade form
  - (c) Mixed form
  - (d) Any of the mentioned
3. Which of the following is the difference equation of the FIR filter of length M, input  $x(n)$  and output  $y(n)$ ?
- (a)  $y(n) = \sum_{k=0}^{M+1} b_k x(n+k)$
  - (b)  $y(n) = \sum_{k=0}^{M+1} b_k x(n-k)$
  - (c)  $y(n) = \sum_{k=0}^{M-1} b_k x(n-k)$
  - (d) None of the mentioned
4. The roots of the equation  $H(z)$  must occur in \_\_\_\_\_
- (a) identical
  - (b) zero
  - (c) reciprocal pairs
  - (d) conjugate pairs

5. The following input-output pairs have been observed during the operation of a time invariant system

(i)  $x_1[n] = \{1, 0, 2\}$  (Laplace transform)  
 $y_1[n] = \{0, 1, 2\}$

(ii)  $x_2[n] = \{0, 0, 3\}$  (Laplace transform)  
 $y_2[n] = \{0, 1, 0, 2\}$

(iii)  $x_3[n] = \{0, 0, 0, 1\}$  (Laplace transform)  
 $y_3[n] = \{1, 2, 1\}$

The conclusion regarding the linearity of the system is \_\_\_\_\_

- (a) Linear
- (b) Non-linear
- (c) One more observation is required
- (d) Conclusion cannot be drawn from observation

6. 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 non-negative

7. If  $(101.01)_2 = (x)_{10}$ , then what is the value of  $x$ ?
- (a) 505.05                      (b) 10.101  
(c) 101.01                      (d) 5.25
8. What is the resolution to cover a range of numbers  $x_{\max} - x_{\min}$  with 'b' number of bits?
- (a)  $(x_{\max} + x_{\min})/(2^b - 1)$   
(b)  $(x_{\max} + x_{\min})/(2^b + 1)$   
(c)  $(x_{\max} - x_{\min})/(2^b - 1)$   
(d)  $(x_{\max} - x_{\min})/(2^b + 1)$
9. Among the following, functions that can be performed by digital image processing is?
- (a) Fast image storage and retrieval  
(b) Controlled viewing  
(c) Image reformatting  
(d) All of the above
10. Which of the following is an example of digital image processing?
- (a) Computer graphics  
(b) Pixels  
(c) Camera mechanism  
(d) All of the mentioned

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) How to design of IIR digital filters from analog filters?

Or

- (b) What is difference between Chebyshev and Butterworth filter?

12. (a) Explain the frequency response of linear phase FIR filters.

Or

- (b) Explain what is cascade in DSP.

13. (a) How many properties are there in DFT? Explain any one.

Or

- (b) What is difference between linear and circular convolution?

14. (a) Write the program addition of two fixed point number.

Or

- (b) Write short notes on quantization.

15. (a) Explain how is DSP used for speech processing.

Or

- (b) What is sampling and quantization in DSP?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. (a) What is the impulse invariant transformation and explain its drawback?

Or

- (b) Draw and explain the basic network structure of IIR filter.

17. (a) Discuss in detail about window in Fourier transform.

Or

- (b) Explain why Kaiser window is most used for designing FIR filter.

18. (a) Explain what is FFT convolution? Why is FFT faster than convolution?

Or

- (b) What is the difference between Z-transform and Fourier transform?

19. (a) Write short notes on quantization errors in FFT algorithm.

Or

- (b) Discuss in detail about floating-point in DSP.

20. (a) Discuss in detail about morphological operation.

Or

(b) Explain what is blob analysis image processing.

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(6 pages)

**Reg. No. :** .....

**Code No. : 6526**

**Sub. Code : ZELM 34/  
ZECM 34**

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Third Semester

Electronics/Electronics and Communication

**RESEARCH METHODOLOGY**

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. What is the main role of research in education?
  - (a) to upsurge one's social status
  - (b) to increase one's job prospects
  - (c) to augment one's personal growth
  - (d) to help an applicant in becoming a renowned educationalist

2. Which of the following features are considered as critical in qualitative research?
  - (a) Collecting data with the help of standardized research tools
  - (b) Design sampling with probability sample techniques
  - (c) Collecting data with bottom-up empirical evidence
  - (d) Gathering data with top-down schematic evidence
  
3. How is random sampling helpful?
  - (a) reasonably accurate
  - (b) an economical method of data collection
  - (c) free from personal biases
  - (d) all of the above
  
4. In order to pursue the research, which of the following is priorly required?
  - (a) Developing a research design
  - (b) Formulating a research question
  - (c) Deciding about the data analysis procedure
  - (d) Formulating a research hypothesis

5. A research intends to explore the result of possible factors for the organization of effective mid-day meal intervention. Which research method will be most appropriate for this study?
- (a) Descriptive survey method
  - (b) Historical method
  - (c) Ex-post facto method
  - (d) Experimental method
6. Tippit table refers to as \_\_\_\_\_
- (a) Table of random digits
  - (b) The table used in sampling methods
  - (c) The table used in statistical investigations
  - (d) All of the above
7. Evaluation research is concerned with \_\_\_\_\_
- (a) How well are we doing?
  - (b) Why are we doing?
  - (c) What are we doing?
  - (d) None of the above
8. Which of the following does not correspond to characteristics of research?
- (a) Research is not passive
  - (b) Research is systematic
  - (c) Research is not a problem-oriented
  - (d) Research is not a process

9. When conducting an ANOVA, FDATA will always fall within what range?
- (a) Between 0 and infinity
  - (b) Between 0 and 1
  - (c) Between 1 and infinity
  - (d) Between negative infinity and infinity
10. Analysis of variance is a statistical method of comparing the several populations?
- (a) Means
  - (b) Variances
  - (c) Standard deviations
  - (d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) Explain the objective of research.
- Or
- (b) Discuss in detail about the types of research.  
Explain any one.
12. (a) What is sampling design in research explain its types?
- Or
- (b) Write short notes on fundamentals of sampling.

13. (a) Describe the methods of data collection in research.

Or

- (b) Explain the elements of analysis.

14. (a) Discuss in detail about the techniques of hypotheses.

Or

- (b) What is chi square test and its types?

15. (a) Explain one way ANOVA.

Or

- (b) Describe ANOCOVA assumption in ANOCOVA.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b)  
Each answer should not exceed 600 words.

16. (a) Describe what are the techniques involved in defining a program.

Or

- (b) Write short notes on features of good design.

17. (a) Explain the measurement and scaling techniques in research.

Or

(b) What is scale in research and its types?

18. (a) Discuss in detail about the regression analysis.

Or

(b) Write short notes on selection of appropriate method of data processing operations.

19. (a) Explain what is variance in research methodology.

Or

(b) Discuss in detail about the conversion of chi to phi.

20. (a) Elaborate the analysis of variance and covariance ANOVA.

Or

(b) What is the difference between Q type factor analysis and cluster analysis?

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