

Hall Ticket Number :

**R-19**

**Code: 19A411T**

I B.Tech. I Semester Supplementary Examinations November 2023

**Essentials of Electrical & Electronics Engineering**

( Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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**UNIT-I**

Marks CO BL

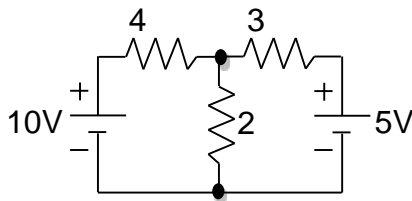
1. What are the types of resistors? Explain any three with neat diagrams. 14M CO1 L2

**OR**

2. Explain the following with neat diagrams  
 a) Fixed value resistors b) Fixed value capacitors 14M CO1 L2

**UNIT-II**

3. a) State and explain super position theorem. 6M CO2 L2  
 b) Find current through 2 resistor using super position theorem for the circuit given below.



8M CO2 L3

**OR**

4. a) State and explain Kirchhoff's laws. 7M CO2 L2  
 b) State and explain maximum power transfer theorem. 7M CO2 L2

**UNIT-III**

5. a) Explain the operation of Zener diode in forward biased mode 8M CO3 L2  
 b) If the forward voltage applied to a silicon diode at 30°C is 0.8V. Find the value of the forward current, if the reverse saturation current is 50nA. take  $\eta = 2$ . 6M CO3 L3

**OR**

6. Explain the Extrinsic Semiconductors and Intrinsic Semiconductors with neat sketch and compare them. 14M CO3 L2

**UNIT-IV**

7. Explain the principle and operation of  $\pi$  section filter with bridge rectifier and also derive an expression for its ripple factor 14M CO4 L2

**OR**

8. With neat waveforms explain the Full wave Rectifier with RC filter and also derive an expression for its ripple factor. 14M CO4 L3

**UNIT-V**

9. a) With neat diagram explain the various current components of NPN transistor. 8M CO5 L2  
 b) Derive the relation between  $\beta$ ,  $\alpha$  and  $\beta$  6M CO5 L3

**OR**

10. With neat sketch explain the construction and operation of PNP and NPN transistors. 14M CO5 L2

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages. 2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

Hall Ticket Number :

**R-19****Code: 19A312T**

I B.Tech. I Semester Supplementary Examinations November 2023

**Engineering Graphics & Design**

(Common to EEE &amp; ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks CO BL

**UNIT-I**

1. The major and minor axes of an ellipse are 120mm and 80mm. Draw an ellipse by Concentric Circles method

14M CO1 L2

**OR**

2. Construct a regular Hexagon by General Method, given the length of its side is 50mm

14M CO1 L2

**UNIT-II**

3. Draw a hypocycloid of a circle of 40mm diameter, which rolls inside another circle of 160mm diameter, for one revolution counter clockwise. Draw a tangent & a normal to it at a point 65mm from the centre of the directing circle

14M CO2 L2

**OR**

4. A circle of diameter 30mm rolls on a flat surface without slipping. Trace the path of a point lying on its circumference for one & a half revolution of the circle.

14M CO2 L2

**UNIT-III**

5. A point is 50mm from both the reference planes. Draw its projections in all possible positions

14M CO3 L3

**OR**

6. A line AB, 50mm long, has its end A 20mm above the H.P and 30mm below the V.P. the line is inclined at  $30^\circ$  to the H.P and at  $45^\circ$  to the V.P. Draw the projections

14M CO3 L3

**UNIT-IV**

7. A square ABCD of 40mm side has a corner on the HP and 20mm in front of the VP. All the sides of the squares are equally inclined to the HP and parallel to the VP. Draw its projections

14M CO4 L3

**OR**

8. A thin rectangular plate of sides of 60mmx30mm has its shortest side in the VP and inclined at  $30^\circ$  to the HP. Project its top view if its front view is a square of 30mm long sides

14M CO4 L3

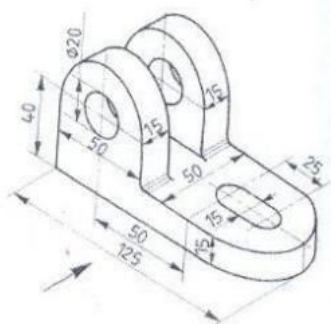
**UNIT-V**

9. Draw the projections of a cone, base 75mm diameter and axis 100mm lying on the HP on one of its generators with the axis parallel to the VP

14M CO5 L3

**OR**

10. Convert the following isometric view to orthographic views



14M CO5 L3

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Hall Ticket Number :

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R-19

Code: 19A511T

I B.Tech. I Semester Supplementary Examinations November 2023

## Problem Solving and C Programming

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

### UNIT-I

1. a) What is a variable? What are the rules for declaring variables? Give examples of valid and invalid variables 8M
- b) What is an algorithm? Describe the characteristics of an Algorithm 6M

OR

2. a) What is data type? Explain basic data types and their sizes used in a C Language 7M
- b) Draw the Flow Chart for finding a number is prime or not. 7M

### UNIT-II

3. a) Write a C program to generate multiplication table 6M
- b) Explain in detail about Control Statements? 8M

OR

4. a) Write a program in C to search for an element using linear search technique 7M
- b) Explain about selection sort with suitable example. 7M

### UNIT-III

5. a) Explain any five string manipulation library functions with examples. 9M
- b) What is mean by recursion? Explain the advantages of recursive function. 5M

OR

6. What is function parameter? Explain different types of parameters in C functions. 14M

### UNIT-IV

7. What is dynamic memory allocation? Write and explain the different dynamic memory allocation functions in C. 14M

OR

8. a) What is a pointer? Explain how the pointer variable declared and initialized. 7M
- b) Write advantages and disadvantages of pointers 7M

### UNIT-V

9. a) Explain how the structure variable passed as a parameter to a function with example. 7M
- b) Write a C program to read and display a text from the file. 7M

OR

10. a) What is a self-referential structure? Give an example. 5M
- b) What is a file? Explain how the file open and file close functions 9M

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**R-19****Code: 19AC11T**

I B.Tech. I Semester Supplementary Examinations November 2023

**Algebra and Calculus**

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

**UNIT-I**

1. a) If  $\lambda$  is an Eigen value of a non-singular matrix  $A$ , then  $\frac{1}{\lambda}$  is an Eigen value

of  $A^{-1}$ 

7M CO1 L2

- b) Find the Eigen values of  $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 2 & 2 \\ 0 & 0 & -2 \end{bmatrix}$

7M CO1 L3

**OR**

2. a) Find the rank of  $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 4 \\ 7 & 10 & 12 \end{bmatrix}$

7M CO1 L3

- b) Solve  $x + y + z = 4, 2x + 5y - 2z = 3, x + 7y - 7z = 5$

7M CO1 L3

**UNIT-II**

3. Reduce the quadratic form  $2x^2 + 2y^2 + 2z^2 - 2xy - 2yz + 2zx$  to canonical form by using orthogonal transformation.

14M CO2 L3

**OR**

4. Diagonalize the matrix  $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$

14M CO2 L2

**UNIT-III**

5. a) If  $z = u^2 + v^2$  and  $u = at^2, v = 2at$ , then find  $\frac{dz}{dt}$

7M CO3 L3

- b) Evaluate  $\frac{\partial z}{\partial x}$  and  $\frac{\partial z}{\partial y}$ , if  $z = \log(x^2 + y^2)$

7M CO3 L3

**OR**

6. Find the maximum and minimum values of  $x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$

14M CO3 L3

**UNIT-IV**

7. Trace the curve  $r = a \cos 2\theta$

14M CO4 L4

**OR**

8. a) Expand  $\sin x$  in powers of  $(x - \frac{f}{2})$ .

7M CO4 L3

- b) Using Maclaurin's series, expand  $\log(1+x)$  in powers of  $x$ .

7M CO4 L3

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## UNIT-V

9. Show that  $\int_0^{\infty} x^4 e^{-x^2} dx = \frac{3\sqrt{f}}{8}$

14M CO5 L3

OR

10. a) Evaluate  $\int_0^2 \int_0^3 xy dx dy$

7M CO5 L3

b) Evaluate  $\int_0^2 \int_0^x y dy dx$

7M CO5 L3

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Hall Ticket Number :

R-19

Code: 19AC12T

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### Applied Physics

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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#### UNIT-I

Marks CO BL

1. Explain the Fraunhofer diffraction due to double slit with necessary theory and draw the intensity distribution curve. 14M CO1 L2

OR

2. a) Describe the construction and theory of quarter and half wave plates. 8M CO1 L2  
b) Calculate the minimum thickness of wave plate for a light beam of wavelength,  $\lambda = 589.3\text{nm}$  if  $\mu_e = 1.48640$  and  $\mu_o = 1.65833$ . 6M CO1 L3

#### UNIT-II

3. a) Explain the hysteresis loop (B-H) of a ferromagnetic materials in detail. 9M CO2 L2  
b) A circular loop of copper having a diameter of 10 cm carries a current of 500 mA. Calculate the magnetic moment associated with the loop. 5M CO2 L3

OR

4. a) Distinguish between soft and hard magnetic materials. 6M CO2 L4  
b) What are the engineering applications of magnetic materials? 4M CO2 L1  
c) Calculate the magnetic moment per unit volume of a magnetic material placed in a magnetic field of intensity 1000 A/m. The magnetic susceptibility is  $-0.42 \times 10^{-3}$ . 4M CO2 L3

#### UNIT-III

5. a) Explain optical fiber communication system with block diagram. 10M CO3 L2  
b) An optical fiber has a core and cladding materials of refractive index 1.55 and 1.50 respectively and light is launched into it in air. Calculate the numerical aperture. 4M CO3 L3

OR

6. State and prove the Stoke's and Gauss theorem 14M CO3 L2

#### UNIT-IV

7. a) Classify the solids into insulators, semiconductors and conductors based on its energy band diagram. 6M CO4 L3  
b) Explain electrical conductivity in semiconductors. 8M CO4 L2

OR

8. a) Deduce expression for drift and diffusion current in semiconductors. 8M CO4 L3  
b) Explain the fermi energy level for p and n-type semiconductors. 6M CO4 L2

#### UNIT-V

9. a) Define superconductor and write the applications of superconductors. 6M CO5 L3  
b) Classify the superconductors. 8M CO5 L2

OR

10. a) Discuss about thermal, mechanical, and optical properties of nanomaterials. 6M CO5 L3  
b) Analyze the characterization of nanomaterials by scanning electron microscope. 8M CO5 L4

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