

Hall Ticket Number :

R-19

Code: 19AC12T

I B.Tech. I Semester Supplementary Examinations November 2023

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)

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 -0.42×10^{-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

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: 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)

UNIT-I

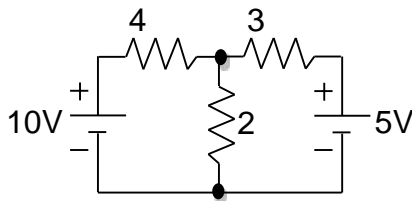
1. What are the types of resistors? Explain any three with neat diagrams. 14M CO1 L2

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 π 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 β , α and β 6M CO5 L3

OR

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

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)

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)

Marks CO BL

UNIT-I

1. a) If λ 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
