Hall Ticket Number :										

R-15

Code: 5GC23

I B.Tech. II Semester Supplementary Examinations November 2023

Engineering Physics

(Common to CE, ME & CSE)

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) Analyze Einstein's co-efficient for spontaneous and Stimulated emission of radiation 8M
   b) Summarize Ruby, He-Ne and Semiconductor Lasers 6M

OR

2. a) Recite the ruby laser for production of laser 8M
   b) Describe construction of optical fiber 6M

UNIT–II

3. a) Write steps to find Miller indices 6M
   b) Define ultrasonics and write its properties 8M

OR

4. a) Illustrate the powder method to describe the structure of crystal 6M
   b) Explain production and detection of ultrasonics in detail 8M

UNIT–III

5. Analyze motion of electron in periodic potential of metal 14M

OR

6. a) Brief the physical importance of Schrodinger's equation 7M
   b) Explain postulates of free electron model 7M

UNIT–IV

7. a) What is photo diode explain it 6M
   b) Explain direct and indirect band gap semiconductors 8M

OR

8. a) Derive Hall voltage and justify its importance 6M
   b) Define and explain drift and diffusion currents in semiconductors 8M

UNIT–V

9. a) Classify the ferromagnetics by hysteresis property 6M
   b) What is CNT and explain it 8M

OR

10. a) Define magnetic materials write any two examples 5M
    b) Brief the basic principles of nano materials 9M

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Hall Ticket Number :										

R-15

Code: 5G121

I B.Tech. II Semester Supplementary Examinations November 2023

C Programming and Data Structures

(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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UNIT–I

1. a) Write a program to read and display array elements using pointers 7M

   b) What is a pointer? What are the features of pointers? Write a C program to print address of a variable 7M

OR

2. a) Write a C program to swap two numbers using pointers. 6M

   b) Write a program to perform addition of array elements using pointer to array. 8M

UNIT–II

3. a) Explain different modes to open a file 7M

   b) How to copy and compare structure variables? Illustrate with example. 7M

OR

4. a) Define union. List out the differences between unions and structures 7M

   b) Write a C program to copy the contents from one file to another file. 7M

UNIT–III

5. Write a C Program to perform the following operations on a queue
   a) Insert b) Delete c) Display 14M

OR

6. Show the stack after each operation of the following sequence that starts with the empty stack: push(a), push(b), pop, push(c), push(d), pop. 14M

UNIT–IV

7. What is a Doubly Linked List.? Explain different operations of a Doubly linked list with suitable examples. 14M

OR

8. Write a C program to implement the following operations on a singly Linked List
   a) Insert at beginning b) deletion at end c)Traversing a List 14M

UNIT–V

9. a) Define and describe the terms:
   Tree, Binary Tree, Complete Binary Tree and Degree of a tree. 9M

   b) Draw a complete undirected graph having five nodes. 5M

OR

10. Define Graph and describe various representations of a graph with suitable examples. 14M

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Hall Ticket Number :										

R-15

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations November 2023

Engineering Mathematics – II

(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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UNIT–I

1. a) Show that the area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is $\frac{16}{3}a^2$ 7M

   b) Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz\,dx\,dy\,dz$ 7M

OR

2. a) Change of order of integration and evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y}\,dx\,dy$ 7M

   b) Evaluate $\int_0^1 \int_0^{1-z} \int_0^{1-x-y} (x+y+z)\,dx\,dy\,dz$ 7M

UNIT–II

3. a) Write the Laplace Transforms of some standard functions 6M

   b) Find the Laplace Transform of i) $\cos 2t$ ii) $\sin 2t \sin 3t$ 8M

OR

4. a) Using Convolution Theorem, Evaluate $L^{-1}\left\{\frac{s+2}{s^2-4s+13}\right\}$ 7M

   b) Find the Laplace Transform of $t\sin 3t$ 7M

UNIT–III

5. Solve the differential equation $\frac{d^2x}{dt^2} + 9x = \sin t$ given that $x(0) = 1, x\left(\frac{®}{2}\right) = 1$ using Laplace Transform 14M

OR

6. Solve $y'' + 2y' - 3y = \sin t,\ y(0) = 0,\ y'(0) = 0$ Using Laplace Transform 14M

UNIT–IV

7. a) Show that $\nabla^2\left(\frac{1}{r}\right) = 0$ 7M

   b) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$ 7M

OR

8. a) Evaluate the line integral of $\int_c (xy + y^2)\,dx + x^2\,dy$ where 'c' is the square formed by the lines $y = \pm 1$ and $x = \pm 1$ 7M

   b) Using the line integral, calculate the work done by the force, $\bar{F} = (3x^2 - 6yz)\bar{i} + (2y + 3xz)\bar{j} + (1 - 4xyz^2)\bar{k}$ in moving a particle from the point $(0,0,0)$ to the point $(1,1,1)$ along the curve $C: x = t,\ y = t^2,\ z = t^3$. 7M

UNIT–V

9. Verify by Green's Theorem for $\int_c \left[(xy + y^2)\,dx + x^2\,dy\right]$ where 'c' is bounded by $y = x$ and $y = x^2$ 14M

OR

10. Verify divergence theorem for $\bar{F} = 4xz\bar{i} - y^2\bar{j} + yz\bar{k}$ taken over the cube bounded by $x = 0, x = 1; y = 0,\ y = 1; z = 0, z = 1$ 14M

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