Hall Ticket Number :

I B.Tech. II Semester Supplementary Examinations December 2022

Engineering Physics

(Common to CE, ME, CSE & IT)

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)   Derive the expression for Diameter of Newton's Ring   8M
   b)   Explain the Diffraction greeting spectrum.   6M

OR

2. a)   Explain the production of Laser rays by ruby laser method   7M
   b)   Explain optical communication system.   7M

UNIT–II

3.   Define miller indices and write conditions for finding miller indices 6M
         Derive packing fraction of S.C and B.C.C   8M

OR

4. a)   Deduce Bragg's law equation   9M
   b)   What is ultrasonic and write properties   5M

UNIT–III

5. a)   State de-Broglie hypothesis of dual nature and derive its wavelength   10M
   b)   Write the sources of electrical resistance   4M

OR

6.   Analyze the particle in one dimensional box   14M

UNIT–IV

7. a)   Define and explain drift and diffusion currents in semiconductors   8M
   b)   what is LED brief it   6M

OR

8. a)   Differentiate any three of dia , para , ferro, antiferro and ferrite 10M
   b)   classify soft and hard magnetic materials   4M

UNIT–V

9. a)   Explain the production of nano materials by ball milling method   10M
   b)   What is CNT and explain it   4M

OR

10. a) Brief BCS theory and Flux quantization   8M
    b) Justify the diamagnetic nature of superconductors   6M

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R-15

Code: 5GC25

I B.Tech. II Semester Supplementary Examinations December 2022

Mathematical Methods-II

(Common to CSE & IT)

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. Find the parabola of the form $a + bx + cx^2$ which fits most closely with the observations

x	-3	-2	-1	0	1	2	3
y	4.63	2.11	0.67	0.09	0.63	2.15	4.58

14M

OR

2. Fit a parabola to the following data points in the table:

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

14M

UNIT–II

3. Using Taylor series method, find an approximate value of y at $x=0.2$ for the differential equation $y' - 2y = 3e^x$, $y(0) = 0$.   14M

OR

4. Use Runge-Kutta method to evaluate $y(0.1)$ and $y(0.2)$ given that $y' = x + y$, $y(0) = 1$.   14M

UNIT–III

5. Define periodic function and find the Fourier expansion of
$f(x) = x - x^2$, $-1 < x < 1$.   14M

OR

6. Expand $f(x) = \cos x$, $0 < x < \pi$ in half range sine series.   14M

UNIT–IV

7. Find the Fourier transform of $e^{-\frac{x^2}{2}}$ by finding the Fourier transform of
$e^{-a^2 x^2}$ ($a > 0$).   14M

OR

8. Find the Fourier sine and cosine transform of e^{-ax} ($a > 0$) and deduce the inverse formula.   14M

UNIT–V

9. Form the partial differential equation for $f(xy + z^2, x + y + z) = 0$ 14M

OR

10. Solve by the method of separation of variables $2xz_x - 3yz_y = 0$.   14M

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Code: 5G121

I B.Tech. II Semester Supplementary Examinations December 2022

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 perform addition of array elements using pointer to array.	7M
	b)	Explain the declaration of pointers and pointer to pointer with examples.	7M

OR

2.	a)	Explain dynamic memory allocation functions in C in detail.	7M
	b)	What is the use of command line arguments	7M

UNIT–II

3.	a)	Write a program for sorting given numbers using selection sort technique	7M
	b)	Write an algorithm for Binary search? Validate it with suitable data set?	7M

OR

4.   Write a C program that defines a structure **employee** containing the details such as **empno, empname, department name and salary**. The structure has to store 20 employees in an organization. Use the appropriate method to define the above details and define a function that will display the contents?   **14M**

UNIT–III

5.   Write an algorithm to convert a given infix expression into prefix expression.   **14M**

OR

6.   Write a C Program to perform the following operations on a queue
    a) Insert   b) Delete   **14M**

UNIT–IV

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

OR

8.   What are different types of linked list? Write a C function to count number of elements present in single linked list.   **14M**

UNIT–V

9.   State binary search tree property. And construct the binary search tree for the following keys: G , K, L ,R, A, C, T, F, J, T, Y, E.   **14M**

OR

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

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I B.Tech. II Semester Supplementary Examinations December 2022
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. Evaluate $\int\limits_0^\infty \int\limits_0^\infty e^{-\left(x^2+y^2\right)} dx\, dy$ by changing to polar coordinates. And

   hence show that $\int\limits_0^\infty e^{-x^2} dx = \dfrac{\sqrt{f}}{2}$ 14M

OR

2. a) Evaluate $\int\limits_0^{\frac{f}{2}} \int\limits_0^{a\sin_{"}} \int\limits_0^{\frac{\left(a^2-r^2\right)}{a}} r\, dz\, dr\, d_{"}$ 7M

   b) Evaluate $\int\limits_0^5 \int\limits_0^{x^2} x\left(x^2+y^2\right) dy\, dx$ 7M

UNIT–II

3. a) Find the Laplace Transform of $t\, e^{-t} \operatorname{Sin} t$ 7M

   b) Find $L^{-1}\left\{\dfrac{s}{\left(s^2+1\right)\left(s^2+9\right)\left(s^2+25\right)}\right\}$ 7M

OR

4. a) Find the Laplace Transform of $\int\limits_0^t \dfrac{e^{-t}\operatorname{Sin} t}{t}\, dt$ 7M

   b) Write the Laplace Transforms of some standard functions   7M

UNIT–III

5. Solve the differential equation by Laplace Transform
   $\left(D^2+2D+5\right)y = e^{-t}\sin t,\ y(0)=0;\ y'(0)=-1$ 14M

OR

6. Solve the differential equation $y''+y=t,\ y(0)=1,\ y'(0)=2$ Using
   Laplace Transform   14M

UNIT–IV

7. Using the line integral, calculate the work done by the force,
   $\bar{F} = \left(3x^2-6yz\right)\bar{i} + \left(2y+3xz\right)\bar{j} + \left(1-4xyz^2\right)\bar{k}$ in moving a particle from
   the point $(0,0,0)$ to the point $(1,1,1)$ along the curve $C: x=t,\ y=t^2,\ z=t^3$.   14M

OR

8. a) Show the vector $(x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$ is irrotational and find its scalar potential.   **7M**

    b) Find the directional derivative of $2xy + z^2$ at the point $(1, -1, 3)$ in the direction of $\bar{i} + 2\bar{j} + 3\bar{k}$ **7M**

UNIT–V

9. Verify the Stoke's theorem for a vector field $\bar{F} = (2x - y)\bar{i} - yz^2\bar{j} - y^2z\bar{k}$ over the upper half surface of $x^2 + y^2 + z^2 = 1$ bounded by projection on xy-plane   **14M**

OR

10. 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**

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