Hall Ticket Number :

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations June 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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Marks

UNIT–I

1. Evaluate $\int\limits_{0}^{5}\int\limits_{0}^{x^2} x\left(x^2 + y^2\right)dy\,dx$

OR

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

UNIT–II

3. a) Write the Laplace Transforms of some standard functions
   b) Find the Laplace Transform of i) $\cos 2t$ ii) $\sin 2t \sin 3t$

OR

4. Evaluate $\int\limits_{0}^{\infty} t\,e^{-2t} \cos t\,dt$

UNIT–III

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

OR

6. Solve the differential equation $\dfrac{d^2x}{dt^2} - 4\dfrac{dx}{dt} - 12x = e^{3t}$ given that $x(0)=1, x'(0)=-2$ using Laplace Transform

UNIT–IV

7. Find $div\,\bar{F}$ and $curl\,\bar{F}$ where $\bar{F} = grad\left(x^3 + y^3 + z^3 - 3xyz\right)$

OR

8. Evaluate $divergence\,of\left(2x^2z\,\bar{i} - xy^2z\,\bar{j} + 3yz^2\,\bar{k}\right)$ at the point $(1,1,1)$.

UNIT–V

9. Evaluate by 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.

OR

10. Verify by Gauss Divergence theorem for $\bar{F} = x^3\bar{i} + y^3\,\bar{j} + z^3\,\bar{k}$ taken over the cube bounded by $x=0, x=a; y=0,\ y=a; z=0, z=a$

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Code: 5GC23

I B.Tech. II Semester Supplementary Examinations June 2022

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) Explain the process of induced absorption, spontaneous emission and stimulated emission. Obtain an expression for energy density of radiation under equilibrium conditions in terms of Einstein A & B Coefficients.

OR

2. Explain the construction and working of semiconductor laser

UNIT–II

3. a) What is space lattice? Describe briefly the seven systems of crystals

   b) Explain the various detection methods for ultrasonics.

OR

4. Derive Bragg's law for X-ray diffracton

UNIT–III

5. Mention the assumptions of classical free electron theory. Based on classical free electron theory derive the expression for electrical conductivity of a metal.

OR

6. Explain the salient features of quantum free electron theory.

UNIT–IV

7. Describe with suitable diagrams the construction and action of a P-N junction diode

OR

8. a) Discuss Maglev vehicles and SQUIDS.

   b) What is Meissner effect? Discuss type I and type II superconductor with examples.

UNIT–V

9. a) Explain in detail any two applications of nanotechnology

   b) Discuss the applications of hard and soft magnets

OR

10. a) What are ferromagnetic materials? Discuss the hysteresis of a ferromagnetic material

    b) Explain the synthesis of nanomaterials using chemical vapour deposition.

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R-17

Code: 5GC25

I B.Tech. II Semester Supplementary Examinations June 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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Marks

UNIT–I

1. a) Fit a parabola of the form $y=a+bx+cx^2$ for the following data.

X	10	15	20	25	30	35
Y	35.3	32.4	29.2	26.1	23.2	20.5

   b) Derive the normal equations of the straight-line equation y = a+bx.

OR

2. Fit a straight line y = ax + b for following data

X	1	2	3	4	5
Y	14	27	40	55	68

UNIT–II

3. Apply Runge-Kutta method to find an appropriate value of y for x = 1.2 in steps of 0.1 if $\frac{dy}{dx} = x + y^2$, given that y =1.5 where x = 1.

OR

4. Apply Milne's method to find the solution of the differential equation $y' = x^2 + y^2$, y(0) = 0.at x = 0.4 by taking h = 0.1.

UNIT–III

5. Express $f(x) = ax + b$ as half range sine series in $0 < x < 1$

OR

6. Determine the Fourier series for $f(x) = x\cos x$ in the interval $0 < x < 2f$

UNIT–IV

7. Derive the Fourier transform of $f(x) = \begin{cases} x, & |x| \le a \\ 0, & |x| > a \end{cases}$

OR

8. Evaluate the Integrals $i)\int_0^a \frac{\cos px}{a^2 + p^2} dp \ ii)\int_0^a \frac{p\sin px}{a^2 + p^2} dp$ by using Fourier Transform Technique.

UNIT–V

9. Solve $x(y - z)p + y(z - x)q = z(x - y)$

OR

10. Find the partial differential equation arising from $w(x + y + z, x^2 + y^2 + z^2) = 0$

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I B.Tech. II Semester Supplementary Examinations June 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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Marks

UNIT–I

1. a) Define pointer? How pointer variables are initialized.
   b) Write a c program to access elements of an array using pointers.

OR

2. a) Write a short note on void pointer.
   b) Discuss about any two dynamic memory allocation functions.

UNIT–II

3. a) Differentiate structures and unions.
   b) Explain any one sorting technique with example program.

OR

4. a) List and explain any four functions related to file handling in c.
   b) Differentiate linear search and binary search.

UNIT–III

5. What is Queue? Explain the operations of a Queue with an example program.

OR

6. a) Convert the following infix expression to post fix expressions
        i)   A + B * C +D   ii) (A + B) * (C+D)
   b) What is stack? Write the applications of stack.

UNIT–IV

7. Discuss the operations of a single linked list with proper diagrams.

OR

8. How to represent doubly linked list? Write the algorithm to insert and delete operations in double linked list.

UNIT–V

9. What is Binary Search Tree? Construct the BST for the nodes 15, 6, 3, 7, 45, 50

OR

10. What is Di-graph? Explain different representation of graphs.

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