Seat No.

Total No. of Pages : 3

MAR_APR 2026 SUMMER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Engineering Maths - III

Sub. Code: 63338/73197/77769

Day and Date: Thursday ,14-05-2026 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions:

Special Inst.:
1. Attempt any three full questions from each section.
2. Figures to the right indicate full marks.
3. Use of non- programmable scientific calculator is allowed.

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Q1) **Solve the following.** **[12]**

a) Solve $(D^2+4D)\ y=\sin(5x).\cos(3x)$ **[6]**

b) Solve $(D^2 - D + 1)y = x^3 - 3x^2 + 1$ **[6]**

Q2) **Solve the following.** **[11]**

a) Find the directional derivative of $\emptyset = x^2 - y^2 - 2z^2$ at the point P(2, −1, 3) in the direction $\overline{PQ}$ where Q(5, 6, 4) **[5]**

b) Find the angle between the normals to the surface $xy = z^2$ at the points (1, 4, 2) and (−3, −3, 3). **[6]**

Q3) **Solve the following.** **[11]**

a) Find the coefficient of correlation for the following data. **[5]**

x	1	3	4	5	7	8	10
y	2	6	8	10	14	16	20

b) Fit a straight line to the following data & estimate the value of y corresponding to x = 6. **[6]**

x	1	2	3	4	5
y	14	27	40	55	68

Q4)

Attempt any two from the following. **[12]**

a) Solve $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos(logx) + x.\sin(logx)$ **[6]**

b) Show that the vector field given by $\bar{F}=(6xy+z^3)i+(3x^2-z)j+(3xz^2-y)$ k is irrotational. Also find the scalar potential $\emptyset$ such that $\nabla\emptyset=\bar{F}$. **[6]**

c) Fit a least square geometric curve $y = ax^b$ to the following data. **[6]**

x	1	2	3	4	5
y	0.5	2	4.5	8	12.5

Q5) **SECTION-II** **[12]**

Solve the following.

a) A discrete random variable has the probability density function given below. **[6]**

X	−2	−1	0	1	2	3
P(X = x)	0.2	k	0.1	2k	0.1	2k

Find i) k ii) P(X< 1) iii) P(−2< X< 2)

b) A firm produces articles of which 0.1% are defective. It packs them in cases each contains 500 articles. If wholesaler purchases 100 such articles, how many can be expected to be free from defective and how many can be expected to have one defective? **[6]**

Q6) **Solve the following.** **[11]**

a) Find the laplace transform of $e^t tsin4t$. **[5]**

b) Find inverse laplace transform of $\frac{1}{(s^2+9)(s^2+4)}$ using Convolution theorem. **[6]**

Q7) **Solve the following.** **[11]**

a) Evaluate $\int_0^{\pi/2} sinx\,dx$ by using Trapezoidal rule by dividing the interval into 4 equal sub intervals. **[5]**

b) Evaluate using Simpson's $(\frac{1}{3})^{rd}$ rule to obtain value of $\int_1^2 \frac{dx}{x}$ taking 10 equal sub intervals. **[6]**

Q8)

76925

Attempt any two of the following. **[12]**

a) Fit a Poisson distribution to the following data to find the theoretical frequencies. **[6]**

No. of defects in garments	0	1	2	3	4	5	6
No. of Samples	35	52	48	25	13	5	2

b) Use laplace transform method to solve $\frac{d^2y}{dt^2} - \frac{dy}{dt} - 6y = 2$, when $y(0) = 1$ and $y'(0) = 0$ at $t = 0$. **[6]**

c) Find the approximate value of $\int_0^6 e^x \, dx$ by using Simpson's $(\frac{3}{8})^{th}$ rule by dividing the interval into 6 sub intervals. **[6]**

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (101) Bachelor of Engineering (77769) Engineering Maths - III Part 2 SEM 3
2] (1154) B.Tech. CBCS (73197) Engineering Maths - III Part 2 SEM 3
3] (101) Bachelor of Engineering (63338) Engineering Maths-III Part 2 SEM 3

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