Seat No.

Total No. of Pages : 3

OCT-NOV 2025 WINTER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Engineering Mathematics III

Sub. Code: 114403/112330

Day and Date: Tuesday ,16-12-2025 **Total Marks: 60**

Time: 02:30 PM To 05:00 PM

Instructions: **1. Assume suitable data wherever necessary and mention it boldly**
2. Figures to the right indicate full marks

Special Inst.: **1) Question No.1 is Compulsory.**
2) Attempt any Three Questions from Question No. 2 to Question No.5.
3) Use of non-programmable scientific calculator is allowed.

Q1) Attempt any **Three** of the following. **[15]**

a. Solve $(D^2 + 2D + 2)y = 1 + x^2$ **[5]**

b. Show that $\bar{F} = (z^2 + 2x + 3y)i + (3x + 2y + z)j + (y + 2xz)k$ is irrotational but not solenoidal. **[5]**

c. Fit a straight line $y = a + bx$ to the following data. **[5]**

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

d. Solve $(D^4 + 10D^2 + 9)y = sin2x \cos x$ **[5]**

Q2) Solve the following. **[15]**

a. If the probability that an individual suffers a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals (i) exactly 3, (ii) more than 2 (iii) more than 1 individual will suffer a bad reaction. **[8]**

b. The life-time of certain type of battery has mean life of 400 hours and a standard deviation of 50 hours. Assuming the distribution of life-time to be normal find
(i)The percentage of batteries which have life-time of more than 350 hours.
(ii)The percentage of batteries which have life-time between 300 and 500 hours.
[Given: For S.N.V.Z the area under the curve from z=0 to z=1 is 0.3413, and from z=0 to z=2 is 0.4772] **[7]**

Q3) Solve the following. **[15]**

a. **[5]**

Find the Laplace transform of $\frac{e^{-4t}\,sin3t}{t}$.

b. Find the Inverse Laplace transform of the following by Convolution Theorem. **[5]**

$$\frac{1}{(s^2+4)\,(s^2+9)}$$

c. **[5]**

Evaluate using Laplace transform $\int_0^{\infty} e^{-2t}\ tcost\ dt.$

Q4) Solve the following. **[15]**

a. **[8]**

Evaluate $\int_0^{\pi}\ (x - cosx)\ dx$ by using Simpson's $\frac{3}{8}^{th}$ rule and Weddle's rule by dividing $[0, \pi]$ into 6 equal sub intervals.

b. **[7]**

Evaluate $\int_0^1\ \frac{x^2}{1+x^3}\ dx$ by using (i) Trapezoidal rule and (ii) Simpson's $\frac{1}{3}^{rd}$ rule by dividing the interval into 4 equal sub intervals.

Q5) Solve the following. **[15]**

a. **[5]**

Solve using Laplace transform

$$\frac{d^2y}{dt^2} - 3\frac{dy}{dt} + 2y = 4e^{2t} \text{ with } y(0) = -3 \text{ and } y'(0) = 5.$$

b. Six fair coins are tossed simultaneously. If 192 such tosses are made, find the expected number of tosses showing (i) one and only one head (ii) all heads. **[5]**

c. Evaluate $\int_{0.2}^{1.4}\ (sinx - logx + e^x)dx$ by using Weddle's rule by dividing [0.2,1.4] into 6 equal sub intervals. **[5]**

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] (1154) B.Tech. CBCS (114403) Engineering Mathematics III Part 2 SEM 3

2] (11731) Bachelor of Technology (NEP-2.0) (112330) Engineering Mathematics III Part 2 SEM 3