

Total No. of Question : [4]

Registration No. :

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Programme Name : Bachelor of Electronics and Telecommunication Engineering

Regular S.Y.B.Tech. ESE (A.Y. 2023-24) Sem. III Nov.2023

III SEMESTER (2022 BATCH)

201ETL201-Applied Mathematics (TH)

Duration : [11:00 AM - 01:00 PM]

Date : 21 Nov, 2023

Day : Tuesday

Marks : 50

Instructions :

(Q1) Attempt the following. [20.0]

(1.1) Solve $(D^3 + 8)y = x^4 + 2x^2$ [6.0]

CO :- C201.1

Blooms Taxonomy :- Apply

(1.2) Show that $\vec{f} = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational and hence find scalar potential ϕ such that $\vec{f} = \nabla\phi$ [7.0]

CO :- C201.2

Blooms Taxonomy :- Apply

(1.3) [7.0]

Find both equations of line of regression of x on y and y on x from the following data

x	10	14	18	22	26	30
y	18	12	24	6	30	36

CO :- C201.3

Blooms Taxonomy :- Understand, Apply

(Q2) Attempt the following. [10.0]

(2.1) In a large consignment of electric bulbs, 10 % are defective. A random sample of 20 is taken for inspection. Using Binomial distribution find the probability that i) all are good bulbs ii) exactly 3 are defective bulb. [4.0]

CO :- C201.4

Blooms Taxonomy :- Apply

(2.2) [6.0]

There are 500 boxes each containing 1000 ballet papers. The chance of defective paper is 0.002. Find the number of boxes containing (i) Atleast one defective (ii) Exactly two defective paper.

OR

The income distribution of a group of 10000 persons was found to be normal with mean Rs.7500 & Standard deviation Rs.500. What is the number of persons of this group who have income (i) Exceeding Rs.6680 (ii) Exceeding Rs.8320
(Given for S.N.V. z area between $z = -1.64$ to $z = 1.64$ is 0.8990)

CO :- C201.4

Blooms Taxonomy :- Apply

(Q3) Attempt the following.

[10.0]

(3.1)

[4.0]

$$\text{Find } L\left\{\frac{e^{-t} \sin t}{t}\right\}$$

CO :- C201.5

Blooms Taxonomy :- Understand, Apply

(3.2)

[6.0]

$$\text{Find } L^{-1}\left\{\frac{s^2+1}{s^3+3s^2+2s}\right\} \text{ by partial fraction.}$$

OR

$$\text{Solve by Laplace transform } \frac{dy}{dx} + 3y = e^{-t}, y=1 \text{ at } t=0$$

CO :- C201.5

Blooms Taxonomy :- Understand, Apply

(Q4) Attempt the following.

[10.0]

(4.1)

[6.0]

Obtain the Fourier series expansion of e^x in $-\pi < x < \pi$

OR

Obtain the Fourier series expansion of the function $f(x) = x^2$ $-l \leq x \leq l$

CO :- C201.6

Blooms Taxonomy :- Understand, Apply

(4.2)

[4.0]

$$\text{Find half range sine series of the function } f(x) = \begin{cases} x, & 0 < x < \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} < x < \pi \end{cases}$$

CO :- C201.6

Blooms Taxonomy :- Understand, Apply
