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BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - II Robotics & Automation Engineering : WINTER- 2022
SUBJECT : DIFFERENTIAL EQUATIONS, PROBABILITY & STATISTICS

Day : Thursday

Time : 10:00 AM-01:00 PM

Date : 24-11-2022

W-24123-2022

Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non – programmable **CALCULATOR** is allowed.
- 4) Assume suitable data, if necessary.

Q.1 Solve $\frac{dy}{dx} = \cos x \cos y + \sin x \sin y$ (10)

OR

Q.1 Solve $(2x + y - 3) dy - (x + 2y - 3) dx = 0$ (10)

Q.2 Solve by method of variation of parameter (10)
 $D^2 + 1 = \cot x$

OR

Q.2 Solve $\frac{d^2y}{dx^2} + \frac{dy}{dx} = \frac{1}{1+e^x}$ (10)

Q.3 Obtain Laplace transform of (10)

a) $e^{-4t} \sin 3t$ b) $\int_0^{\infty} t e^{-3t} \sin t dt$

OR

Q.3 Find inverse Laplace transform

a) $\frac{t^{n-1}}{1-e^{-t}}$ b) $e^{at} (2 \cos bt - 3 \sin bt)$

Q.4 Find the area bounded by the parabola $y = x^2$ & line $y = 2x + 3$ (10)

P.T.O.

OR

Q.4 The rod of length "a" is divided into three parts. Find M.V. of the product of (10) these parts.

Q.5 The followings table gives the marks obtained in a paper of statistics out of 50, (10) by the students of two divisions A & B. Find which of them shows greater variability.

Class	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Division A	2	6	8	8	15	18	12	11	9	4
Division B	3	5	7	9	12	16	11	5	6	2

OR

Q.5 The equation of two lines are $2x = 8 - 3y$ and $2y = 5 - x$. find the mean values (10) of x and obtain the value of correlation coefficient.

Q.6 An urn contains 8 white & 10 red balls. Second urn contains 11 white, 12 red (10) balls. One ball is drawn at random from the first urn & put into the second urn without noticing its color. A ball is then drawn at random from the second urn. What is the probability that it is white?

OR

Q.6 Number of road accidents follows a poisson's distribution with mean 5 find the (10) probability that in a certain month number of accidents on the highway will be

- i) less than 3
- ii) Between 3 & 5
- iii) More than 3

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