BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - II R&AE :SUMMER- 2022
SUBJECT : DIFFERENTIAL EQUATIONS, PROBABILITY & STATISTICS

Day : Tuesday
Date : 26-07-2022

S-24123-2022

Time : 10:00 AM-01:00 PM
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 $\frac{dy}{dx} = \tan^2(x+y)$ **(10)**

OR

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

Q.2 Solve $(x+2)^2\frac{d^2y}{dx^2} + 3(x+2)\frac{dy}{dx} + y = 4\sin\left[\log(x+2)\right]$ **(10)**

OR

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

Q.3 Find inverse Laplace transform of **(10)**

a) $\left[\frac{2s+1}{\left(s^2+s+1\right)^2}\right]$ b) $\left[\frac{s}{\left(s^2+a^2\right)^2}\right]$

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 Evaluate $\iint xy(x+y)\,dx\,dy$ where R is the region bounded by **(10)**

$y = x^2$ and $y^2 = -x$

P.T.O.

OR

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

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

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 regression lines obtained in a correlation analysis are $4x - 5y + 33 = 0$ & $20x - 9y - 107 = 0$. **(10)**

If the variance of y is 16 then final

i) The mean values of x & y.

ii) The correlation coefficient between x & y

iii) The variance of x

Q.6 A dice is thrown 6 times. If "getting an odd number" is a " Success" What is the probability of **(10)**

i) 5 successes

ii) At least 5 Success

iii) At most five success

OR

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

i) less than 3

ii) Between 3 & 5

iii) More than 3

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