Day : Tuesday   Time : 10:00 AM-01:00 PM

Date : 26-07-2022   **S-24064-2022**   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 **WHEREVER** necessary.
5) Draw neat diagram **WHEREVER** necessary.

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

OR

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

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

OR

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

Q.3 Find Inverse Laplace Transform of   **(10)**

i) $\dfrac{2s+1}{(s^2+s+1)^2}$ ii) $\dfrac{s}{(s^2+a^2)^2}$.

OR

Q.3 Find Laplace Transform of   **(10)**

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

Q.4 Evaluate $\iint\limits_R xy(x+y)\,dx\,dy$ where R is the area bounded by $y = x^2$ and $y^2 = -x$.   **(10)**

OR

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

Q.5 The equation of two regression lines obtained in a correlation analysis are   **(10)**
$4x - 5y + 33 = 0$ & $20x - 9y - 107 = 0$. If the variance of y is 16 then find,

iii) The mean values of x and y.
iv) The correlation coefficient between x & y.
v) The variance of x .

OR

Q.5 The following table gives the marks obtained in a paper of statistics out of 50 by **(10)** the students of two divisions A and B.

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

Find out which of the two divisions show greater variability.

Q.6 A dice is thrown 6 times. If 'getting an odd number' is a 'success.' What is the **(10)** probability of
    i)   5 successes
    ii)   At least 5 success
    iii)   At most five successes.

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 and 5
    iii)   more than 3 .

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