

Q:1 (a) Explain the types of function with illustrations. (8)

(b) Give the definition of derivative and explain the rules of differentiation with illustrations. (9)

(c) Evaluate any two of the following. (8)

(1)  $\int (3t^2 + 2t - 10) dt$ .

(2)  $\int (4x^3 - 9x^2 + 4x + 3) dx$ .

(3)  $\int_1^3 (6x^2 - 8x + 12) dx$

(4)  $\int_{-4}^4 (25t + 2) dt$ .

(b) Find out  $\frac{dy}{dx}$  of any three of the following. (9)

(1)  $y = e^x$

(2)  $y = \frac{10}{x^3} - \frac{7}{x^2}$

(3)  $y = (5x^2 + 3x - 1)^5$

(4)  $y = \frac{5x^2 - 7x + 3}{3x + 2}$ .

(5)  $y = 9x^3 + 3x^2 + 17x - 120$ .

(6)  $y = (x+1)(x-1)$ .

Q:2. (a) Calculate mean, median and mode for (9) from the following data.

Classes	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-26
Frequency	5	7	9	10	12	6	11	10

(b) With the help of the above data calculate (8) standard deviation and coefficient of variation.

[OR]

(a) State and prove addition and multiplication rules of probability. (9)

(b) State the characteristics of  $t$ -test and (8) give its importance.

Q:3. (a) Calculate the coefficient of correlation (9) for the following data and interpret it:

X	10	20	30	40	50	60	70	80
Y	80	70	60	50	40	30	20	10

(b) Obtain the regression equation (6)  $Y = \alpha + \beta X$  and estimate value of  $Y$ , when  $X = 70$ .

X	30	40	45	50	60
Y	28	35	35	38	40

[OR]

(a) Write a note on Cost of living Index. (9)

(b) Obtain ~~and~~ suitable index number for (8) the following data.

(2)

Commodity	Weight	Price in ₹	
		2010	2016
A	10	15	20
B	20	18	22
C	25	10	15
D	15	6	8
E	30	3	4

Q.4 (a) ~~Write~~ Explain the meaning of time series and discuss its components. (12)

(b) Calculate seasonal indices by ratio-to-moving average method from the following data: (12)

Year.	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
2015	68	62	61	63
2016	68	63	63	67
2017	65	58	66	61

OR

Write short notes. (any two). (24)

- (1) Hypothesis testing.
- (2) Concepts of probability.
- (3) Normal distribution.
- (4) Bay's Theorem
- (5) Sampling Methods.