Time: 3 Hrs. Max Marks: 100

N.B. (1) All questions are compulsory

    (2) Figures to the right indicate full marks

    (3) Graph papers will be provided on request

    (4) Use of simple non-programmable calculator is allowed

SECTION I

Q.1) Attempt **any four** from the following

A) Find the derivative of y w.r.t. x: (5)

i) $y = 5\log x + 3x^2 - 7$

ii) $y = (4x^2 + 3)/(\log x - 5)$

B) Find the total revenue function if the demand $D = 300p - p^2$, where p is the price. Also find the total revenue when the price is Rs 5 per unit.   (5)

C) The total cost of x items of commodity is given by $C = x^2 + 20x + 9$. Find Marginal Cost and Average Cost when x=3.   (5)

D) If the demand D is given by $D = 12 + 4p - p^2$. Find the elasticity of demand when p=3   (5)

E) The total cost of producing x articles is given by $C = 20 + 4x$ and the total revenue from x articles is given by $R = 30x - x^2$. Find the number of articles (x) which maximizes the profit.   (5)

Q.2) Attempt **any four** from the following:

A) At what rate will the simple interest on Rs 15000 for 4years be equal to the simple interest on Rs 16000 for 3 years at 10% p.a.?   (5)

B) Find the amount on maturity at the end of 2 years of Rs 30000 deposited at 10% p.a. compounded half yearly.   (5)

C) Find the present value of Rs 50000 required after 3 years at 6% p.a. compounded annually.   (5)

D) What amount would be accumulated at the end of 3 years if an annuity of Rs 20000/- is deposited at the end of each year? The rate of interest is 10% p.a. compounded yearly.   (5)

E) Manoj takes a loan of Rs 80000 to be repaid in 4 EMI's at 12% p.a. by reducing balance interest rate. Find the Equated Monthly Instalments (EMI)   (5)

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SECTION II

Q.3 Attempt **any four** from the following

A) Find correlation coefficient between X and Y, given that, n=25, $\sum x = 75$, $\sum y = 100$, $\sum x^2 = 250$, $\sum y^2 = 500$, $\sum xy = 325$ (5)

B) Six participants in a music competition were assigned score by two judges X and Y as follows: (5)

X	54	61	44	32	24	12
Y	64	25	15	36	40	56

Compute Spearman's rank correlation coefficient between X and Y.

C) From the following data, obtain the yield when the rainfall is 30 inches. The correlation coefficient between rain and yield is 0.8 (5)

	Rainfall(inches)	Yield (per acre)
Mean	27	40
Standard Deviation	3	6

D) It is known that the two regression equations are 2x+3y-66=0 and 2x+y-38=0. Find the mean value of x and y. Also find the correlation coefficient between X and Y. (5)

E) Write a short note on Scatter diagram. (5)

Q.4 Attempt **any four** from the following

A) Calculate Fisher's price index number from the following data: (5)

Commodity	p_0	q_0	p_1	q_1
A	9	5	15	5
B	8	10	12	11
C	4	6	5	6
D	1	4	2	8

B) Find three yearly moving averages for the following data: (5)

Year	2011	2012	2013	2014	2015	2016	2017
Sales (Lakh Rs)	15	17	22	30	25	27	35

C) Find Cost of living index number for the year 2017 using Family Budget method. (5)

Commodity	Price (Rs/Kg) (2015)	Price (Rs/Kg) (2017)	Weightage
Wheat	32	40	20
Rice	25	30	10
Dal	40	55	5
Salt	3	4	7
Vegetables	8	14	8

D) Fit a trend line by method of least square. (5)

Years	1991	1992	1993	1994	1995	1996	1997
Sales(in thousands)	12	30	56	15	24	34	40

E) Explain components of time series. (5)

Q.5 Attempt **any four** from the following

(A) 30% of the students in the class are girls. Find the probability that a randomly selected group of 5 students include 3 girls. (5)

(B) A random variable X follows poison distribution with mean=2. Find the probability of

  i) 0 success   ii) at most 2 successes $(e^{-2}=0.135)$ (5)

(C) State the properties of normal distribution. (5)

(D) The probability that a student is a swimmer is 4/5. Out of 5 students selected find the probability that i) 4 are swimmers ii) 1 or less are swimmers (5)

(E) The weekly wages of 8000 workers are normally distributed with mean Rs 770 and S.D. Rs 70. Find the no. of workers whose wages below Rs700 (area between z=0 and z=1 is 0.3413) (5)

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