

- Note:** 1. All questions are compulsory  
2. Figures of the right indicate full marks  
3. Graph papers will be provided on request  
4. Use of simple calculator is allowed.

SECTION – I

**Q.1 Attempt any four of the following.**

- a. The cost manufacturing  $x$  items of a product is given by  $C = x^2 + 5x + 2$ . Find Total Cost, Average Cost and Marginal Cost if  $x = 4$  items are manufactured. [5]
- b. Demand function is given by  $P = 20 - 4D$  where  $P$  &  $D$  are Price and Demand respectively. Find the total Revenue and Average Revenue when  $D$  is 3 units [5]
- c. Find Average Revenue if Elasticity of Demand is 2 and Marginal Revenue is 30. [5]
- d. The demand function is given by  $D = 20 - 2p - 3p^2$  where  $D =$  demand and  $p =$  price. Find the Elasticity of Demand w.r.t. price when price is 2. [5]
- e. Differentiate the following functions with respect to  $x$ . [5]
- i)  $y = 5x^3 - \log x$   
ii)  $y = a^{x+9}$   
iii)  $y = 3x - x^2$   
iv)  $y = \log x + 1$   
v)  $y = 6e^x$

**Q.2 Attempt any four of the following.**

- a. Find Simple Interest on Rs. 5,000 at 10% p.a. for 2 years. Also find the maturity amount. [5]
- b. If Rs. 5,000 amounts to Rs. 7625 after 7 years. Find the rate of simple interest. [5]
- c. What sum of money will amount to Rs. 19,965 in 3 years at 10% p.a. compound interest? [5]
- d. Harish borrowed Rs. 50,000 at 10% p. a. He wishes to return the amount within two year. Find EMI using Flat interest rate method. [5]
- e. Find the Accumulated value after 5 years of an ordinary annuity of Rs. 10,000 p.a. at 20% p.a. compounded annually. [5]

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

- a. Calculate Spearman's Rank Correlation Coefficient. [5]

X	105	112	107	115	160	152	148	132
Y	120	127	135	123	140	142	138	110

- b. Explain the term Correlation and describe types of Correlation using scatter diagram. [5]

- c. Given the regression equation  $y$  on  $x$  is  $2x - 3y + 14 = 0$  and  $x$  on  $y$  is  $3x - y - 42 = 0$  Find [5]

- i) Mean values of  $x$  &  $y$   
ii) Coefficient of Correlation  $r$ .

- d. Given the following data, find the regression equation  $x$  on  $y$  and estimate  $x$  when  $y = 5$ . [5]  
Mean value of  $x = 4$  and Mean value of  $y = 9$ . Standard deviation of  $x$  and  $y$  are 2 & 1  
Coefficient of correlation  $r = -1$

- e. Calculate Karl Pearson's Coefficient of Correlation and hence State the type of Correlation. [5]

Marks in English	17	8	12	13	10	12
Marks in Economics.	13	7	10	11	8	9

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

- a. What is Time series? Describe the various components of time series with suitable example. [5]

- b. Find 5 yearly moving averages for the following data. [5]

X	1997	1998	1999	2000	2001	2002	2003	2004	2005
Y	87	90	92	98	105	93	100	110	125

- c. Fit the straight line trend by the method of least square for the data given below. [5]  
Estimate trend for the year 2007.

Year (X)	2000	2001	2002	2003	2004	2005	2006
No. of workers(Y)	45	49	51	50	52	53	50

- d. For the following data calculate i) Laspeyre's ii) Paasches iii) Fishers Index number. [5]

Commodity	Base Year		Current Year	
	Price ( $p_0$ )	Quantity( $q_0$ )	Price( $p_1$ )	Quantity( $q_1$ )
A	5	6	20	25
B	3	6	25	18
C	4	5	12	15



e. Calculate the cost of Living Index Number for the following data.

[5]

Group	Index Number (I)	Weights (W)
Food	160	48
Clothing	120	07
Rent	140	10
Fuel	100	10
Education	80	15

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

- a. State Probability mass function of the Binomial Distribution and State any three Properties of Binomial Distribution. [5]
- b. Given Mean and Variance of a Binomial Distribution are 4 and 2.4 respectively. Find Probability of all 5 Successes. [5]
- c. Given  $n=10$ ,  $q = 3/4$ . Find Mean and Variance of Binomial Distribution. [5]
- d. A variate X follows Poisson Distribution with parameter 7. Find  $P[x=0]$ ,  $P[x=1]$ . Given  $e^{-7} = 0.00092$ . [5]
- e. Given the area to the right of  $Z=1$  is 0.1587, where Z is Standard Normal variate, Find  
i) Area between (  $Z=0$  to  $Z=1$  )  
ii) Area between (  $Z=-1$  to  $Z=1$  ) [5]
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