Q.P. Code:00853

[Time: 3:00 Hrs.] [Marks: 100]

Please check whether you have got the right question paper.

N.B: 1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of non-programmable simple calculator is allowed.
4. Graph paper will be provided on demand of student.
5. Both the sections written on same answer sheet.

Section-I

Q.1 Attempt any Four of the following:

a) The total cost function is $C = 20 - 3x^2$ and the demand function is $p = 5 + 6x$. Find the profit when $x = 100$. **5**

b) Find $\frac{dy}{dx}$ for the following: **5**
i) $y = 5x^4 - 3e^x + 4\sqrt{x} + 2x$ ii) $y = (x + e^x)(5 + log x)$

c) The cost of producing x items is given by $2x^2 + 5x + 20$. Find the total cost, average cost and marginal cost when $x = 10$. **5**

d) The demand function is given by $D = 25 - 2p - p^2$. Find the elasticity of demand when the price is 4. **5**

e) The demand and supply curves of a commodity are given by $D = 19 - 3p - p^2$ and $S = 5p - 1$. Find the equilibrium price and the quantity exchanged. **5**

Q.2 Attempt any Four of the following:

a) Mr. Akash lent Rs. 5000 to Mr. Prashant and Rs. 4000 to Mr. Sagar for 5 years and received total simple interest of Rs. 4950. Find: **5**
    (i) the rate of interest and **(ii)** simple interest of each.

b) Find the rate of interest at which a sum of Rs. 2000 amounts to Rs. 2690 in 3 years given that the interest is compounded half yearly. ($\sqrt[6]{1.345} = 1.05$) **5**

c) Find the amount for an ordinary annuity with periodic payment of Rs. 3000, at 9% p.a. compounded semi-annually for 4 years. **5**

d) Mr. Naik has borrowed a sum of Rs. 60,000 from a person at 6% p.a. and is due to return it back in 4 monthly installments. Find the *EMI* by reducing balance method. **5**

e) Find the present value of an immediate annuity of Rs. 1600 for 2 years at 7% p.a. compounded half yearly. **5**

Section-II

Q.3 Attempt any Four of the following:

a) Write note on scatter diagram. **5**

b) Calculate the Karl Pearson's correlation coefficient from the following. **5**

X	12	10	20	13	15
Y	7	14	6	12	11

c) Calculate the coefficient of rank correlation from the data given below. **5**

X	40	33	60	59	50	55	48
Y	70	60	85	75	72	82	69

d) Compute the two regression equations on the basis of the following information: **5**

	X	Y
Mean	40	45
Standard deviation	10	9

Coefficient of correlation between x and y = 0.50. Also estimate the value of x when y = 48 using the appropriate equation.

e) From the following regression equations, find $\bar{x}$, $\bar{y}$, and coefficient of correlation between x and y. $3x - 2y - 10 = 0,\ 24x - 25y + 145 = 0$ **5**

Q.4 Attempt any Four of the following:

a) Write a short note on the importance of Index Numbers. **5**

b) Determine the trend for the following data giving the production of steel in million tons, using 5 yearly moving averages. **5**

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Production	28	30.5	32	36.8	38	36	39.4	40.6	42	45	43.5

c) The following time series data on consumption of cold drinks which contains only seasonal and irregular variation construct indices for seasonal variations using simple Arithmetic Mean. **5**

Year	Quarterly Values			
	I	II	III	IV
2003	39	20	60	85
2004	45	23	62	90
2005	60	32	76	100
2006	47	35	65	85

d) From the following data calculate Dorbish-Bowlay's index numbers. **5**

	Base year		Current year	
Commodity	Price	quantity	price	Quantity
Rice	4	15	5	20
Pulses	8	20	12	30
Sugar	6	25	8	20
Oil	14	10	21	15

e) Find the cost-of-living Index number for the following data by family budget method. **5**

Groups	Index Number	Weights
Food	120	60
Clothing	187.5	5
Fuel	250	10
Rent	300	15
Miscellaneous	200	10

Q.5 Attempt any Four of the following:

a) State the properties of standard normal curve. **5**

b) The mean of a binomial distribution is 12 and standard deviation is 3. **5**
Calculate *n*, *p* and *q*.

c) A die is thrown at random. What is the expectation and variance of the number **5**
on it?

d) If X is a normal variate with mean 50 and standard deviation 8. Find the **5**
probability that X assume a value between 34 and 62. [Area under normal
curve between Z = 0 and Z =2 is 0.4772 and Area between Z =0 and Z = 1.5 is
0.4332]

e) Out of 50 items in a lot are found to be defective. Find the probability of the **5**
following if 4 items are selected: (*i*) 3 defective items, (*ii*) at most 3 defective
items.

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