Time: 3 hrs.   **Marks:100**

Note:
1. All questions are compulsory with internal choice.
2. Figures to the right indicate full marks.
3. Use of simple non-programmable calculator is allowed

Q.1 Attempt **any 4** from the following.   (20)

(a) If the total cost function is $C = 4 + 3x + x^2$, find the cost when x is 10 units also find average cost when x is 4 units.

(b) Find the derivative of y w.r.t. x:
(i) $y = 5logx + 2x^2 - 7$
(ii) $y = x^3 + e^x + 4^x - logx + 7$.

(c) Find the derivatives of $= \frac{2x^2 - 3x + 5}{x^2 + 1}$.

(d) If the demand function is $p = 20 - 3D$, find total revenue and average revenue when D is 2 units.

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

Q.2 Attempt **any 4** from the following.   (20)

(a) Harsha opend a recurring deposite in a bank for 4 years with payments of ₹5000 paid at the end of each year Find the money obtained at the end of the period with 6% P.a.

(b) Sanjay invested ₹1000 at the end of every month for 4 years at 12% P.a. compound interest. Find the amount he will receive at the end of the period.

(c) Find the present value of an immediate annuity of ₹10000 p.a. for 4 years at 9% p.a.

(d) Find the Future value of ₹30000 kept in a fixed deposit account, after 6 years at 8% of compound interest P.a.

(e) A sum of ₹12000 becomes ₹17280, at 20% compound interest P.a. Find the Period.

Q.3 Attempt **any 4** from the following.   (20)

(a) Find 3 yearly moving average and represent it on a graph.

Year	2000	2001	2002	2003	2004	2005	2006	2007
Exports	46	53	72	57	62	78	60	85

(b) Find the coefficient of correlation for the following data:

X	14	8	10	11	9	13	5
Y	14	9	11	13	11	12	4

(c) Find Spearman's Rank Correlation Coefficient.

Rank 1	3	5	7	1	2	8	6	4
Rank 2	2	1	4	5	7	6	3	8

(d) Given the following data, find the two regression equations and estimate y when $x = 40$. Also estimate x when $y = 35$.

	x	y
Mean	43	37
S.D.	3.1	2.8

and correlation coefficient $r = 0.65$

(e) Calculate Fisher's price index numbers from the following data:.

Commodity	p_0	q_0	p_1	q_1
A	6	50	9	55
B	2	100	3	125
C	4	60	6	65
D	10	30	14	25

Q.4   Attempt **any 4** from the following.   **(20)**

(a) It is observed that 60% of students of a class are vegetarians. If 7 students from the class are selected at random, find the probability that the number of vegetarians is less than 2.

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

(c) A Poisson variate has standard deviation 3. Find $P(0)$ and $P(1)$, (Given $e^{-9} = 0.000123$)

(d) For a Poisson distribution, the ratio of probabilities of $(x = 0)$ and $(x = 1)$ is 1:4. Find the probability of $(x = 3)$, given that $e^{-4} = 0.0183$.

(e) If mean and standard deviation of a Binomial distribution are 8 and 2 respectively, find probability that no. of successes is (*i*) only 2   (*ii*) 3 or 4

Q.5   Attempt **any 4** from the following.   **(20)**

(a) Uses of Poisson Distribution.
(b) Write a short note on Scatter Diagram.
(c) Write a short note on types of Index Number.
(d) State the properties of Normal Distribution.
(e) Explain components of Time Series.

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