Q.P. Code :19967

[Time: 2 ½ Hours] **[Marks:75]**

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory carrying 15 marks each.
2. Figures to the right indicate marks of sub-questions.
3. Use of simple calculator is allowed

Q.1 A) Fill in the blanks by choosing appropriate option. (**any eight**) 08

1) An annuity in which all the payments are equal is called ----------
   a) Equitable annuity
   b) Annuity due
   c) Uniform annuity
   d) Egalitarian annuity

2) If the highest value in a group of observation is 19850 and the lowest value is 16650 then the range is ----------.
   a) 3200
   b) 2300
   c) 3400
   d) None of these

3) If 0<r<1 then correlation is ----------
   a) Positive
   b) Negative
   c) Perfect positive
   d) Perfect negative

4) The difference between compound and simple interest on Rs. 3,000 at 10% p.a for two years is ----------
   a) 3
   b) 30
   c) 300
   d) None of these

5) At maxima, the second order derivative is ----------
   a) Less than zero
   b) Zero
   c) Greater than zero
   d) None of these

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6) The price elasticity of demand is ----------
   a) $\frac{-D}{P}\frac{dD}{dP}$
   b) $\frac{-P}{D}\frac{dP}{dD}$
   c) $\frac{-P}{D}\frac{dD}{dP}$
   d) $\frac{-D}{P}\frac{dP}{dD}$

7) If $f(x) = x^2 - 2x + 3$ then $f(-2)$ is
   a) 11
   b) 2
   c) 9/2
   d) None of these

8) _____ is not used for future value.
   a) Sum due
   b) Discounted value
   c) Amount
   d) Accumulated value

9) Numerical characteristics are called ----------
   a) Variables
   b) Values
   c) Attributes
   d) None of these

10) ---------- is affected maximum by extreme values.
   a) Median
   b) Arithmetic mean
   c) Mode
   d) None of these

B) State whether true or false (**any seven**) 07

1) Mean is capable of further algebraic treatment.
2) Mode is a positional average.
3) A sinking fund is not an annuity
4) Mode can be obtained by using a Histogram.
5) If $f(x) = e^x + 5x$ then $f(1) = 6$
6) The graphical representation of a linear function is always a line.
7) At equilibrium point, demand is equal to supply.

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8) The sum of deviations of individual values of variable x from the arithmetic mean is zero.
9) $f(x) = \log(x^2 + 9)$ is a exponential function.
10) Scatter diagram can give the degree of relationship between variables.

Q.2 a) What sum should be set aside each year at 6% p.a compound interest for 5 years to replace a machinery which is expected to cost Rs. 1, 20, 000. The salvage value of the existing machinery will be Rs. 20, 000 at the end of 5 years. 08

b) Find the mode of the following data. 07

Bill in Rs.	500-600	600-700	700-800	800-900	900-1000	1000-1100
No. of families	60	120	150	130	80	40

OR

p) A loan of Rs. 80, 000 is to be repaid in 4 equal monthly installments starting from the end of the first month. The rate of interest is 9% p.a. compounded monthly. Find the EMI using reducing balance method. 08

q) Find the first quartile for the following data: 07

Class interval	20-30	30-40	40-50	50-60	60-70	70-80
frequency	50	75	100	125	25	25

Q.3 a) Find the derivative of y w.r.t x 08

i) $y = \frac{e^x + \log x}{x^3 - 4}$

ii) $y = (5^5 + \log x)(x^5 + 5)$

b) If the demand function is given by $D = 2 - 0.2p$ and the supply function is given by $S = 0.2 + 0.7p$, find the equilibrium price and the quantity offered and purchased at that price. 07

OR

p) If the total revenue and total cost functions are given by $R = 30x - x^2$ and $C = 50 + 4x$, then find the output at which the profit is maximum. Also find the maximum profit. 08

q) Find the maturity amount of a two year fixed deposit of Rs. 40, 000 at 4%p.a if the interest is compounded half-yearly. 07

Q.4 a) Find the regression equation of Y and X for the following data. 08

X	5	6	9	8	3
Y	32	25	30	34	39

b) Find the rank correlation coefficient for the following data. 07

Rank 1	2	5	4	1	3	6
Rank 2	5	3	2	4	1	6

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OR

p) Find the correlation coefficient for the following data. 08

X	3	4	5	3	4
Y	12	7	5	11	8

q) Find the standard deviation for the following data: 07

Time in seconds	40-50	50-60	60-70	70-80	80-90	90-100
No. of customers	6	26	30	24	9	5

Q.5 a) Explain what precautions must be taken while drafting a questionnaire. 08

b) What are the requisites of a good measure of dispersion? 07

OR

Write short notes on **any three** of the following. 15

1) Merits and demerits of arithmetic mean
2) Define correlation and types of correlation
3) Function and its types
4) Define annuity and its types
5) State limitations of statistics

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