Q.P. Code :19968

[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. (<u>any eight</u>)   08

1)   Arithmetic mean of 10, 20, 30, 40 is --------------
     a)   25
     b)   30
     c)   100
     d)   None of these

2)   A statistical measure calculated for all units in the sample is called a -----------
     a)   Statistic
     b)   Parameter
     c)   Variate
     d)   Attribute

3)   The sum of deviations of individual values of variable x from the --------- is zero.
     a)   Median
     b)   Arithmetic mean
     c)   Mode
     d)   None of these

4)   The coefficient of correlation 'r' always lies between ------------
     a)   0 and 1
     b)   -1 and 1
     c)   -1 & 0
     d)   None of these

5)   If $byx = \frac{5}{6}$ and $bxy = \frac{8}{15}$ then r= ---------
     a)   0.6667
     b)   0.3337
     c)   1
     d)   None of these

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6) $f(x) = 20$ is a --------- function.
   a) Logarithmic
   b) Constant
   c) Exponential
   d) None of these

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

8) An annuity in which each payment is made at the end of the time period is called ----------
   a) Annuity due
   b) Annuity certain
   c) Immediate annuity
   d) Uniform annuity

9) The data collected by investigators using questionnaires is called ----------
   a) Secondary data
   b) Primary data
   c) Analysis
   d) None of these

10) If the highest value in a group of observation is 55 and the lowest value is 40 then coefficient of quartile deviation is ----------
   a) 0.1579
   b) 0.6667
   c) 15
   d) None of these

B) State whether true or false (**any seven**)   07
   1) Median is capable of further algebraic treatment.
   2) Mode is a positional average.
   3) The demand is called inelastic if the elasticity of demand is between zero and one.
   4) Mean deviation is based on all the observations.
   5) Correlation reveals cause and effect relationship.
   6) If $f(x) = e^x + 5x$ then $f(0) = 1$
   7) A sinking fund is an annuity
   8) Median can be obtained by using a Histogram.
   9) If the demand function is $p = 25 + 4D - 2D^2$ then marginal revenue function is $MR = 25 + 8D - 6D^2$
   10) Differentiation is the process of finding the derivative of a function.

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Q.2 a) Find the standard deviation for the following data: 08

Reduction in weight kgs.	2-4	4-6	6-8	8-10	10-12
No. of persons	5	15	35	30	15

b) Find the maturity amount of a deposit of Rs. 4, 00, 000 compounded semi-annually for one year 07
at 6% p.a.

OR

p) A loan of Rs. 20, 000 is to be returned in 3 equal monthly installments at 8% p.a. Find the EMI using 08
reducing balance method.

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

Weekly expenditure in Rs.	50-70	70-90	90-110	110-130	130-150
No. of families	20	60	80	30	10

Q.3 a) Differentiate the following y w.r.t x 08
   i) $y = (x^3 + \log x)(e^x + 5^x)$
   ii) $y = \frac{9+x^2}{(3x+\log x)}$

b) The total cost function is given by $C = 2,000 + 50x$ and the total revenue function is given 07
by $R = 100x$, where x is the quantity produced and sold. Find the break-even point.

OR

p) The total cost (C) and the total revenue (R) for a company are given by $C = 50 + 4x$ and 08
$R = 30x - x^2$, where x is the output. Find the output at which the profit is maximum. Find the
maximum profit.

q) Find the mode for the following data: 07

Production in units	100-110	110-120	120-130	130-140	140-150
No. of workers	10	50	100	80	10

Q.4 a) Find the coefficient of correlation for the following data: 08

X	15	18	20	19	22
Y	9	10	11	11	12

b) A housing society decides to set aside a certain sum at the end of each year to create a sinking fund, 07
which should amount to Rs.5,00,000 in 4 years at 12% p.a. Find the amount to be set aside each year.

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OR

p) Find the regression equation of Y on X for the following data:

X	3	5	8	10	14
Y	9	14	20	27	40

08

q) Arithmetic mean of heights of 100 boys is 150 cms and that of 50 girls is 144 cms. find the combined arithmetic mean of 150 students.

07

Q.5 a) Define Annuity and its types.   08
     b) Explain various methods of collecting primary data.   07

OR

Write short notes on **any three** of the following.   15
1) Merits and demerits of arithmetic mean
2) Function and its types
3) Merits and demerits of mean deviation
4) Define statistics and explain its four procedures
5) Scatter diagram

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