Day	: Saturday		Time :	10.00 AM TO 01.00 PM
Date	: 27/04/2019	**S-2019-3954**	Max. Marks : 75	

N.B.:
1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagrams **WHEREVER** necessary.
4) Answers to both the sections should be written in the **SEPARATE** answer books.

SECTION – A

Q.1 Write short notes on **ANY THREE** out of **FOUR** of the following: **[15]**

a) Experimental research

b) Random and Non-random sampling

c) Reliability of research

d) Ex-post facto research

Q.2 Attempt **ANY ONE** out of **TWO** of the following: **[10]**

a) What is research design? Describe different types of research design.

b) What is sampling? Describe probability sampling.

Q.3 Attempt **ANY ONE** out of **TWO** of the following: **[15]**

a) What is Research? Types/methods of Data Collection.

b) Define variables. Describe types of variables.

SECTION – B

Q.4 Attempt **ANY TWO** out of **THREE** of the following: **[10]**

a) A random variable X follows Normal Distribution with mean 'zero' and variance 'one' obtain:
   i) $P(X \geq 2.3)$ ii) $P(-1.2 \leq X \leq 2)$ iii) $P(X \leq 1.7)$

b) Explain the terms 'Type – I' and 'Type – II' error, level of significance and confidence interval.

c) From the frequency distribution given below. Obtain the 'median' by plotting the 'ogive curve'.

x	$100 - 200$	$200 - 300$	$300 - 400$	$400 - 500$	$500 - 600$
f	5	10	20	12	3

Also find quartile Q_1 and Q_3.

P.T.O.

Q.5 Attempt **ANY ONE** out of **TWO** of the following: [10]

a) **i)** Explain the different measures of 'Skewness'.

ii) $\bar{x} = 120.5$, $\bar{y} = 10.4$

$\sigma_x = 12.7$ (s.d. of X), $\sigma_y = 2.4$ (s.d. of X)

Correlation coefficient between (X, Y) = r_{xy} = 0.93.
From the data given above, obtain the line of regression of X on Y also estimate X when Y = 15.

b) The two salesman 'A' and 'B' are working in a certain city. From the data given below state whether there is no significant difference between the average sales between the salesman 'A' and 'B' at 5% level of significance.

Salesman	A	B
No. of sales	20	20
Average sales (in Rs.)	170	200
S.D. (in Rs.)	20	15

Q.6 Attempt **ANY ONE** out of **TWO** of the following: [15]

a) **i)** Explain 'chi-square' test for testing independence of 2 attributes.

ii) Define the term discrete and continuous random variable with an example.

b) **i)** Obtain Karl Pearson's correlation coefficient between random variable 'X' and 'Y'

X	14	19	24	21	26	22
Y	31	36	48	37	50	45

ii) Write the formula for:
'Mean Deviation about mean'. And
'Test statistics for testing equality of two means for large sample test'.

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