

[Time:2.30 Hrs]

[ Marks:75 ]

Please check whether you have got the right question paper.

N.B: 1. Q.1 is compulsory and carries 20 Marks.

2. Q.8 is compulsory and carries 15 Marks.

3. Attempt any Four questions from Q.2 to Q.7. Each of these questions carry 10 Marks.

4. Figures to the right indicate full marks.

5. Use of simple calculator is permitted.

Q.1 A Select the correct option for the following statements/questions: 10

I If the regression equation of X and Y is  $5X+7Y=135$ , the estimated value of X when

Y = 10 is \_\_\_\_\_

- a) 8                      b) 10                      c) 5                      d) 13

II When data is arranged, middle value in set of observations is classified as

- a) median.                      b) mean.                      c) variance.                      d) standard deviation.

III Two samples A and B have the same standard deviation but the mean of A is greater than that of B the coefficient of variation of A is

- a) Greater than that of B                      b) Less than that of B  
c) Equal to that of B                      d) None of these

IV A card is drawn at random from a well-shuffled pack of cards. What is the probability that the card drawn is a diamond?

- a)  $1/3$                       b)  $1/13$                       c)  $2/13$                       d)  $1/4$

V In which of the following distributions, random variable is continuous?

- a) Binomial   b) Poisson   c) Normal   d) Bernoulli

VI If x and y are independent then coefficient of correlation between x and y is

- a)  $r = 1$    b)  $r = -1$    c)  $r = 0$    d)  $r \neq 0$

VII Using a goodness-of-fit test, we can assess whether a set of obtained frequencies differ from a set of \_\_\_\_\_ frequencies

- a) Mean      b) Actual      c) Predicted      d) Expected
- VII The numerical value of a standard deviation can never be \_\_\_\_\_.
- I a) Negative      b) Zero      c) Larger than the variance      d) None of the above

IX To use a t-test, the dependent variable must have

- a) Nominal or interval data      b) Ordinal or ratio data
- c) Interval or ratio data      d) Ordinal or interval data

X The sampling error is defined as?

- a) difference between population and parameter
- b) difference between sample and parameter
- c) difference between population and sample
- d) difference between parameter and sample

B State whether the statement is True or False.

10

I A conditional probability exists when the probability of one event is dependent on another.

II A set of data is considered homogeneous or uniform if its coefficient of variance is low.

III Standard error is always non- negative.

IV In normal distributions, the mean, median, and mode are all equal.

V When the two variable varies together in the same direction then there is negative correlation.

VI If coefficient of skewness is  $S_k = 0$  then the distribution is symmetric.

VII A curve which is more peaked than the normal curve is called Leptokurtic.

VII Mean are not capable of further algebraic treatment.

I

IX The standard deviation's numerical value is never zero.

X All value of data are identical than mode does not exist.

Q.2

Attempt any Two of the following:

10

A Find the 3<sup>rd</sup> Deciles and 87<sup>th</sup> percentiles from the following data:

Daily wages in Rs.	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No. of workers	12	28	36	50	25	18	16	10	5

B Calculate the mode using the graphical method for the following distribution of data:

Sales in units	10-20	20-30	30-40	40-50	50-60	60-70
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No. of Days	24	30	45	30	20	15
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- C In a private health club, there are 200 members. 100 men, 80 women and 20 children. The average heights of men, women and children were 60 kgs 50kg and 35 kgs respectively. Find the average weight of the combined group of all the members of the club.

Q.3 Attempt any Two of the following: 10

- A Calculate quartile deviation for the following distribution of ages of 800 persons.

Age in Years	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No. of Persons	50	70	100	180	150	120	70	60

- B Find the standard deviation for the following data:

Class Interval	0-20	20-40	40-60	60-80	80-100
Frequency	8	12	30	16	4

- C For the following ungrouped data find the Karl Pearson's Coefficient of Skewness.

12,18,25,15, 16, 10, 8 15, 27,14

Q.4 Attempt any Two of the following: 10

- A If the probability is 0.45 that a program development job; 0.8 that a networking job applicant has a graduate degree and 0.35 that applied for both. Find the probability that applied for atleast one of jobs. If number of graduate are 500 then how many are not applied for jobs?
- B The probability that Ram can shoot a target is  $\frac{2}{5}$  and probability of Laxman can shoot at the same target is  $\frac{4}{5}$ . A and B shot independently. Find the probability that (i) the target is not shot at all, (ii) the target shot by only one of them.
- C The following pay of matrix has been formed by portfolio manager giving pay-offs for different modes of investment under different states of the economy. Decide on the best mode of investment by calculating expected monetary values (EMV).

State of economy	Probability	Investment alternative			
		Gov. F.D	Company F.D	Mutual fund	Shares
Depression	0.25	100	90	50	0
Recovery	0.45	100	110	120	140
Prosperity	0.30	100	120	150	200

Q.5 Attempt any Two of the following: 10

- A The probability that a car passing through a certain junction will have an accident is 0.00007. on a day ,10000 cars pass the junction. Find the probability that at most 1 car has an accident ( $e^{-0.7}=0.497$ )
- B The probability that a contractor gets a government contract is 0.3. He has applied for 5 such contracts. Find the probability that he gets a) no contract, b) atleast one contracts.
- C From the results of the F.Y.B.M.S examination, it was observed that the percentage marks obtained by the students follow a normal distribution with a mean of 60% marks and a standard deviation of 5% marks. A student is selected at random. Find the probability that the % marks obtained by the student are a) between 65 and 70, b) greater than 70. [ it is given that, for a standard normal variate the area under the curve between 0 and 1 is 0.3413 and between 0 and 2 is 0.4772.]

Q.6 Attempt any Two of the following: 10

- A A machine produces copper plates of thickness 2cm with standard deviation of 0.4 cm. A sample of 50 copper plates is selected at random. The average thickness of the sample is 2.04cm. Test the hypothesis that the machine is performing in a normal way, at 5% level of significance.
- B The following table is given

Eye colour in fathers	Eye colour in sons		Total
	Brown	Black	
Brown	230	148	378
Black	251	471	622
Total	381	619	1000

Test whether the colour of the son's eyes is associated with that of the fathers at the 0.1 level of significance.

- C A sample of 6 persons in an office revealed an average daily smoking of 10, 12, 8, 9, 16, 5 cigarettes. The average level of smoking in the whole office has to be estimated at 90% level of confidence. [ At 90% level of confidence  $t = 2.015$  for 5 degree of freedom]

Q.7 Attempt any Two of the following: 10

- A Calculate product moment correlation coefficient between advertising expenditure (in '1000) and annual sales (in '1000) given below:

Advt Expenses	3	7	4	2	1	4	1	2
Sales	11	16	9	4	7	6	3	8

- B The regression equation of income (x) on expenditure (y) is  $3x-2y=3,900$ . The ratio of the standard deviation of income and expenditure is 4:3 find the coefficient of correlation

between income and expenditure. Also find the average income if the average expenditure is Rs.1,800.

- C An urn X contains 2 white and 4 black balls. Another urn Y contains 5 white and 7 black balls. A ball is transferred from the urn X to the urn Y, then a ball is drawn from urn Y. Find the probability that it is white.

Q.8 Attempt any Three of the following: 15

- A In Vijay sales every day sale of number of laptops with his past experience the probability per day are given below:

No. of laptop	0	1	2	3	4	5
Probability	0.05	0.15	0.25	0.2	0.15	0.2

Find his expected number of laptops can be sale? Also find variance.

- B A manufacturer claims that 10% of his product is defective. A sample of 300 items selected at random had 32 defective items. Test his claim at 1% level of significance.
- C Spearman's Rank correlation coefficient for the following data:

Demand	38	48	52	98	75	66
Price	85	96	75	120	100	98

- D A population consists of the fine number 4, 7, 9 and 12. Consider all possible samples of size 2 that can be drawn with replacement from this population. Find i) Mean of population, ii) The standard deviation of population, iii) The mean of the sampling distribution of means, iv) The standard deviation of the sampling distribution of mean.