

[Time: 03.00 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, Q.3, Q.4, Q.5, Q6 and Q7. Each of these questions carry 10 Marks.
4. Figures to the right indicate full marks.

<b>Q.1</b>	<b>(A) Select the correct option for the following statements/questions:</b>	<b>(10)</b>
	<p>1) Diameter of a ball produced by the company is normally distributed with mean 12 cm and S.D 0.1 cm. If we take a random sample of size 10 with replacement, then the standard error of sample mean is ____.</p> <p>a) 0.01    b) 0.3    c) 0.04    d) 0.03</p> <p>2) The standard deviation of any sampling distribution is called:</p> <p>a) Standard error    b) Non-Sampling error c) Type-I error    d) Type-II error</p> <p>3) Population of aeroplanes in the Indian Air Force is which type of population</p> <p>a) Existent population    b) Finite population c) Infinite population    d) Hypothetical population</p> <p>4) A card is drawn from a well-shuffled pack of playing card. What is the probability that the card a face card?</p> <p>a) 1/13    b) 2/13    c) 3/13    d) 4/13</p> <p>5) A group of 10 students was randomly drawn from fy MMS and was given yoga training for three weeks. Their wellness life style was compared with another similarly selected group which did not undergo such training. Which type of statistical test will be appropriate for testing justifiable of Null Hypothesis?</p> <p>a) Independent t-test    b) Dependent t-test c) Wilcoxon T test    d) Sign test</p> <p>6) Analysis of variance is a statistical method of comparing the ____ of several populations.</p> <p>a) Standard Deviation    b) Variances    c) Means    d) frequency</p> <p>7) In simple linear regression, how many independent variables are considered ____</p> <p>a) One    b) Two    c) Three    d) None</p> <p>8) In a study, subjects are randomly assigned to one of three groups: control, Experiments A, Experimental B. After treatment, the mean scores for the three groups are compared. The appropriate statistical test for comparing these means is:</p>	

- a) Correlation Coefficient      b) Analysis of Variance  
c) Chi-Square                      d) T-test

9) The data about sales and advertisement expenditure of a firm is given as mean of sales (in crore of Rs.) 40, mean of advertisement expenditure (in crore of Rs.) 6, Standard deviation of sales and advertisement expenditure are 10 and 1.5 respectively. The correlation coefficient between sales and advertisement expenditure is 0.9. The likely sales for a proposed advertisement expenditure of Rs. 10 core is \_\_\_\_\_.

- a) Rs. 64 core      b) Rs. 67 core      c) Rs. 70 core      d) Rs. 58 core

10) For one way ANOVA if  $SST = 45$  with degree of freedom 3 and  $SSE = 32$  with degree of freedom 16, then the test statistic F is \_\_\_\_\_.

- a) 7.2      b) 7.3      c) 7      d) 7.5

**(B) State whether the statement is True or False.**

**(10)**

1. Median is the Averages which is not based on all the values given in the data set.
2. In testing a hypothesis, we take the level of significance as 2% if it is not mentioned earlier.
3. A regression line is also known as the prediction equation.
4. The correlational analysis between two sets of data is known as a simple correlation.
5. A card is drawn from a deck of cards the probability that it is a queen is  $3/13$ .
6. If the values taken by a random variable are negative, the negative values will have negative probability.
7. The Chi-Square test is used for categorical data analysis.
8. ANOVA is a procedure for testing the difference among different groups of data for homogeneity.
9. A t-test is a significance test that assesses the medians of two independent groups.
10. Mean is least affected by the fluctuation of sampling.

Q.2

Attempt any Two of the following:

(A) Find the median and  $D_7$  from the following data:

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	10	7	25	30	15	12	1

(B) Calculate mean and mode for the following frequency distribution data

Age Group	0-5	5-10	10-15	15-20	20-25
No. of Children	6	8	12	9	5

(C) The mean monthly salary paid to 77 employees in a company was Rs. 78. The mean salary of 32 of them was Rs. 45 and of the other 25 was Rs. 82. What was the mean salary of the remaining?

Q.3

Attempt any Two of the following:

(A) Find the quartile deviation and the coefficient of quartile deviation.

Marks	10	20	30	40	50	60
No. of students	5	8	5	10	2	4

(B) Find standard deviation and coefficient of variance for the given data:

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
No. of refrigerators	6	11	15	8	3

(C) Compute the coefficient of correlation between x & y for the following data:

x	5	10	5	11	12	4	3	2	7	1
y	1	6	2	8	5	1	4	6	5	2

Q.4

Attempt any Two of the following:

(A) If two dice are thrown, what is the probability that sum is  
i) greater than 9      ii) neither 10 or 12.

(B) There are 40 pages in a book. A page is opened at random. Find the probability that the number of this opened page is a multiple of 3 or 5.

(C) From the given pay off table, find the best decision using EMV criterion.

State of Nature	P	Acts		
		A1	A2	A3
S1	0.1	125	-100	-125
S2	0.7	400	340	300
S3	0.2	650	740	750

Q.5	<p><b>Attempt any Two of the following:</b></p> <p>(A) The probability that a person visiting an automobile show room will buy a car is 0.3 and that of his buying a two wheeler is 0.6? If the probability that he buys both a car as well as a two-wheeler is 0.1, find the probability that he buy</p> <ol style="list-style-type: none"> <li>At least one of the vehicle</li> <li>None of the vehicles</li> </ol> <p>(B) An Insurance company insures 4000 peoples against loss of both eyes in a car accident. Based on previous data, the rates were computed on the assumption that on the average 10 persons in 1,00,000 will have car accident each year that result in this type of injury. What is the probability that more than 3 of the insured will collect on their policy in a given year? [Given that <math>e^{-0.4} = 0.6703</math>]</p> <p>(C) A sample of 100 items taken at random from a batch known to contain 40% defectives. What is the probability that the sample contains:</p> <ol style="list-style-type: none"> <li>at least 44 defectives, ii) exactly 44 defectives?</li> </ol> <p>(The area under normal curve between 0 and 12.3 is 0.5, between 0 and 0.71 is 0.2624, between 0 and 0.918 is 0.3208).</p>	(10)
Q.6	<p><b>Attempt any Two of the following:</b></p> <p>(A) In a sample of 1,000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance? [critical value at 1% l.o.s is 2.58].</p> <p>(B) A company has 4000 employees whose average monthly wage comes to rs. 4,800 with standard deviation of rs 1,200. Let <math>\bar{x}</math> be the mean monthly wage for a random sample of certain employees selected from this company. Find the mean and standard deviation of <math>\bar{x}</math> for a sample size of (i) 40, (ii) 100, (iii) 180.</p> <p>(C) The mean life of the tyres manufactured by a company follows normal distribution with standard deviation 3200 kms. A sample of 250 tyres is taken and it is found that the average life of the tyres is 50000 kms with a standard deviation of 3500 kms. Establish the 99% confidence interval within which the mean life of tyres of the company is expected to lie. [<math>Z_{0.005} = 2.58</math>].</p>	(10)
Q.7	<p><b>Attempt any Two of the following:</b></p> <p>(A) Obtain the Rank correlation coefficient for the following data:</p>	(10)

x	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	70

(B) An IQ test was administered to 5 persons before and after they were trained.

The results are given below:

Candidates	I	II	III	IV	V
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

Test whether there is any change in IQ after the training programme. (for 1% L.O.S)

[Critical value at 1% l.o.s is 4.6]

(C) From the following table showing the number of plants having certain characters, test the hypothesis that the flower colour is independent of flatness of leaf at the 0.1 level of significance.

	Flat leaves	Curled leaves	Total
White Flowers	99	36	135
Red Flowers	20	5	25
Total	119	41	160

Q.8

Attempt any Three of the following:

(15)

(A) Suppose in IDOL, the average (mean) weight of all male students is 60 kg and standard deviation is 25 kg. If a sample of 36 male students is selected at random, find the probability that the male students having average weight

- (i) more than 70 kg
- (ii) less than 55 kg

(B) Show that the sample mean ( $\bar{X}$ ) is an unbiased estimator of population mean  $\mu$  in sampling from a normal population.

(C) Find Karl person's coefficient of correlation from the following:

$$\sum x = 20 \quad \sum y = 11.58 \quad \sum xy = 47.5 \quad \sum x^2 = 90 \quad \sum y^2 = 27.03 \quad N = 5$$

(D) The data given below is of marks secured by first year and second year students of a college. Find which group has more variation.

	Group 1	Group 2
Mean	50	60
S.D	2	3