

[Time:2.30 Hrs]

[Marks:75]

Please check whether you have got the right question paper.

- N.B: 1. All question are compulsory.
2. Figures to the right indicate full marks.

Q.1 Attempt any four of the following: 20

- A Find the Mean and Variance of the given data

X	1	2	3	4	5	6
P(X)	0.2	0.15	0.1	0.2	0.15	0.2

- B Explain the properties of Normal distribution

- C Verify the function has p.m.f or not? Also find the expected value of the given probability distribution

X	2	4	6	8	10
P(X)	0.3	0.2	0.2	0.2	0.1

- D A random variable x has following probability distribution

X	0	1	2	3	4	5	6
P(X)	k	2k	3k	5k	4k	2k	k

Find k. Hence find E(x).

- E A bag contains 4 Red and 6 White balls. Two balls are drawn atrandom and gets Rs.10 for each red and Rs.5 for each white ball.. Find his mathematical expectation.
- F What are the Properties of t-Distribution.

Q.2 Attempt any four of the following: 20

- A Two samples of sizes 9 and 12 are drawn from two normally distributed populations having variances 16 and 25 respectively. If the sample variances are 20 and 8, determine whether the first sample has a significantly larger variance than the second sample at significance levels of (a)0.05 (b) 0.01 (F0.95=2.95, F0.99=4.74)
- B Explain the term a) Alternative Hypothesis b) Critical region
- C On the examination given to the Students at a Large Number of Different School The Mean Grade Was74.5 and Standard Deviation was 8.0 at one particular school Where 200 Students took the Examination. The mean Grade was 75.9. Discuss The Significance of the result 0.05 level from the view point
a) one tailed Test b) Two tailed Test
- D In a city, it is claimed that average IQ of students is 102. The intelligence quotients (IQs) of 16 students from one area of a city showed a mean of 107 and a standard deviation of 10. Test the claim at 5% LOS. (tc at 5% LOS =2.144)

- E Individuals are chosen at random from a population and their height (in inches) is found to be – 63, 63, 64, 65, 66, 69, 69, 70, 70, 71. Find students t by considering population mean to be 65.
- F Explain Null Hypothesis

Q.3 Attempt any four of the following:

20

- A Explain WILCOXON'S SIGNED RANK TEST
- B The manufacturer of patent medicine claims that it is 90-% effective in a relive being an allergy for period of 8 hrs.in a sample of 200 people who had the allergy, the medicine provided relief for 160 people. Determine the manufacture claim legitimate at 5% level of significance.
- C In an experiment to study the dependence of hypertension on smoking habits, the following data is taken from 180 individuals

	No Smokers	Moderate Smokers	Heavy smokers
Hypertension	21	36	30
No hypertension	48	26	19

Test the hypothesis at 5 % LOS that the presence or absence of hypertension is independent of smoking. (Given- $\chi^2_{tab}=5.99$)

- D Write KRUSKAL-WALIS TEST
- E Explain ANALYSIS OF VARIANCE (ANOVA)
- F Explain in short Non-paramereic test.

Q.4 Attempt any three of the following:

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- A Explain the term a) discrete random variable b) level of significance.
- B Define variance. With usual notations show that $E(aX + b) = aE(X) + b$ and $V(aX + b) = a^2 V(X)$.
- C Explain Cumulative Distribution Function
- D In the past, a machine has produced washers having a thickness of 0.050 in. To determine whether the machine is in proper working order, a sample of 10 washers is chosen, for which the mean thickness is 0.053 in and the standard deviation is 0.003 in. Test the hypothesis that the machine is in proper working order at 5% and 1% LOS. (t_c at 5% LOS = 2.26, t_c at 1% LOS = 3.25)
- E Consider tossing of a fair coin 3 times Define X = number of times tails Occurred Find $E(X)$ and $V(X)$

Value	0	1	2	3
Probability	1/8	3/8	3/8	1/8

- F Write a Note on Runs Test?