

Duration: 2 1/2 Hrs

Marks: - 75

Note:-

- 1) All Questions are compulsory
- 2) Figures to the right indicate maximum marks.

Q1) Answer the following (Any 4 out of 6)

(20 M)

- a) Give any five examples of discrete Random Variable. (Co1) (R)
- b) Define chi square distribution; List its Characteristic? (Co1) (R)
- c) A pair of dice is thrown. If the sum of the number is an odd number, what is the probability that sum is divisible by 3. Co1 (A)
- d) Define the term. (CO1) (R)
 - 1) Random Experiment
 - 2) Sample Space
 - 3) Event
 - 4) Favorable outcome
- e) Find the possible value of X in case of tossing of two coins simultaneously where X is the number of heads (Co2) (U)
- f) Enlist the properties of T distribution. Co1 (R)

Q2) Answer the following (Any 4 out of 6)

(20 M)

- a) Explain the term mathematical Expectations of Discrete Random Variable. Co2 (U)
- b) Let the output of random variable X denote the number of defective computer parts in a shipment of 400. The following table gives the probability mass functions (pmf) of X. Find Expectation, mean and variance Co1 (U)

X	0	1	2	3	4	5
P(X)	0.02	0.2	0.3	0.3	0.1	0.08

- c) Verify which of the following functions are pdfs. Co2 (A)

$$1) \quad f(x) = \frac{x^3}{500} \quad (10-x) \text{ for } 0 \leq x \leq 10$$

$$f(x) = 0 \quad \text{otherwise}$$

$$2) \quad f(x) = 2e^{-x} \quad x \geq 0$$

$$= 0 \quad \text{otherwise}$$

- d) Explain the term 'Reliability function' of continuous random variable. (Co2) (U)
- e) State and Explain the properties of F' distribution. (CO2) (U)
- f) The mean and variance of binomial variate are 12 and 6. Find:- Co2 (A)

$$i) p(X=0)$$

$$ii) P(x \geq 1)$$

3) Answer the following (Any 4 out of 6)

(20 M)

- a) Explain Type 1 and Type II error in testing of hypothesis. (Co3) (U)
- b) A sample of 50 files from a file system is selected. The sample mean size of file is 12.3 Kbytes. The standard deviation is known to be 0.5 Kbytes. Whether there is evidence at 0.05 level of significance that the populations mean size of file is 12.5k bytes. (Co2) (A)
- c) A Real Estate Agency want to compare the price of two BHK flats in two area of Bangalore city. A sample of 60 listings in Area 1 and 99 listings in Area 2 yields the following result (In lakh of rupees)

X	Area1	Area2
(X)	72	68
Population SD	13	18
N	60	99

At the 0.05 level of significance, is there evidence that the average price in area 1 is higher than area?
(Co3) (A)

- d) Write a short notes on confidence intervals. (Co3) (R)
- e) Compare Parametric and Non parametric test. (Co3) (R)
- f) Explain the procedure to conduct wilcoxon signed rank test. (Co3) (U)

4) Answer the following (Any 5 out of 6)

(15 M)

- a) Explain Run test for randomness. (Co4) (AU)
- b) Write a short notes on Confidence Interval
- c) Following is the cumulative distribution function of discrete random variable X

X	1	2	3	4	5	6	7
f(x)	0.09	0.23	0.35	0.49	0.71	0.89	1.00

Find 1) p m f of X 2) Standard deviation . (Co4) (A)

- d) Suppose a family of 3 children. Let X is the number of girls in a family. Find probability distribution of X
(Co2) (A)
- e) Write a short note of F test (co2)(A)
- f) Compare parametric and non-parametric Test (CO 3) (A)

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