

Date:

Registration number:

ST JOSEPH'S UNIVERSITY, BENGALURU-27
M.Sc., MATHEMATICS - II SEMESTER
SEMESTER EXAMINATION: May 2023
MT 8621 - STATISTICS

Time- 1 ½ hrs

Max Marks-50
(5 x 10 = 50)

Answer any 5 full questions

This question paper contains 2 printed pages
Each question carries 10 marks

- ONE Graph Sheet is to be provided with answer script.
- Statistical tables are to be provided for reference.

1. i) The scores of 10 students in a test out of 50 were 28, 36, 34, 28, 48, 22, 35, 27, 19, 41. Later the maximum mark was increased to 100 and accordingly each students' score was double. Find the variance of the new score.

ii) Represent the given data in the form of Ogive curve.

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Number of Students	7	10	20	13	12	19	14	9

(5+5)

2. i) Calculate the first four moments about the mean for the following distribution.

Variable	0-10	10-20	20-30	30-40
Frequency	1	3	4	2

ii) A random variable has the following probability distribution

X	-2	-1	0	1	2	3
P(X)	0.1	K	0.2	2k	0.3	3k

Find (i) the value of k (ii) Evaluate $P(X < 2)$ (iii) Evaluate the mean of X
(iv) Evaluate the variance of X. (5+5)

3. A. i) An insurance company insured 2,000 scooter drivers, 4,000 car drivers and 6,000 truck drivers. The probability of their accident is 0.1, 0.3, 0.2 respectively. One of the insured person meets with an accident, what is the probability that he is scooter driver?

ii) In a large consignment of electric bulbs, 10 percent are defective. A random sample of 20 is taken for inspection. Find the probability that (a) all are good bulbs (b) at most there are 3 defective bulbs (c) exactly there are 3 defective bulbs.

iii) The marks obtained by a number of students for a certain subject is assumed to be normally distributed with mean 65 and standard deviation of 5. If 3 students are taken at random from this set, what is the probability that exactly 2 of them will have marks over 70? (3+4+3)

(OR)

B. Fit a Poisson distribution to the following data and test the goodness of fit. (10)

X	0	1	2	3	4	5	6
Frequency f(x)	275	72	30	7	5	2	1

4. i) A random sample of 100 bulbs from a company P shows a mean life 1300 hours and standard deviation of 82 hours. Another random sample of 100 bulbs from a company Q showed a mean life 1248 hours and standard deviation of 93 hours. Are the bulbs of company P superior to bulbs of company Q at 5% level of significance?

ii) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The Manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample upto the standard? (5+5)

5. i) A group of 10 rats fed on diet A and another group of 8 rats fed on diet B, recorded the following increase in weight. Test the hypothesis that the samples are from populations with equal variances at 5% level of significance.

Diet A	5	6	8	1	12	4	3	9	6	10
Diet B	2	3	6	8	10	1	2	8	-	-

- ii) Mechanical Engineers testing a new arc welding technique, classified welds both with respect to appearance and X-ray inspection. Test for independence using 0.05 level of significance.

		Appearance		
		Bad	Normal	Good
X-ray	Bad	20	7	3
	Normal	13	51	16
	Good	7	12	21

(5+5)

6. i) The equation of two regression lines obtained in a correlation analysis is as follows: $3x + 12y = 19$; $3y + 9x = 46$. Obtain (i) correlation coefficient (ii) mean value of X and Y.
 ii) Obtain the lines of regression of Y on X from the data given below.

X	50	55	50	60	65	65	65	60	60	50
Y	11	14	13	16	16	15	15	14	13	13

(5+5)

7. i) Define Type – I and Type – II error.
 ii) Explain the types of sampling in detail. (2+8)
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