



Date:

Registration number:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27
M.Sc., MATHEMATICS - II SEMESTER
SEMESTER EXAMINATION: April 2022
(Examination conducted in July 2022)

MT 8621 - STATISTICS

Time- 1 ½ hrs

Max Marks-35

(7 x 5 = 35)

Answer any 7 full questions

This question paper contains 2 printed pages

Each question carries 5 marks

1. i) Draw the Ogive curve for the given data.

C.I	0-10	10-20	20-30	30-40	40-50	50-60
Freq.	8	16	30	35	15	26

- ii) In a class, 40 speaks Kannada, 12 speaks Tamil, 9 speaks Malayalam, 7 speaks Telugu and 4 speaks Hindi. Present the data in a pie-chart with appropriate angles. (3+2)

2. Find the mean and standard deviation of the following table giving the age distribution of 542 ages.

Ages	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of persons	3	61	132	153	140	51	2

3. Calculate Karl Pearson's coefficient of skewness from the given data.

Profit in lakhs	Below 20	Below 40	Below 60	Below 80	Below 100
No of firms	8	20	50	64	70

4. i) Assume that the factory has two machines. Past records shows that machine I produces 20% of the items of output and machine II produces 80% of the items. Further, 6% of the items produced by machine I were defective and only 1% produced by machine II were defective. If a defective item is drawn at random, what is the probability that it was produced by (a) machine I, (b) machine 2?

- ii) Write a short note on systematic random sampling and stratified random sampling. (3+2)

5. i) If the probability density function of a random variable X is $f(x) = \frac{x}{2}$ in $0 \leq x \leq 2$, find $P(X > 1.5 / X > 1)$.

- ii) Assuming on an average, number of telephone numbers, one out of four called between 5p.m. to 6 p.m, on week days in Bengaluru City is engaged. Find the probability that if 10 randomly selected telephone numbers are called, not more than 3 of them will be engaged. (3+2)

6. i) The savings bank account of a customer showed an average balance of Rs.150 and a standard deviation of Rs.50. Assuming that the account balances are normally distributed, (a) What percentage of account is over Rs.200? (b) What percentage of account is between Rs.120 and Rs.170? (c) What percentage of account is less than Rs.75?

- ii) An office has four phone lines. Each is busy about 10% of the time. Assume that the phone lines act independently.

(a) What is the probability that all 4 phones are busy?

(b) What is the probability that at least 2 of them are busy?

(3+2)

7. i) A sample of heights of 6400 sailors has a mean of 67.85 inches and SD of 2.56 inches while a sample of heights of 1600 soldiers has a mean of 68.55 inches and SD of 2.52 inches.
- Frame the hypothesis to test those soldiers are taller than sailors.
 - What test static is to be used to test the hypothesis?
 - Write your inference based on the result.

ii) Define null hypothesis and alternate hypothesis with example. (3+2)

8. 1000 students at the college level were graded according to their I.Q. and their economic conditions. What conclusion can you draw from the following data, given that the tabulated value $\chi^2_{0.05} = 3.841$

Economic conditions	I.Q level	
	High	low
Rich	460	140
Poor	240	160

9. Calculate the correlation coefficient for the following heights (in inches) of fathers X and their sons Y.

X: 65 66 67 67 68 69 70 72

Y: 67 68 65 68 72 72 69 71

10. i) The lines of regression in a bivariate distribution are $X + 9Y = 7$ and $Y + 4X = \frac{49}{3}$. Find the mean of X, regression coefficients b_{XY} and b_{YX} .
- ii) The two regression equations of two random variables X and Y are $4x - 5y + 33 = 0$ and $20x - 9y = 107$. Find the mean values of X and Y. (3+2)
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