

22397

24225

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable scientific Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following :

10

- (a) Find the harmonic mean of 2, 4, 5, 11, 14.
- (b) Find the D6 for the following data :
11, 25, 20, 15, 24, 28, 19, 21
- (c) If the Karl Pearson's coefficient of skewness of a distribution is 0.32, the standard deviation is 6.5 and the mean is 29.6, then find the mode of the distribution.
- (d) Find the covariance of the following pair of observation of two variate.
(2.1, 8), (2.5, 12), (4.0, 14), (3.6, 10)
- (e) Eight coins are tossed once, find the probability of getting exactly two tails.
- (f) If X is a Poisson variate such that $P(X = 1) = P(X = 2)$ then find $P(6)$.
- (g) Calculate the probability of normal distribution with the population mean 2, standard deviation 3 of random variable 5.



2. Attempt any THREE of the following :

12

- (a) The average of marks obtained by 120 candidates was 35. If the average of marks of passed candidate was 39 and that of failed candidates was 15, what is the number of candidates who passed the examination ?
- (b) Find median of the following data :

Age	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Frequency	3	4	7	8	5	2	1

- (c) The following data gives the marks obtained by 100 students of a class. Calculate median using ogive curve.

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
No. of Students	2	5	6	8	10	25	20	18	04	02

- (d) Calculate Spearman's ranks correlation coefficient of the following data :

	Marks									
English	56	75	45	71	62	64	58	80	76	61
Maths	66	70	40	60	65	56	59	77	67	63

3. Attempt any THREE of the following :

12

- (a) Calculate the coefficient of skewness from the following data :

x	3	6	9	12	15	18
f	10	23	18	15	22	16

- (b) Calculate Bowley's coefficient of skewness from the following data :

Size	2	4	6	8	10	12
Frequency	11	22	18	15	10	4

- (c) Using least square method, fit the straight line $Y = a + bx$ for the following data :

x	0	5	10	15	20
y	7	11	16	20	26

- (d) Calculate coefficient of correlation between x and y series from the following data :

$$\Sigma x^2 = 215, \Sigma y^2 = 163, \Sigma xy = 186$$

4. Attempt any THREE of the following :**12**

- (a) Calculate coefficient of correlation for the data :

x	3	5	9	13	15
y	9	13	10	23	35

- (b) Fit the regression line for the following data :

x	10	22	22	13	16	21
y	25	18	24	25	12	17

- (c) A five digit number is formed by the digits 1, 2, 3, 4, 5 without repetition. Find the probability that the number formed is divisible by 4.
- (d) In a hospital, there are two vacancies for the post of doctor. A doctor and his wife come for interview. The probability of selection of doctor is $\frac{1}{10}$ and his wife is $\frac{1}{8}$. Find the probability that only one will be selected.
- (e) In a bulb factory machines A, B and C manufacture 60%, 30% and 10% bulbs respectively. 1%, 2% and 3% of the bulbs produced respectively by A, B and C are found to be defective. Find the probability that these bulbs were produced by the machine A.

5. Attempt any TWO of the following :**12**

- (a) Attempt the following :

- (i) If 3% of electric bulbs manufactured by a company are defective, if 100 bulbs are manufactured. Find the probability that exactly five are defective.
- (ii) If 2% of pipes manufactured by a company are defective, find the probability that in a sample of 1000 pipes, exactly 6 pipes are defective.
- (b) The number of traffic accidents that occurs on a particular stretch of road during a month, follows a Poisson distribution with a mean of 9.4. Find the probability that less than two accidents will occur on this stretch of road during a randomly selected month.

- (c) In a test of 2000 electric bulbs, it was found that the life of a particular make was normally distributed with average life of 2040 hours and standard deviation of 60 hours. Estimate the number of bulbs likely to burn for between 1920 hours and 2160 hours.

Given that $A(2) = 0.4772$, $A(1.83) = 0.4664$

6. Attempt any TWO of the following :

12

- (a) Attempt the following :

- (i) A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025 cm. A random sample of 10 washers was found to have an average thickness of 0.024 cm with a standard deviation of 0.002 cm. Test the significance of deviation. (Value of t for 9 degree of freedom at 5% level is 2.262.)
- (ii) The following table gives the distribution of births across the days of the week. Find the value of χ^2 (chi-square).

Day :	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Births :	13	23	24	20	27	18	15

- (b) Test whether the sample having the values 63, 63, 64, 55, 66, 69, 70, 70, 71 has been chosen from a population with mean 65 at 5% level of significance. (Value of t for 8 degree of freedom is 2.31)
- (c) In an anti-malaria campaign in a certain area, quinine was administered to 812 persons, out of a total population of 3248. The number of fever cases is shown below :

Treatment	Fever	No fever	Total
Quinine	140	30	170
No Quinine	60	20	80
Total	200	50	250

Calculate the value of χ^2 (chi-square) and discuss the usefulness of quinine in checking malaria. (Given for 1 degree of freedom value of χ^2 (chi-square) at $\alpha = 0.05$ level of significance 3.84)
