

22397

22232

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 Electronic Pocket Calculator is permissible.

Marks**1. Attempt any FIVE of the following :****10**

- (a) The mean of 30 observations is 20 and mean of 20 observation is 30. Find mean of combine 50 observations.
- (b) If standard deviation of data is 8.5, Mean of data is 20.6 and mode of data is 18.52. Find Karl Pearson's coefficient of Skewness.
- (c) Find Q3 (Upper quartiles) for the data
33, 18, 24, 11, 59, 47, 61, 72
- (d) Find Spearman's rank correlation coefficient for the data.

x	12	17	22	27	31
y	113	119	117	115	121

- (e) From 20 tickets Marked 1 to 20, one ticket is drawn at random. Find the probability that it is marked with multiple of 3 or 5.
- (f) An unbiased coin is tossed 6 times. Find the probability of getting at least four head.
- (g) A machine which produces mica insulating washers for use in electric device to turn out washers having a thickness 10 mm. A sample of 10 washers has an average thickness 9.52 mm. with standard deviation of 0.6 mm. Find value of t using t distribution.



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

- (a) The mean weight of 150 students in a certain class is 60 kg. The mean weight of boys is 70 kg and that of girls is 55 kg. Find number of boys and girls students in the class.

- (b) Find Median for the data.

C.I.	10-15	15-20	20-25	25-30	30-35	35-40
f_i	3	7	16	12	9	6

- (c) The crushing strength of 45 Cement concrete blocks are given below.

C.I.	146-155	156-165	166-175	176-185	186-195	196-205
f_i	5	7	9	14	6	4

Find the mode graphically and check it Analytically.

- (d) Karl Pearson's coefficient of Skewness of a distribution is 0.32. Standard deviation is 6.5 and Arithmetic mean is 29.6. Find mode and median of the distribution.

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

- (a) Find Karl Pearson's coefficient of Skewness for the data.

x_i	20	30	40	50	60	70
f_i	8	12	20	10	6	4

- (b) The sum of the upper quartile and lower quartile of data is 100 and the median is 55. The Bowley's coefficient of Skewness is -0.6 . Find upper and lower quartiles for the data.

- (c) Fit a Straight line $y = a + bx$ for the following data :

x	1	2	3	4	5
y	14	27	40	55	68

- (d) Calculate Karl Pearson's coefficient of correlation for the following data.

x	5	9	13	17	21
y	12	20	25	33	35

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

- (a) Find Spearman's rank correlation coefficient for the data.

x	10	12	18	18	15	17	40
y	15	19	25	30	25	25	30

- (b) Find the regression lines for the following data :

x	6	2	10	4	8
y	9	11	5	8	7

- (c) Five men in a Company of 20 are graduates if 3 men are picked up out of 20 at random. Find probability that (a) they are all graduate (b) at least one is graduate.
- (d) There are 36 boys in a class. 18 boys play cricket, 12 boys play Football, and 6 boys can play cricket and football. One boy is selected at random as manager. Find the probability that he plays cricket or football.
- (e) An insurance company insured 2000 Scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of accidents are 0.01, 0.03 and 0.15 respectively. One of the person meets with an accident. Calculate the probability that he is Scooter driver.

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

- (a) (i) If a random Variable has Poisson distribution such that $P(2) = P(3)$, find $P(5)$.
- (ii) If 20% of the bolts produced by a Machine are defective, find the probability that out of 4 bolts drawn one is defective bolt.
- (b) In a certain Factory turning out razor blades, there is a small chance of 0.002 for any blades to be defective. The blades are supplied in a packets of 10. Use Poisson's distribution to calculate the approximate number of packets containing.
- (i) No defective (ii) one defective (iii) at most two defective blades in a consignment of 10000 packets.

- (c) A sample of 100 dry battery cells tested to find length of life produced the following results $\bar{x} = 12$ hours, $\sigma = 3$ hours

Assuming that the data is normally distributed, calculate the percentage of battery cells have length of life. (i) more than 15 hours (ii) less than 6 hours (iii) between 10 hours and 14 hours.

Given

Z	2.5	2	1	0.67
Area	0.4938	0.4772	0.3413	0.2487

6. Attempt any TWO of the following :

12

- (a) (i) In a sample of 600 men from a certain city 450 are found smokers. In another sample of 900 men from another city 450 are smokers. Find standard normal variate Z using sampling distribution of proportions.
- (ii) The mean life of sample of 100 electric bulbs produced by a Company is computed to be 1570 hours with standard deviation of 120 hours. The company claim that the average life of the bulbs produced by it is 1600 hours.

Find value of t using t distribution and state whether the claim made by company is acceptable.

[Given : Value of t at 5% level of significance is 1.96]

- (b) Ten individuals are chosen at random from a population and their heights are found to be in inches 63, 63, 64, 65, 66, 69, 69, 70, 70, 71. Calculate value of t, using t distribution and state whether the mean height of Universe is 65.

Given : [The table value of t at 5% level of significance with g degrees of freedom is 2.262]

- (c) A certain drug was administered to 500 people out of a total of 800 included in a sample to test its efficiency against typhoid, the results are given below.

	Typhoid	No Typhoid	Total
Drug	200	300	500
No Drug	280	20	300
	480	320	800

Calculate value of χ^2 (chi-square), state whether the drug is effective in preventing Typhoid.

Given : [The table value of χ^2 at 5% level of significance with 1 degree of freedom is 3.84]
