

9/5/13

9th May 13

Mathematics - II (Fundamentals of Statistics)

55 : 1ST HALF-13 (p)-JP

Sem - IV (Rev). Reg. Maths - II. (REVISED COURSE)

Con. 5812-13.

DC-7102

(2 Hours)

[Total Marks : 40

- N.B.** (1) Question No. 1 is compulsory.
 (2) Attempt any **four** questions from remaining six.
 (3) Use of simple calculator is **allowed**.

1. (a) Find quartile deviation and coefficient of quartile deviation :—

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Class :	0-10	10-20	20-30	30-40	40-50
Frequency :	22	38	46	35	20

OR

- (a) 20 people were attacked by a disease and 18 survived. Test the hypothesis that survival rate of persons attacked by a disease is 85%. Test at 5% significance level. 4
 (b) In a box there are 10 aspirin, 7 analgin, 5 paracetamol tablets. If two are selected at random, find probability that :— 4
 (i) both are aspirin
 (ii) they are not paracetamol.

OR

(b) Find mean deviation from mode for following distribution :—

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Size	10-15	15-20	20-25	25-30	30-35	35-40
No. of Objects	8	12	12	18	14	10

2. (a) The following table gives no. of car accidents occurred during various days of week. Test whether the accidents are uniformly distributed over a week ($\chi^2_{5,0.05} = 11.07$) 4

Day	Mon	Tue	Wed	Thu	Fri	Sat
No. of Accidents	14	18	12	11	16	13

- (b) A drug is given to two patients. Probability that first patient will recover is $\frac{2}{3}$ and for second, it is $\frac{3}{4}$. Find probability that : 4
 (i) Both patients will recover
 (ii) Only one of them will recover.

3. (a) Find standard deviation for the data :

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Variate	0-20	20-40	40-60	60-80	80-100
Frequency	5	12	32	40	11

- (b) Mean heights of 1000 students in a college is 165 cm with S. D. 10 cm. Assuming normal distribution. Find no. of students having their heights : 4
 (i) greater than 172 cm
 (ii) between 159 and 178 cm.

[TURN OVER

Con. 5812-DC-7102-13.

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$$\left[\begin{array}{l} \text{Area between } Z = 0 \text{ and } Z = 0.7 \text{ is } 0.258 \\ \text{Area between } Z = 0 \text{ and } Z = 0.6 \text{ is } 0.2257 \\ \text{Area between } Z = 0 \text{ and } Z = 1.3 \text{ is } 0.4032 \end{array} \right]$$

4. (a) Let x be a binomial random variable with mean 4 and variance 2.4. Find probability that x takes values less than or equal to 2. 3
- (b) A manufacturing company purchased three new machines of different makes and wishes to decide whether one of them is faster than others in producing certain output. Five hourly production figures are taken at random from each machine and the results are as follows :— 5

Hour	Machinewise production		
	A_1	A_2	A_3
1	25	31	24
2	30	39	30
3	36	38	28
4	38	42	25
5	31	35	28

Using ANOVA determine the mean speeds of 3 machines are significantly different ($F_{0.05, 2, 12} = 3.89$)

5. (a) S. D. of two samples of sizes 9 and 13 are 2.1 and 1.8 respectively. Can you say that the samples are drawn from two populations with same S. D. ($F_{0.05, 8, 12} = 2.85$) 3
- (b) Fit an exponential curve $y = a \cdot b^x$: 5
- | | | | | |
|-----|---|---|----|----|
| x | 1 | 2 | 5 | 7 |
| y | 1 | 5 | 12 | 20 |
6. (a) Find Karl-Pearsons coefficient of skewness : 4
- | | | | | | | | |
|-----|---|----|----|----|----|----|----|
| x | 6 | 12 | 18 | 24 | 30 | 36 | 42 |
| f | 4 | 7 | 9 | 18 | 15 | 10 | 5 |
- (b) Mean weekly sales of chocolate bars in candy stores was 143.5 bars per store. After an ad campaign mean weekly sales in 12 stores for a week increased to 153.7 with S.D. 17.2 bars. Was ad campaign successful ? 4
- Test at $\alpha = 0.05$. Use $t_{0.05, 11} = 1.796$
7. (a) Find k and hence find expected value of a random variable x and variance for a probability distribution : 4
- | | | | | | | |
|--------|------|------|------|-----|------|------|
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| $p(x)$ | 0.15 | 0.20 | 0.10 | k | 0.30 | 0.20 |
- (b) The first four raw moments of a frequency distribution are 2, 20, 40, 200 respectively. Find mean and variance of a distribution. Also comment on nature of skewness and kurtosis. 4