

(3 Hours)

Total Marks:70

Note: All Questions are compulsory.Use of **simple calculators** is allowed.Figures at the right indicate **full marks**.**Q1. (a) Attempt any 7 [2 marks each]:****[14]**

- (i) If Mode = 40.1, Median = 38.5, then the approximate value of Mean is
(a)39.3 (b)837.75 (c)37.7 (d)37.76
- (ii) The observation which occurs maximum number of times is
(a) AM (b) Median (c) Mode (d) None
- (iii) If 75% of the items lies above 60 and 75% of the items lies below 68.25, then co-efficient of Quartile deviation is:
(a) 0.0843 (b) 0.0643 (c) 0.0720 (d)0.0543
- (iv) If Mode=195.2, Median=198.4, then the approximate value of mean is
(a) 200 (b) 250 (c) 210 (d) 225
- (v) If the mean and coefficient of variation are 10 and 5 respectively. Then the standard deviation is
(a) 10 (b) 50 (c) 0.5 (d) 5
- (vi) For a set of data distribution, mean=76.5, S.D=4.56 and mode=72, then the Karl Pearson's co-efficient of skewness is
(a) 0.9868 (b) 0 (c) 2.9857 (d) None of these
- (vii) Two dice are thrown. The probability that the sum of members appearing is more than 10 is;
(a) 1/18 (b) 1/12 (c) 1/6 (d) None of these
- (viii) If the probability of a defective bulb is 0.25, the mean and variance of the distribution of defective bulbs in a total of 100 is:
(a) 25 , 10 (b) 100, 18.25 (c) 200 and 18.75 (d) 25, 18.75
- (ix) The mean of a sample of 400 items taken from a large population is 10 with standard deviation 2.3. Then the upper limit of 95% confidence for population mean is:
(a)10.325 (b) 10.525 (c) 10.225 (d) 10.625

(b) Attempt any 1**[1]**

- (x) To test the hypothesis of equality among several variables the best measure is:
(a) Z-test (b) t-test (c) Chi-square test (d) ANOVA
- (xi) In hypothesis test 'Type-I' error means:
(a) Reject H_0 when H_0 is true (b) Reject H_0 when H_0 is false
(c) Accept H_0 when H_0 is true (d) Accept H_0 when H_0 is false

Q.2 (a) Attempt any 2[4 marks each]

[8]

- (i) The following are the marks of three students A, B,C in 4 subjects P,Q,R and S respectively. The weights of the subjects are given. Decide which of the three students is the best.

	P	Q	R	S
Marks of A	28	30	40	20
Marks of B	35	25	20	15
Marks of C	30	35	30	20
Weight	4	3	2	1

- (ii) Calculate the 3th decile (D_3) and 67th percentile(P_{67}) for the following data.

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of students	4	2	18	22	21	19

- (iii) The following table gives the platelets count (in lakh/cmm) from the analysis of the blood samples of five different days in pathology laboratory. Find the average platelets count per patient.

Days	1	2	3	4	5
Platelets count	0.50	0.75	1.00	1.43	1.8
No. of patients	65	80	95	90	70

(b) Attempt any 1 [3 marks]

[3]

- (i) The mean of marks scored by 300 students in the subject of statistics is 45. The mean of the top 100 of them was found to be 70 and the mean of the last 100 was known to be 20. What is the mean of the remaining 100 students?
- (ii) Find the missing value of the variate for the following distribution whose mean is 31.87

x	12	20	27	33	-	54
f	8	16	48	90	30	8

Q.3. (a) Attempt any 2[4 marks each]

[8]

- (i) The first of the two samples had 150 items with mean 16 and S.D 4. If the whole group has 250 items with mean 15.6 and variance 13.44, find the mean and S.D of the second group.
- (ii) The daily high blood pressure of a patient on the last 25 days are given below. Find the Mean Deviation and Median and its coefficient:

B.P(mmHg):	102	106	110	114	118	122
No. of days :	3	3	5	8	4	2

- (iii) Calculate the standard deviation for the following data giving the bursting pressure of polythene bags.

Bursting Pressure (in kg.)	5-10	10-15	15-20	20-25	25-30
No. of bags	2	8	25	54	11

(b) Attempt any 1 [3 marks]

[3]

- (i) Discuss the Merits and Demerits of Arithmetic Mean.
 (ii) Discuss skewness and kurtosis.

Q.4. (a) Attempt any 2 [4 marks each]

[8]

- (i) Find mean, variance and standard deviation of the following probability distribution.

x :	2	4	6	8	10
P(X) :	0.3	0.2	0.2	0.2	0.1

- (ii) The four raw moments of a frequency distribution are 2, 20, 40 and 200 respectively. Comment on the nature of skewness and kurtosis.
 (iii) Find the Bowley's co-efficient of Skewness for the following data:

Class	0 - 10	10 - 20	20 - 30	30- 40	40- 50
Frequency	5	8	10	5	2

(b) Attempt any 1 [3 marks]

[3]

- (i) Find k and hence find the expected value of a random variable x and variance for the probability distribution:-

x	2	3	4	5
P(x)	0.1	k	0.4	0.3

- (ii) Three unbiased coins are tossed simultaneously. Write down the sample space of the experiment.
 Also, find the probability of getting;
 (a) Exactly two heads.
 (b) At least two heads.
 (c) At the most two heads.

Q.5 (a) Attempt any 2 [4 marks each]

[8]

- (i) A company produces hand gloves. 3 percent are found to be defective. If a sample of 10 is taken, what is the probability that (i) 2 of the are defective (ii) none is defective (iii) at least one of them is defective.

- (ii) The probability that a man aged 50 years will die within the next year is 0.001. Find the probability that within the next year, out of 1000 such persons:
 (i) exactly 2 will die (ii) at most one will die.
 Given $e^{-0.1} = 0.9050$, $e^{-1} = 0.3679$, $e^{-0.01} = 0.99$
- (iii) The life time of a certain kind of pace maker has a mean of 300 days and a standard deviation of 35 days. Assuming that the distribution of life times is normal, find the probability of life time of pace makers is;
 (1) more than 370 days. (2) less than 265 days
 [Given that area between $z=0$ and $z=2$ is 0.4772, Given that area between $z=0$ and $z=1$ is 0.3413.]

(b) Attempt any 1 [3 marks]

[3]

- (i) Fit a straight line of the form $y = a + bx$ for the following data:

X	8.8	11.6	14.4	17.2	20
Y	1	2	3	4	5

- (ii) Fit an exponential curve $y = ab^x$, from the following data:

Year:	2000	2001	2002	2003	2004
Income (in lakhs):	16	27	33	45	52

Estimate the income for the year 2005.

Q.6 (a) Attempt any 2 [4 marks each]

[8]

- (i) Two batches of tablets were prepared using disintegrating agents A or B. Dissolution was determined on randomly selected tablets with the following results.

	No. of Samples	Mean	Variance
Type A	7	44.2857	23.0629
Type B	6	39	22

Do you think that there is a significant difference in effect due to disintegrant A and B.
 (Given that the table value of t at 5% l.o.s. with 12 d.f is 2.18)

- (ii) In a random sample of 600 tablets manufactured by machine 57 are found to be defective. Manager of the company claims that tablet machine produced only 30% defective tablets. Can we say that manager's claim is supported by sample at 5% l.o.s.? Table value at 5% l.o.s is 1.96.

- (iii) A random sample of 4 batteries each 4 different samples were tested for any difference in their average life with the following results.

Brands			
A	B	C	D
12	14	12	14
15	17	19	21
18	12	20	25
10	19	23	20

Use ANOVA table to check if there is any significant difference in the average life of the four brands at 5% level

$$F_{0.05}(3,12) = 3.49$$

(b) Attempt any 1 [3 marks]

[3]

- (i) From a random sample of size $n=9$ is drawn from normal population gave the following observations:

72, 74, 68, 70, 61, 63, 69, 73 and 71.

To test: $H_0: \sigma^2 = 36$ Vs $H_1: \sigma^2 \neq 36$ (Use at 10% l.o.s.)

(Given that table value of χ^2 with 8 d.f at 5% l.o.s. is 2.306)

- (ii) A drug was given to 10 patients. Changes in their blood pressure were recorded as follows: 6,3,-2,4,-3,4,6,0,0,2.

Is it reasonable to believe that consumption of the drug affected the blood pressure . [Given that $t = 2.262$ at 5% l.o.s at 9 df]
