P&S Important questions for 2nd mid exam

4-Marks : 3rd UNIT

1) A Sample of 900 members has a mean of 3.4 cms and S. D 2.61 cms. Is this samples have been taken from a large population of mean 3.25 cm and S.D 2.61cms. If the population is normal and its mean is unknown. Find the 95% fiducial limits of true mean.
2) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.
3) Experience had shown that 20% of a manufactured product is of the top quality. In one day's production of 400 articles only 50 are of top quality. Test the hypothesis at 0.05 level.
4) 20 people were affected by a disease and only 18 survived. Will you reject the hypothesis that the survival rate affected by this disease is 85% in favour of the hypothesis that is more at 5% level.
5) If two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations.
6) In a random sample of 1000 persons from town A, 400 are found to be consumers of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveals a significant difference between town A and town B, so far as the proportion of wheat consumers is concerned?

4-Marks : 4th UNIT

1) A sample of 26 bulbs gives a mean life of 990 hrs with an S.D. of 20 hrs. The manufacturer claims that the mean life of bulbs is 1000 hrs. Is the sample not up to the standard?
2) A random sample of six steel beams has a mean compressive strength of 58,392 p.s.i with a standard deviation of 648 p.s.i.Use this information and the level of significance 0.05 to test whether the true average compressive strength of the steel from which this sample came is 58000 p.s.i. Assume normality?
3) The average breaking strength of the steel rods is specified to be 18.5 thousand pounds. To test this sample of 14 rods were tested. The mean and standard deviations obtained were 17. 85 and 1.955 respectively. Is the result of experiment significant?
4) In one sample 8 observations from a normal population the sum of the squares of deviations of the sample values from the sample mean is 84.4 and in another sample of 10 observations it was 102.6 test at 5% level whether the populations have the same variance.
5) The means of two random samples of sizes 9 and 7 are 196.42 and 198.82 respectively. The sum of the squares of the deviations from the mean is 26.94 and 18.73 respectively. The sample be considered to have been drawn from the same normal population.

6) Pumpkins were grown under two experimental conditions. Two ransom samples of 11 and 9 pumpkins. Show the sample standard deviations of their weights as 0.8 and 0.5 respectively. Assuming that the weight distribution are normal, test the hypothesis that the true variances are equal.

7) Producer of gutkha claims that the nicotine content in his gutkha on the average is 1.83mg. can this claim accepted if a random sample of 8 gutkha items of this type have the nicotine contents of 2.0, 1.7, 2.1, 1.9, 2.2, 2.1, 2.0, 1.6mg? Use 0.05 level of significance.

8) A random sample of 10 boys had the following I. Q's: 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q of 100?

9) To compare two kinds of bumper guards, 6 of each kind were mounted on a car and then the car was run into a concrete wall. The following are the costs of repairs. Use the 0.01level of significance to test whether the difference between two samples means is significant?

Guard I	107	148	123	165	102	119
Guard I	134	115	112	151	133	129

10) The time taken by workers in performing a job by method I and method II is given below. Do these data show that the variances of time distribution from population from which these samples are drawn differ significantly?

Method I	20	16	26	27	23	22	-
Method II	27	33	42	35	32	34	38

11) The number of automobile accidents per week in a certain community is as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9,4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10-week period?

12) A pair of dice is thrown 360 times and the frequency(Y) of each sum(X) is indicated below:

X	2	3	4	5	6	7	8	9	10	11	12
Y	8	24	35	37	44	65	51	42	26	14	14

Would you say that the dice are fair on the basis of the Chi-square test at a 0.05 level of significance?

4-Marks : 5th UNIT

1) Calculate the Karl Pearson's coefficient of correlation for the following paired data. What inference would you draw from the estimate.

X	28	41	40	38	35	33	40	32	36	33
Y	23	34	33	34	30	26	28	31	36	38

2) Find Karl pearson's coefficient of correlation from the following the data

Wages	100	101	102	102	100	99	97	98	96	95

Cost of living	98	99	99	97	95	92	95	94	90	91

3) Calculate the coefficient of correlation between age of cars (X) and annual maintenance cost (Y) and comment:

X	2	4	6	7	8	10	12
Y	1600	1500	1800	1900	1700	2100	2000

4) Find the coefficient of correlation between X and Y for the following data

X	10	12	18	24	23	27
Y	13	18	12	25	30	10

5) A sample of 12 fathers (F) and their elder sons gave the following data about their elder sons (S). Calculate the coefficient of correlation.

F	65	63	67	64	68	62	70	66	68	67	69	71
S	68	66	68	65	69	66	68	65	71	67	68	70

6) Following are the rank obtained by 10 students in two subjects, Statistics (X) and Mathematics (Y). To what extent the knowledge of the students in two subjects is related.

X	1	2	3	4	5	6	7	8	9	10
Y	2	4	1	5	3	9	7	10	6	8

7) The Rank of 16 students in Mathematics and Statistics are as follows (1,1), (2,10), (3,3), (4,4), (5,5), (6,7), (7,2), (8,6), (9,8), (10,11), (11,15), (12,9), (13,14), (14,12),(15,16),(16,13). Calculate the rank correlation coefficient for proficiencies of this group in Mathematics and Statistics

8) Find the most likely production corresponding to a rainfall 40 from the following data

	Rainfall	Production
Average	30	500kgs
Standard deviation	5	100kgs
Coefficient of correlation	0.8	

9) Calculate the both regression equations of Y on X and X on Y from the data.

Price	10	12	13	12	16	15
Amount Demanded	10	22	24	27	29	33

10) Given the bivariate data

X	1	5	3	2	1	1	7	3
Y	6	1	0	0	1	2	1	5

Find the regression line of Y on X and hence predict Y if X=10. Fit a Regression line of X on Y and hence predict X if Y=2.5.

11) From sample of 200 pairs observation the following quantities were calculated.

$\sum X = 11.34, \sum Y = 20.72, \sum X^2 = 12.16, \sum Y^2 = 84.96, \sum XY = 22.13$. From the above data shows how to compute the coefficient of the equations $Y = a + bX$.

12) Determine the equation of a straight line which best fits the data.

X	10	12	13	16	17	20	25
Y	10	22	24	27	29	33	37

1-Marks : 3rd UNIT

1) Define Alternative Hypothesis
2) Define Critical Region
3) Define type I and type II errors.
4) Define one-tailed test and two tailed test
5) Derive critical values of Z for both two-tailed and single-tailed tests at 1%, 5%, and 10% levels of significance.
6) Write the formula for testing hypothesis concerning single mean, two means, single proportion and two proportions.

1-Marks : 4th UNIT

1) A random sample of size 25 from a normal population has the mean $\bar{x} = 47.5$ and S.D S=8.4. Does this information tend to support or refute the claim that the mean of the population is $\mu = 42.5$?
2) A sample of size 10 was taken from a population S.D of sample is 0.03. Find the maximum error with 99% confidence.
3) Ten bearings made by a certain process have a mean diameter of 0.5060cm with S.D of 0.0040cm. Construct 95% confidence interval for actual mean?
4) Write down the applications of the F- distribution
5) Write the properties of F-distribution.
6) For an F-distribution, find $F_{0.99}$ with $v_1=28$ and $v_2=12$
7) If two independent samples of sizes $n_1= 13$ and $n_2=7$ are taken from a normal population. What is the

probability of the first sample will be atleast four times as large as that second sample

8) What is that Degree of freedom?
9) What is the degree of freedom of Binomial distribution?
10) What is difference between t-test and F-test.
11) Define chi-square distribution.
12) Write the formula for F- test.

1-Marks : 5th UNIT

1) Define Correlation with types.
2) What is correlation coefficient
3) Write the properties of the correlation coefficient.
4) Write the formula for Karl Pearson's coefficient of correlation.
5) Write the formula for rank Correlation (Spearman's rank Correlation).
6) Write the formula of rank correlation for repeated ranks.
7) Write the properties of rank correlation coefficient.
8) Define Regression and regression line.
9) Write the formulas for the regression equations of X on Y and Y on X.
10) Write the formulas for the regression equations of X on Y and Y on X if actual means are fractions.
11) If θ is the angle between two regression lines and S.D of Y is twice the S.D of X and r=0.25, find $\tan\theta$
12) If $\sigma_x = \sigma_y = \sigma$ and the angle between the regression lines is $\text{Tan}^{-1}(4/3)$. Find r