SR 22

SET – 1

PART – A (10x1M = 10M)

Note: Answer all Questions. Each Question carries equal marks.

Q. No	Question (s)	Marks	BL	CO
	UNIT – IV			
1	**a)** Write down the applications of the F- distribution	**1M**	L2	**C221.4**
	b) A sample of size 10 was taken from a population S.D of sample is 0.03. Find the maximum error with 99% confidence	**1M**	L2	**C221.4**
	c)For an F-distribution, find $F_{0.99}$with v_1=28 and v_2=12	**1M**	L2	**C221.4**
	d) What is that Degree of freedom?	**1M**	L2	**C221.4**
	UNIT – V			
	e) Define Regression.	**1M**	L2	**C221.5**
	f) Write the formula for Karl Pearson's coefficient of correlation.	**1M**	L2	**C221.5**
	g) Write the formula for the regression equation of X on Y.	**1M**	L1	**C221.5**
	h) Define Correlation with types.	**1M**	L1	**C221.5**
	UNIT – III			
	i) Define Alternative Hypothesis	**1M**	L1	**C221.3**
	j) Define Critical Region.	**1M**	L1	**C221.3**

PART – B (20M)

Q. No	Question (s)	Marks	BL	CO
	UNIT – IV			
2	**a)** A random sample of 10 boys had the following I. Q's: 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. (i) Do these data support the assumption of a population mean I.Q of 100?	**4M**	L3	**C221.4**
	b) 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.	**4M**	L3	**C221.4**
	OR			
3	**a)**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?	**4M**	L2	**C221.4**
	b) 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.	**4M**	L1	**C221.4**

<table>
<tr><td></td><td>The mean and standard deviations obtained were 17. 85 and 1.955 respectively. Is the result of experiment significant?</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">UNIT – V</td></tr>
<tr><td>4</td><td>a) Calculate the coefficient of correlation between age of cars (X) and annual maintenance cost (Y) and comment:
<table>
<tr><td>X</td><td>2</td><td>4</td><td>6</td><td>7</td><td>8</td><td>10</td><td>12</td></tr>
<tr><td>Y</td><td>1600</td><td>1500</td><td>1800</td><td>1900</td><td>1700</td><td>2100</td><td>2000</td></tr>
</table></td><td>4M</td><td>L3</td><td>C221.5</td></tr>
<tr><td></td><td>b) 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.</td><td>4M</td><td>L3</td><td>C221.5</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>5</td><td>a) 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.
<table>
<tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
<tr><td>Y</td><td>2</td><td>4</td><td>1</td><td>5</td><td>3</td><td>9</td><td>7</td><td>10</td><td>6</td><td>8</td></tr>
</table></td><td>4M</td><td>L2</td><td>C221.5</td></tr>
<tr><td></td><td>Calculate the regression equations of Y on X from the data given below taking deviations from actual means of X on Y
<table>
<tr><td>Price</td><td>10</td><td>12</td><td>13</td><td>12</td><td>16</td><td>15</td></tr>
<tr><td>Amount Demanded</td><td>10</td><td>22</td><td>24</td><td>27</td><td>29</td><td>33</td></tr>
</table></td><td>4M</td><td>L3</td><td>C221.5</td></tr>
<tr><td colspan="5">UNIT – III</td></tr>
<tr><td>6</td><td>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.</td><td>4M</td><td>L3</td><td>C221.3</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>7</td><td>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.</td><td>4M</td><td>L5</td><td>C221.3</td></tr>
</table>

SET - 2

Analyze	**L4**	**Evaluate**	**L5**	**Create**	**L6**

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PART – A (10x1M = 10M)

Note: Answer all Questions. Each Question carries equal marks.

Q. No	Question (s)	Marks	BL	CO
	UNIT - IV			
1	**a)**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?	**1M**	L2	**C221.4**
	b)What is the degree of freedom of Binomial distribution?	**1M**	L2	**C221.4**
	c)Write the propertiesof F-distribution.	**1M**	L2	**C221.4**
	d)Define chi-square distribution.	**1M**	L2	**C221.4**
	UNIT – V			
	e)What is correlation and regression?	**1M**	L2	**C221.5**
	f)Write the properties of the correlation coefficient.	**1M**	L2	**C221.5**
	g) Write the formula for rank Correlation (Spearman's rank Correlation)	**1M**	L2	**C221.5**
	h)Write the formula of rank correlation for repeated ranks.	**1M**	L2	**C221.5**
	UNIT – III			
	i) Define type I and type II errors.	**1M**	L2	**C221.3**
	j) Derive critical values of Z for both two-tailed and single-tailed tests at 1%, 5%, and 10% levels of significance.	**1M**	L2	**C221.3**

PART – B (20M)

Q. No	Question (s)	Marks	BL	CO
	UNIT - IV			
2	**a)** 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.	**4M**	L4	**C221.4**
	b)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.	**4M**	L4	**C221.4**
	OR			
3	**a)**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.	**4M**	L4	**C221.4**
	b) A pair of dice is thrown 360 times and the frequency(Y) of each sum(X) is indicated below:	**4M**	L3	**C221.4**

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

<table>
<tr><td></td><td>Would you say that the dice are fair on the basis of the Chi-square test at a 0.05 level of significance?</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">UNIT – V</td></tr>
<tr><td>4</td><td>a) Calculate the Karl Pearson’s coefficient of correlation for the following paired data. What inference would you draw from the estimate?
<table>
<tr><td>X</td><td>28</td><td>41</td><td>40</td><td>38</td><td>35</td><td>33</td><td>40</td><td>32</td><td>36</td><td>33</td></tr>
<tr><td>Y</td><td>23</td><td>34</td><td>33</td><td>34</td><td>30</td><td>26</td><td>28</td><td>31</td><td>36</td><td>38</td></tr>
</table></td><td>4M</td><td>L5</td><td>C221.5</td></tr>
<tr><td></td><td>b) Find the most likely production corresponding to a rainfall 40 from the following data
<table>
<tr><td></td><td>Rainfall</td><td>Production</td></tr>
<tr><td>Average</td><td>30</td><td>500kgs</td></tr>
<tr><td>Standard deviation</td><td>5</td><td>100kgs</td></tr>
<tr><td>Coefficient of correlation</td><td>0.8</td><td></td></tr>
</table></td><td>4M</td><td>L3</td><td>C221.5</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>5</td><td>a) A sample of 12 fathers(F) and their elder sons gave the following data about their elder sons(S). Calculate the coefficient of correlation.
<table>
<tr><td>F</td><td>65</td><td>63</td><td>67</td><td>64</td><td>68</td><td>62</td><td>70</td><td>66</td><td>68</td><td>67</td><td>69</td><td>71</td></tr>
<tr><td>S</td><td>68</td><td>66</td><td>68</td><td>65</td><td>69</td><td>66</td><td>68</td><td>65</td><td>71</td><td>67</td><td>68</td><td>70</td></tr>
</table></td><td>4M</td><td>L5</td><td>C221.5</td></tr>
<tr><td></td><td>b) 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 $Y = a + bX$.</td><td>4M</td><td>L4</td><td>C221.5</td></tr>
<tr><td colspan="5">UNIT – III</td></tr>
<tr><td>6</td><td>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.</td><td>4M</td><td>L4</td><td>C221.3</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>7</td><td>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.</td><td>4M</td><td>L4</td><td>C221.3</td></tr>
</table>

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SET-3

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PART – A (10x1M = 10M)
Note: Answer all Questions. Each Question carries equal marks.

Q. No	Question (s)	Marks	BL	CO
	UNIT - IV			
1	**a)** If two independent samples of sizes n1= 13 and n2=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.	**1M**	L2	**C221.4**
	b) What is difference between t-test and F-test.	**1M**	L2	**C221.4**
	c) Write the formula for F- test.	**1M**	L2	**C221.4**
	d) Define the Chi-Square test.	**1M**	L2	**C221.4**
	UNIT – V			
	e)Define correlation and Regression.	**1M**	L2	**C221.5**
	f)Define line of regression.	**1M**	L2	**C221.5**
	g)What is correlation coefficient	**1M**	L2	**C221.5**

	h)Write the properties of rank correlation coefficient.	**1M**	L2	**C221.5**
	UNIT – III			
	i) Define one-tailed test and two tailed test	**1M**	L2	**C221.3**
	j) Write the formula for testing hypothesis concerning two means	**1M**	L2	**C221.3**

PART – B (20M)

Q. No	Question (s)	Marks	BL	CO
	UNIT - IV			
2	a) 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	**4M**	L4	**C221.4**
	b) 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?	**4M**	L5	**C221.4**
	OR			
3	**a)** 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?	**4M**	L4	**C221.4**
	b)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	**4M**	L5	**C221.4**
	UNIT – V			
4	a) 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	**4M**	L4	**C221.5**
	b) The following are the ranks 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	**4M**	L5	**C221.5**
	OR			

<table>
<tr><td>5</td><td>a) Calculate,the Karl Pearson’s coefficient of correlation for the following paired data. What inference would you draw from the estimate?
<table>
<tr><td>X</td><td>28</td><td>41</td><td>40</td><td>38</td><td>35</td><td>33</td><td>40</td><td>32</td><td>36</td><td>33</td></tr>
<tr><td>Y</td><td>23</td><td>34</td><td>33</td><td>34</td><td>30</td><td>26</td><td>28</td><td>31</td><td>36</td><td>38</td></tr>
</table></td><td>4M</td><td>L5</td><td>C221.5</td></tr>
<tr><td></td><td>b) Given the bivariate data
<table>
<tr><td>X</td><td>1</td><td>5</td><td>3</td><td>2</td><td>1</td><td>1</td><td>7</td><td>3</td></tr>
<tr><td>Y</td><td>6</td><td>1</td><td>0</td><td>0</td><td>1</td><td>2</td><td>1</td><td>5</td></tr>
</table>
Fit a Regression line of X on Y and hence predict X if Y=2.5.</td><td>4M</td><td>L5</td><td>C221.5</td></tr>
<tr><td colspan="5">UNIT – III</td></tr>
<tr><td>6</td><td>a) 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.</td><td>4M</td><td>L4</td><td>C221.3</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>7</td><td>b) 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?</td><td>4M</td><td>L4</td><td>C221.3</td></tr>
</table>

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