

[Time:2.30 Hrs]		[Marks:75]
Please check whether you have got the right question paper.		
N.B:	1. All question are compulsory. 2. Figures to the right indicate full marks. 3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.	

Q.1	Attempt <u>any three</u> of the following:	15																										
	<p>a. Find the arithmetic mean, geometric mean, harmonic mean of numbers 2, 4 and 8. Check the relation between them</p> <p>b. Calculate Quartile 3, Deciles -7 and Percentiles 20 from following data.</p> <table><tr><td>Class</td><td>2 -4</td><td>4-6</td><td>6-8</td><td>8-10</td></tr><tr><td>Frequency</td><td>3</td><td>4</td><td>2</td><td>1</td></tr></table> <p>c. Calculate Quartile deviation (Q. D.), Mean Deviation (M. D.) from mean for the following data.</p> <table><tr><td>Marks</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr><tr><td>No. Of students</td><td>6</td><td>5</td><td>8</td><td>15</td><td>7</td><td>6</td><td>3</td></tr></table> <p>d. Find the standard deviation of the following data.</p> <p>i. 12, 6, 7,3,15, 10, 18, 5</p> <p>ii. 9, 3, 8, 8, 9, 8, 9,18</p> <p>e. Explain types of operators used in R language</p> <p>f. Explain Vectors in R language</p>	Class	2 -4	4-6	6-8	8-10	Frequency	3	4	2	1	Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	No. Of students	6	5	8	15	7	6	3	
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Q.2	Attempt <u>any three</u> of the following:	15																										
	<p>a. For the following ungrouped data find the Karl Pearson's Coefficient of Skewness. 12,18,25,15, 16, 10, 8 15, 27,14</p> <p>b. The first four central moments of a distribution are 0, 15, 36, 78. If the mean of the distribution is 8, find the moments about A = 5.</p> <p>c. : If A and B are two events of sample space S, such that $P(A)=0.85$, $P(B)=0.7$ and $P(A \cup B)=0.95$. Find i) $P(A \cap B)$ ii) $(A B)$, iii) $(B A)$.</p> <p>d. A box contains 5 white and 7 black balls. A person draws 3 balls at random. He gets Rs. 50 for every white ball and losses Rs. 10 every black ball. Find the expectation of him.</p> <p>e. A random sample of 100 students is taken from the population of all part-time students in the Maharashtra, for which the overall proportion of females</p>																											

	<p>is 70%. Find sample mean and sample standard deviation.</p> <p>f. A population consists of the five numbers 7, 9, 10, 14, and 20. Consider all possible samples of size 2 that can be drawn without replacement from this population. Find a) the mean of the population, b) the standard deviation of the population, c) the mean of the sampling distribution of means.</p>													
Q.3	<p>Attempt any three of the following:</p> <p>a. Explain the terms statistic and its sampling distribution.</p> <p>b. Define estimator and estimate.</p> <p>c. Explain the term hypothesis and its types.</p> <p>d. Define Type-I and Type-II errors.</p> <p>e. Write down the R-command for the arithmetic mean and compute for the given data. 1, 4, 7, 12, 19, 15, 21 and 20.</p> <p>f. Explain Data import and export in R</p>	15												
Q.4	<p>Attempt any three of the following:</p> <p>a. A machinist is making engine parts with axle diameter of 0.7 inch. A random sample of 10 parts show a mean diameter of 0.742 inch with a standard deviation of 0.04 inch. Compute the statistic you would use to test whether the work is meeting the specifications and state the conclusion.</p> <p>b. A random sample of 16 values from a normal population showed a mean of 41.5 inches and the sum of squares of deviations from this mean = 135 sq. inches. Obtain the 95 % and 99 % confidence limits for population mean.</p> <p>c. In one sample of 8 observations, the sum of the squares of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations it was 102.6. Test whether this difference is significant at 5% LOS given that 5% point of F for $v_1 = 7$ and $v_2 = 9$ degree of freedom is 3.29.</p> <p>d. The following results are obtained at the end of six months of a kind of psychotherapy given to a group of 120 patients and also for another group of 120 patients who were not given the psychotherapy.</p> <table border="1"> <thead> <tr> <th></th><th colspan="2">psychotherapy</th></tr> <tr> <th></th><th>Given</th><th>Not given</th></tr> </thead> <tbody> <tr> <td>condition improved</td><td>71</td><td>42</td></tr> <tr> <td>condition did not improved</td><td>49</td><td>78</td></tr> </tbody> </table> <p>Can we conclude at 5% LOS that the psychotherapy is effective?</p> <p>e. Define test for independence of attributes.</p> <p>f. Define the chi-square</p>		psychotherapy			Given	Not given	condition improved	71	42	condition did not improved	49	78	15
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Q.5	<p>Attempt any three of the following:</p>	15												

- a. Fit a straight line of the form $y = a + bx$ using least square method

x	0	1	2	3	4
y	1	2.9	4.8	6.7	8.6

- b. Fit a parabola of the form $y = a + bx + cx^2$ using least square method

x	0	1	2
y	1	6	17

- c. Fit a curve of the form $y = ae^{bx}$ for the following data

x	0	2	4	6	8
y	3	55	1095	22000	442000

- d. Write short note on correlation.
- e. The following data are given about the expenditure on clothes and expenditure on entertainment. Average expenditure on clothes Rs. 300, average expenditure on entertainment Rs. 100, S.D of expenditure on clothes Rs. 20, S.D of expenditure on entertainment Rs. 15, coefficient of correlation 0.78. Find the two regression equations.
- f. Show that $s^2_{y,x} = s^2_y(1 - r^2)$