Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | | | **18MA3003** | **Duration :** | | **3hrs** | |
| **Sub. Name :** | | | **BIOSTATISTICS AND QUALITY CONTROL** | **Max. Marks :** | | **100** | |
| **Q. No.** | **Sub Div.** | **Questions** | | | **Course Outcome** | | **Marks** | |
|  |  | **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | |  | |  | |
| 1. | a. | From the below table values, find i) the height of brother when sister’s height is 70 ii) The height of the sister when brother’s height is 75.     |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Heights of brothers (in cm) X: | 65 | 66 | 67 | 68 | 69 | 70 | 71 | | Heights of sisters (in cm) Y: | 67 | 68 | 66 | 69 | 72 | 72 | 69 | | | | CO1 | | 8 | |
| b. | Obtain the rank correlation coefficient for the following data:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 68 | 64 | 75 | 50 | 64 | 80 | 75 | 40 | 55 | 64 | | Y | 62 | 58 | 68 | 45 | 81 | 60 | 68 | 48 | 50 | 70 | | | | CO1 | | 8 | |
|  |  |  | | |  | |  | |
| 2. |  | For the following data, find the partial correlation coefficients.   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X1 | 65 | 72 | 54 | 68 | 55 | 59 | 78 | 58 | 57 | 51 | | X2 | 56 | 58 | 48 | 61 | 50 | 51 | 55 | 48 | 52 | 42 | | X3 | 9 | 11 | 8 | 13 | 10 | 8 | 11 | 10 | 11 | 7 |   Express your views about these values by using partial correlation coefficients. | | | CO2 | | 16 | |
|  |  |  | | |  | |  | |
| 3. | a. | The following data gives the lengths of 12 samples of Egyptian cotton taken from a large consignment. 48, 46, 49, 46, 52, 45, 43, 47, 47, 46, 47, 50. Test whether the mean length of the consignment to be taken as 46. | | | CO3 | | 8 | |
| b. | Random sample of 400 men and 600 women were asked whether they would like to have flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that the proportions of men and women in favour of the proposal are same. | | | CO3 | | 8 | |
|  |  |  | | |  | |  | |
| 4. | a. | The following are the measurement of breaking strength of a certain kind of 2-inch cotton ribbon in pounds:  163 165 160 189 161 171 158 151 169 162  163 139 172 165 148 166 172 163 187 173  Use the sign test to test the null hypothesis against the hypothesis at the 0.05 level of significance. | | | CO4 | | 8 | |
| b. | A teacher wishes to test three different teaching methods I, II and III. To do this, the teacher chooses at random three groups of five students each and teaches each group by a different method. The same examination is given to all the students and the marks obtained are given below. Determine at 0.05 significance level whether there is a difference between the teaching methods by using H-test.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Method I | 78 | 62 | 71 | 58 | 73 | | Method II | 76 | 85 | 77 | 90 | 87 | | Method II | 74 | 79 | 60 | 75 | 80 | | | | CO4 | | 8 | |
|  |  |  | | |  | |  | |
| 5. |  | The data resulted from an experiment to compare three burners A, B and C is given below. A Latin square design was used, as the test were made on 3 engines and were spread over 3 days. Is there any significant difference between the three burners?   |  |  |  |  | | --- | --- | --- | --- | |  | Engine 1 | Engine 2 | Engine 3 | | Day 1 | A(16) | B(17) | C(20) | | Day 2 | B(16) | C(21) | A(15) | | Day 3 | C(15) | A(12) | B(13) | | | | CO5 | | 16 | |
|  |  |  | | |  | |  | |
| 6. | a. | In order to determine whether there is significant difference in the durability of 3 makes of computers, samples of size 5 are selected from each make and the frequency of repair during the first year of purchase is observed. The results are as follows:   |  |  |  | | --- | --- | --- | | Makes | | | | A | B | C | | 5 | 8 | 7 | | 6 | 10 | 3 | | 8 | 11 | 5 | | 9 | 12 | 4 | | 7 | 4 | 1 |   In view of the above data, set up one – way ANOVA table and what conclusions can you draw? | | | CO5 | | 10 | |
| b. | A random sample of size 16 has 53 as mean. The sum of the squares of deviations from mean is 135. Can the sample be regarded as taken from the population having 56 as mean? | | | CO3 | | 6 | |
|  |  |  | | |  | |  | |
| 7. | a. | A sample analysis of examination results of 500 students were made. It was found that 220 students had failed, 170 students had secured a third class, 90 were placed in second class and 20 got a first class. Do these figures commensurate with the general examination result which is in the ratio of 4:3:2:1 for the various categories respectively. | | | CO3 | | 8 | |
| b. | For a certain X and Y series which are correlated, the two lines of regression are: 5X-6Y+90 = 0 and 15X–8Y– 130 = 0  Find the mean of the two series and the correlation coefficient. | | | CO1 | | 8 | |
|  | | **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | |  | |  | |
| 8. | a. | Draw a OC curve of the double sampling plan given that *N = 1000, n1 = 50, c1 = 1, n2 = 25* and *c2 = 2.* | | | CO6 | | 10 | |
| b. | Calculate the control limits in respect of chart and R-chart comment on the state of control for the following data: (Given A2 = 0.58, D3 =0, D4 = 2.15)   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Sample No: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | Mean (): | 43 | 49 | 37 | 44 | 45 | 37 | 51 | 46 | 43 | 47 | | Range (R): | 5 | 6 | 5 | 7 | 7 | 4 | 8 | 6 | 4 | 6 | | | | CO6 | | 10 | |