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



**End Semester Examination – Nov/Dec – 2018**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code : 18MA3003** |  | **Duration :** | **3hrs** |
| **Sub. Name : BIOSTATISTICS AND QUALITY CONTROL** |  | **Max. marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Calculate the spearman’s rank correlation coefficient from the following:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | 115 | 109 | 112 | 87 | 98 | 98 | 120 | 100 | 98 | 118 | | B | 75 | 73 | 85 | 70 | 76 | 65 | 82 | 73 | 68 | 80 | | CO1 | 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 |
|  |  |  |  |  |
| 2. | a. | Given the following coefficients of correlation:  r12= 0.45 r13= 0.32 r14= 0.25 r23= 0.61 r24= 0.54  r34= 0.70. Calculate the second order partial correlation coefficient of r12.34. | CO2 | 12 |
| b | Write any five advantages of Multiple Correlation Coefficient | CO2 | 4 |
|  |  |  |  |  |
| 3. | a. | The fatality rate of typhoid patients is believed to be 17.26 per cent. In a certain year 640 patients suffering from typhoid were treated in a metropolitan hospital and only 63 patients died. Can you consider the hospital efficient? | CO3 | 8 |
| b. | The nicotine contents in milligrams in two samples of tobacco were found to be as follows.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Sample A | 24 | 27 | 26 | 21 | 25 | - | | Sample B | 27 | 30 | 28 | 31 | 22 | 36 |   Test whether the samples have come from the same normal population. | CO3 | 8 |
|  |  |  |  |  |
| 4. | a. | The following data relate to the daily production of cement a large plant for 30 days.  11.5 10.0 11.2 10.0 12.3 11.1 10.2 9.6 8.7 9.3  9.3 10.7 11.3 10.4 11.4 12.3 11.4 10.2 11.6 9.5  10.8 11.9 12.4 9.6 10.5 11.6 8.3 9.3 10.4 11.5  Use sign test to test the null hypothesis that the plants average daily production of cement is 11.2 against alternative hypothesis u<11.2 at the 5% level of significance | CO4 | 8 |
| b. | Use the Mann whitney U-test to determine whether there was a difference in the scores of the two groups. Use 5% level of significance.   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Group A | 7 | 11 | 9 | 4 | 8 | 6 | 12 | 11 | 9 | 10 | 11 | 11 | | Group B | 8 | 9 | 13 | 14 | 11 | 10 | 12 | 14 | 13 | 9 | 10 | 8 | | CO4 | 8 |
|  |  |  |  |  |
| 5. |  | The following data resulted from an experiment to compare three burners A, B and C. A Latin square design was used as the test were made on 3 engines and were spread over 3 days.   |  |  |  |  | | --- | --- | --- | --- | |  | 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. | Find the correlation coefficient for the following data:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 78 | 89 | 99 | 60 | 59 | 79 | 68 | 61 | | Y | 125 | 137 | 156 | 112 | 107 | 136 | 123 | 108 | | CO1 | 8 |
| b. | Calculate thetest of goodness of fit for the following data:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | O | 14 | 56 | 110 | 88 | 40 | 12 | | E | 10 | 50 | 100 | 100 | 50 | 10 | | CO3 | 8 |
|  |  |  |  |  |
| 7. | a. | Explain multiple and partial correlation in a trivariate distribution  r12= 0.863r13= 0.648andr23= 0.709. Findr12.3 | CO2 | 8 |
| b. | 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 | 8 |
|  | | | | |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | For a sampling plan N = 2000, n = 100 and c = 0,1,2. Determine the probability of acceptance of the following lots: (i) 0.5% defective (ii) 0.7% defective (iii) 1% defective (iv) 2% defective (v) 4% defective (vi) 8% defective. Draw an OC curve, ATI , AOQ and also obtain the value of AOQL. | 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 |