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

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

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| **Code :** | **18MA2002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DESIGN AND ANALYSIS OF EXPERIMENTS** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | |
| 1. | Write the formula for standard deviation. | CO1 | 1 |
| 2. | Define median for ungrouped data for odd number of observations. | CO1 | 1 |
| 3. | Write the empirical relationship between mean, median and mode. | CO1 | 1 |
| 4. | Define coefficient of variation. | CO1 | 1 |
| 5. | Define scatter diagram. | CO2 | 1 |
| 6. | Define positive correlation. | CO2 | 1 |
| 7. | Write the formula for Karl Pearson’s coefficient of correlation. | CO2 | 1 |
| 8. | What do you mean by Spurious correlation? | CO2 | 1 |
| 9. | Define critical region. | CO4 | 1 |
| 10. | Define level of significance. | CO4 | 1 |
| 11. | Define two types of errors. | CO4 | 1 |
| 12. | Define degrees of freedom. | CO4 | 1 |
| 13. | Give the layout plan for RBD. | CO5 | 1 |
| 14. | Mention the basic principles of designs of experiments. | CO5 | 1 |
| 15. | Give reason why F test is robust. | CO5 | 1 |
| 16. | What is post hoc test? | CO5 | 1 |
| 17. | What do you mean by factorial experiment? | CO3 | 1 |
| 18. | Define confounding. | CO3 | 1 |
| 19. | Write any method to manage data with missing values. | CO3 | 1 |
| 20. | Write the layout of split plot design. | CO3 | 1 |

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| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | |
| 21. | Find the mean and median for the following data:  8, 15, 7, 21, 40, 6, 18, 16, 37, 16, 19, 17 | CO1 | 5 |
| 22. | The mean of marks in Statistics of 100 students in a class was 72. The mean of marks of boys was 75, while their number was 70. Find out the mean marks of girls. | CO1 | 5 |
| 23. | Find the standard deviation for the following data:  78, 98, 85, 65, 48, 86, 112, 57, 98, 99, 67, 76 | CO1 | 5 |
| 24. | Find the Correlation Coefficient for the following data:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 28 | 39 | 55 | 79 | 56 | 87 | 49 | 56 | 38 | | Y | 62 | 48 | 58 | 59 | 74 | 81 | 39 | 66 | 70 | | CO2 | 5 |
| 25. | Find Spearman’s Rank Correlation Coefficient for the following ranks:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Rank in X | 6 | 8 | 7 | 3 | 4 | 2 | 1 | 5 | | Rank in Y | 3 | 8 | 1 | 7 | 6 | 4 | 5 | 2 | | CO2 | 5 |
| 26. | The variables x and y have the regression lines 3x + 2y – 26 = 0 and 6x + y – 31 = 0. Find the correlation coefficient between them and means of x and y. | CO2 | 5 |
| 27. | The mean weekly sales of chocolate bars in candy stores was 146.3 per store. After an advertising campaign the mean weekly sales in 22 stores was increased to 153.7 with s.d. 17.2. Was the advertising campaign successful? | CO5 | 5 |
| 28. | Two independent samples of sizes 8 and 7 from a normal population had the following values: Sample I: 22 25 18 48 32 26 37 12  Sample II: 13 17 35 46 22 29 21  Do the population variances differ significantly at 1% level of significance? | CO5 | 5 |
| 29. | The theory predicts the proportion in the four groups A, B, C and D is 9:3:3:1. In an experiment a researcher obtained the numbers in the four groups as 882, 313, 287 and 118 respectively. Do the experimental results support the theory? | CO4 | 5 |
| 30. | Perform Analysis of Variance for the following data:  A: 32 38 67 56 48  B: 22 34 30 47  C: 62 19 28 34 | CO4 | 5 |
| 31. | Write the ANOVA for split plot designs. | CO3 | 5 |
| 32. | Write short notes on 23 factorial experiments. | CO3 | 5 |

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| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | |
| 33. | From the following data find two regression lines and hence correlation coefficient.   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 25 | 28 | 35 | 32 | 31 | 36 | 29 | 38 | 34 | 32 | | Y | 43 | 46 | 49 | 41 | 36 | 32 | 31 | 30 | 33 | 39 |   Also estimate X when Y = 60 and estimate Y when X = 50. | CO2 | 15 |
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| 34. | From the following data find whether there is any significant liking in the habit of taking soft drinks among categories of exployees.   |  |  |  |  | | --- | --- | --- | --- | | Soft drinks | Employees | | | | Clerks | Teachers | Officers | | Pepsi | 10 | 25 | 65 | | Thumps up | 15 | 30 | 65 | | Bovanto | 50 | 60 | 30 | | CO4 | 15 |
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| 35. | The following data gives the sales in 1000’s of rupees by 4 salesmen in 3 states. Analyse the data and draw your conclusions.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | State | Salesmen | | | | | A | B | C | D | | Tamil Nadu | 7 | 5 | 1 | 8 | | Kerala | 6 | 12 | 8 | 15 | | Karnataka | 2 | 6 | 9 | 3 | | CO3 | 15 |