CHRIST UNIVERSITY,BENGALURU - 560029

End Semester Examination October - 2015

Bachelor of Science - CMS / EMS V SEMESTER

Code: STA531 **Max.Marks: 100**

Subject: DESIGN OF EXPERIMENTS AND RESEARCH METHODOLOGY **Duration: 3Hrs**

SECTION A

Answer any TEN questions **10X3=30**

1 Explain the process of constructing a bar chart in EXCEL.

2 What are the options for generating random numbers in EXCEL? Explain briefly.

3 What are the steps for constructing histogram in EXCEL?

4 How do you construct various graphs in SPSS? Explain construction of pie chart.

5 How do you test for correlation and regression in SPSS?

6 Explain the usage of " weight cases" in SPSS.

7 In one way ANOVA show that $\sum_{1}^{k} n_i \alpha_i = 0$

8 Mention any two principles of experimental designs.

9 Write the formula for the critical difference in randomized block design.

10 Define factorial experiment. What are its advantages?

11 Distinguish between factors and levels in a factorial experiment.

12 What are the various steps in formulation of research problem?

SECTION B

Answer any FIVE questions **5X6=30**

13 Write all the steps to solve the following in EXCEL.

The average height of 5 year old boys in a certain country is known to be normally distributed with mean 95 cm and standard deviation 16 cm. A firm is selling a nutrient which it claims will significantly increase the height of children. In order to demonstrate its claim it selects a random sample of 60 four year old boys, half of whom are given the nutrient for one year and half of whom are not. Given that the heights of the boys at 5 years of age, determine whether the nutrient is effective in increasing height.

14

Explain the above table and write all steps to generate it.

15 (a) Define ANOVA and one way ANOVA

(b)Write all the steps for performing one way ANOVA using SPSS.

16 In one way ANOVA is the error sum of squares is an unbiased estimator of σ^2_e ? Prove.

17 Describe the Latin square design and mention its merits and demerits.

18 Explain what is meant by main effects and interaction effects in 2^3 factorial experiments and obtain the expressions for the main effects.

19 What are the advantages of multivariate analysis techniques?

SECTION C

Answer any FOUR questions **4X10=40**

20 Statistically analyze the Latin square design.

21 Explain the statistical analysis of the following data.(Do not solve it).

Researchers have sought to examine the effect of various types of music on agitation levels in patients who are in the early and middle stages of Alzheimer's disease. Patients were selected to participate in the study based on their stage of Alzheimer's disease. Three forms of music were tested: Easy listening, Mozart, and piano interludes. While listening to music, agitation levels were recorded for the patients with a high score indicating a higher level of agitation. Scores are recorded below.

Group	Piano Interlude	Mozart	Easy Listening
Early Stage Alzheimer's	2124221820	9121059	2926302426
Middle Stage Alzheimer's	2220251820	141811913	1518201319

22 Obtain the expectation of the treatment and block sum of squares in two way ANOVA.

23 Completely analyze the 2^2 factorial experiment.

24 Explain the concept of confounding in factorial experiments and statistically analyze the totally confounded 2^3 factorial design.

25 (a) How do you estimate missing values in Latin square design?

(b) What is the efficiency of LSD relative to RBD(rows and columns)?