CHRIST (DEEMED TO BE UNIVERSITY),BENGALURU - 560029

End Semester Examination March - 2018

Bachelor of Science IV SEMESTER

Code: STA431 **Max.Marks: 100**

Subject: SAMPLE SURVEYS AND DESIGN OF EXPERIMENTS **Duration: 3Hrs**

SECTION A

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

1 Expand the terms- CSO,NSSO, MoSPI.

2 In 1999, two departments were combined to form a ministry. Write a short note in this matter.

3 Compare Sampling and Sampling distribution.

4 When an area can be divided into different homogenous groups, what kind of sampling is suitable? Write a few lines about this procedure.

5 Analyze briefly " Regression estimation".

6 Define ANOVA and mention the assumptions made in ANOVA.

7 Name the subject matter of " Design of Experiments".

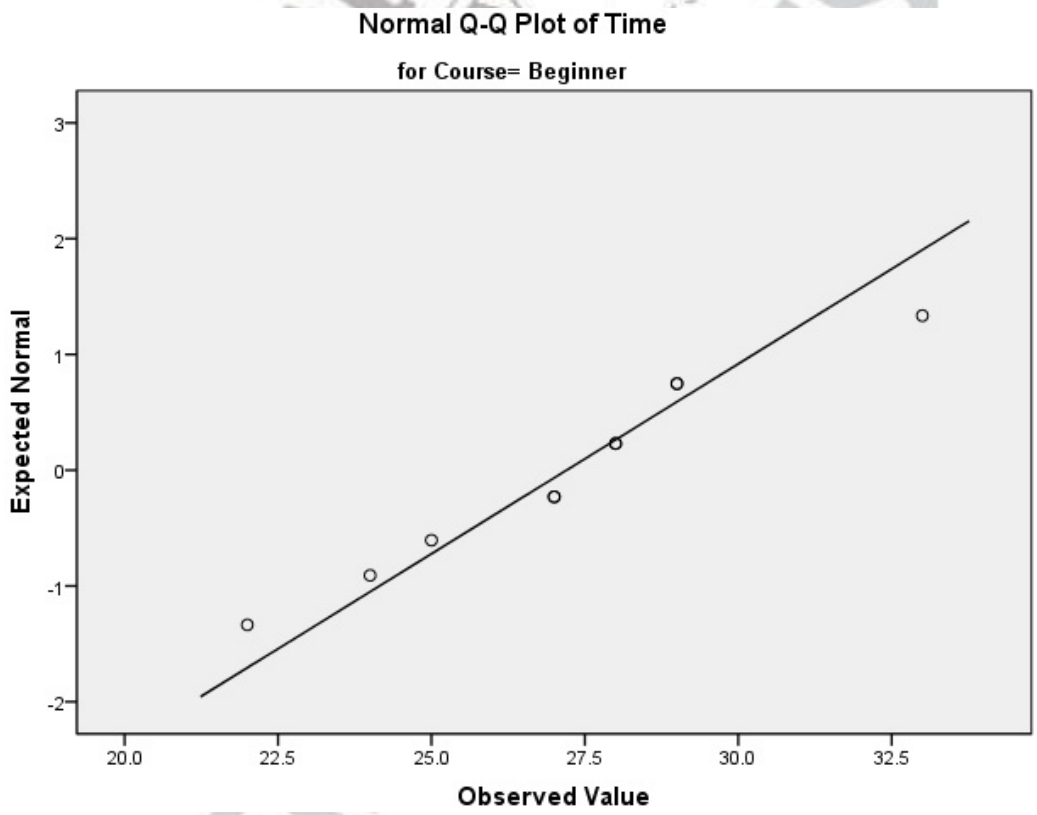
8 Identify two disadvantages of a Latin square design.

9 Name a few factorial designs.

10 Define a 2^3 factorial experiment.

11 Describe Shapiro Wilk test using SPSS.

12 Identify the usage of this graph.



SECTION B

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

13 Explain any three principles of sample survey.

14 Which Sampling technique would you use and why.

Imagine that you own a movie theatre and you are offering a special horror movie film festival next month. To decide which horror movies to show, you survey moviegoers asking them which of the listed movies are their favourites. To create the list of movies needed for your survey, you decide to sample 100 of the 1,000 best horror movies of all time. a.Horror movie population is divided evenly into classic movies (those filmed in or before 1969) and modern movies (those filmed in or later than 1970) Write out all of the movie titles on slips of paper and place them in an

empty box. .Draw out 100 titles and you will have your sample.

15 Explain the terms (a) Design of experiments (b) Uniformity trials (c) Fertility Contour map.

16 Write a note on " Missing Plot technique".

17 Analyze the term " treatment contrast". When are two such contrasts said to be orthogonal? Show that in a 2^2 factorial experiment the main effects and the interaction effects are mutually orthogonal.

18 How do you analyze this data ? Write all steps using R, do not solve it.

A drug company tested three formulations of a pain relief medicine for migraine headache sufferers. For the experiment 27 volunteers were selected and 9 were randomly assigned to one of three drug formulations. The subjects were instructed to take the drug during their next migraine headache episode and to report their pain on a scale of 1 to 10 (10 being most pain).

Drug A 4 5 4 3 2 4 3 4 4
Drug B 6 8 4 5 4 6 5 8 6
Drug C 6 7 6 6 7 5 6 5 5

SECTION C

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

19 How do you allocate sample sizes in proportional and optimal allocation? Give the relationship between SRS, Neyman and proportional allocation after defining each one. (Write all formulae with notations)

20 Identify the best sampling technique when there is a linear trend in observations.

21 Statistically analyze the design which is appropriate here.

Red palm oil, due to its high content of vitamin A, is thought to reduce the occurence and severity of malarity for young children. To investigate whether this is indeed the case, a supplement will be prepared that contains either a placebo, a low dose, or a high dose of red palm oil. Because boys and girls may differ in exposure to malaria and the response to the red palm oil supplement, we consider a two-way ANOVA, that takes also gender into account. Suppose we recruit 75 boys and 75 girls to the study. We will then randomly assign 25 of each gender to each of the red palm oil levels.

22 Explain layout of Latin square design. State all its properties.

23 Build a statistical analysis of 2^3 factorial experiment.

24

Gender	Teaching Method	
	Conventional	Role Play
Male	64 75 60 69 42	38 53 33 46 38
Female	42 55 50 56 51	25 23 32 28 43

ANOVA				
Source of Variation	*SS*	*df*	*MS*	*F*
Gender	994.05			
Teaching method	2714.5			
Interaction	36.45			
Within	756			
Total	4501			

In a medical school a new method of teaching in which professional actors played

the roles of patients was introduced. The test scores of male and female students who were taught by either the conventional method or by a new form of training using role-play are shown in the table. Find F_A , F_B. Is there any difference in the mean test score under (i) Gender (ii) Teaching Method, using a two-way ANOVA at $\alpha = 0.05$. [A : Gender and B : Teaching Method]