VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA

DEPARTMENT OF PRODUCTION ENGINEERING

MID SEMESTER EXAM, MARCH-2016

Subject: **SM&DE** Full Marks: 20

Semester: 6[TH] B.Tech Time: 2 hours

DISTRIBUTION TABLES ARE ALLOWED

Answer any four questions including Q. No. 1

Q.No.1. Answer all the questions [1×5]

(a) Distinguish between Random and Non Random sampling?

(b) What are the criteria for a good estimator?

(c) Write the basic difference between stratified & cluster sampling?

(d) What is significance level?

(e) What is Null and Alternate hypothesis?

Q.No.2 [1.5+3.5]

(a) What are the different methods of random sampling?

(b) Discuss about each methods with example.

Q.No.3 [1×5]

A manufacturer supplies the rear axle for Indian postal service mail trucks. These axles must be able to withstand **80,000** kg/cm^2 in stress test, but an excessively strong axle raises production costs significantly. Long experience indicates the standard deviation of the strength of its axle is **4,000** kg/cm^2.The manufacturer selects a sample of **100** axles from production, test them & finds that the mean stress capacity of the sample is **79,600** kg/cm^2. If the axles manufacturer uses a significance level of **0.05** in testing, will the axles meet his stress requirement?

(For 0.05 level of significance Z= 1.96)

(PTO)

Q.No.4 [2.5+2.5]

Mr. sahu President of National Health Insurance Company is opposed to national health insurance. He argues that it would be too costly to implement, particularly since the existence of such system would, among other effects tend to encourage people to spend more time in hospitals. Mr. sahu believes that the length of stays in hospitals are dependent on types of health insurance that people have. He asked his staff statistician to check the matter. The statistician collected data on a random sample of **660** hospital stays & summarized them in table given below:

Fraction of cost covered by insurance	Days in Hospital			
	< 5 Days	5-10 Days	>10 Days	Total
<25 %	40	75	65	180
25-50%	30	45	75	150
>50%	40	100	190	330

(a) Compute chi-square value.

(b) Test the hypothesis at 0.10 level of significance

Q.No.5 [2.5+2.5]

A company requires that college seniors who are seeking position with it be interviewed by 3 different executives. These enable the company to obtain a evaluation of each candidate. Each executive gives the candidate either a positive or negative rating. For staffing purposes the director of recruitment for this company thinks that the interview process can be approximated by a binomial distribution with P= **0.40** that is with 40% chance of a candidate receiving a positive rating on any one interview. Interview result of 100 candidates is given below:

Possible positive rating for three interview	Number of candidates receiving each of the rating
0	18
1	47
2	24
3	11

(a) State null and alternate hypothesis & compute the chi square value.

(b) Test the hypothesis (goodness of fit) at 0.20 level of significance.