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**B – 2586**

Reg. No. : .....

Name : .....

**Eighth Semester B.Tech. Degree Examination, January 2017  
(2008 Scheme)**

**08.806.3 : INDUSTRIAL QUALITY CONTROL**

Time : 3 Hours

Max. Marks : 100

**PART – A**

Answer **all** questions in Part **A**. **Each** question in Part **A** carries **4** marks.

1. Define control-chart. Name the different types of control charts and their areas of applications.
2. What is the process capability ? Explain the relation between the process capability and specifications.
3. Explain the choice of the control charts for the following situations :
  - a) A textile manufacturer has to control the level of rejections in the different shops of the factory.
  - b) Large bales of cotton coming out of a spinning mill are to be monitored for quality of output imperfection levels has to be controlled.
  - c) The audio tape manufacturer has to maintain the thickness of the magnetic coating on audio tapes.
  - d) A transformation manufacturing unit has to control the number of rejections in the shop floor.
4. What are warning limits on a control chart ? How can they be used ?
5. Differentiate between type A and type B OC curve.
6. Draw the flow chart for double sampling plan.
7. Compare random sampling and stratified sampling.
8. Compare the inherent availability and achieved availability.
9. Define the term 'reliability' and describe why it is expressed as a probability.
10. What is MTBF ? How does it help in assessing reliability ?

P.T.O.



## PART – B

Answer **any one full** question from **each** Module in Part B. **Each full** question carries 20 marks.

## MODULE – I

11. a) What are the eight dimensions of Quality ? Explain their significance with respect to product Quality taking some examples. 10

b) The educational institution is an industry supplying a service (education). It starts with raw material (students), apply a process (teaching) and turn out a finished product (graduate). There are raw material specifications (minimum entrance requirements) and incoming inspection (entrance exams). There is a process specification (curriculum, course outlines); process facilities (faculty, laboratories, books); process controls (reports, assignments and quizzes); and final product testing (examination). You are required to identify the elements through which this educational service achieves fitness for use. 10

The elements include :

- a) The service rendered
- b) Specifications established for “raw material” entering the process
- c) Nature of the process specifications
- d) Nature of the “finished product” specifications
- e) Nature of the Quality controls in use during the various stages of progression from raw material to finished product.

For each service sector listed below, identify the elements (a) through (e) :

- i) Postal service
- ii) Public library
- iii) The bank
- iv) Telephone company
- v) The supermarket.

OR



12. a) A machine is producing a product to a specification of  $12.58 \pm 0.05$  mm. A study of 10 groups of 5 each shows the following measurements. 10

1	2	3	4	5	6	7	8	9	10
12.62	12.63	12.62	12.61	12.59	12.57	12.57	12.58	12.61	12.56
12.60	12.56	12.56	12.66	12.58	12.63	12.56	12.57	12.60	12.55
12.62	12.60	12.57	12.62	12.57	12.60	12.61	12.60	12.62	12.65
12.61	12.59	12.58	12.61	12.59	12.59	12.59	12.62	12.60	12.60
12.65	12.60	12.63	12.60	12.56	12.59	12.60	12.60	12.65	12.54

- i) Determine the control limits for average and range chart and plot the points.
- ii) Determine process capability.
- iii) Does the process meet the given specification requirements ?
- iv) What is the total percentage of rejection if any ?

- b) A company starts new unit for the manufacture of oil cloth. In order to have QC program, the following data from inspection were recorded. Draw an appropriate control chart and suggest a future value for parameter of your choice. 10

Inspected lot number	1	2	3	4	5	6
Square Meter of oil cloth inspected	200	250	100	90	120	80
Number of Non conformities	05	07	03	02	04	01

MODULE – II

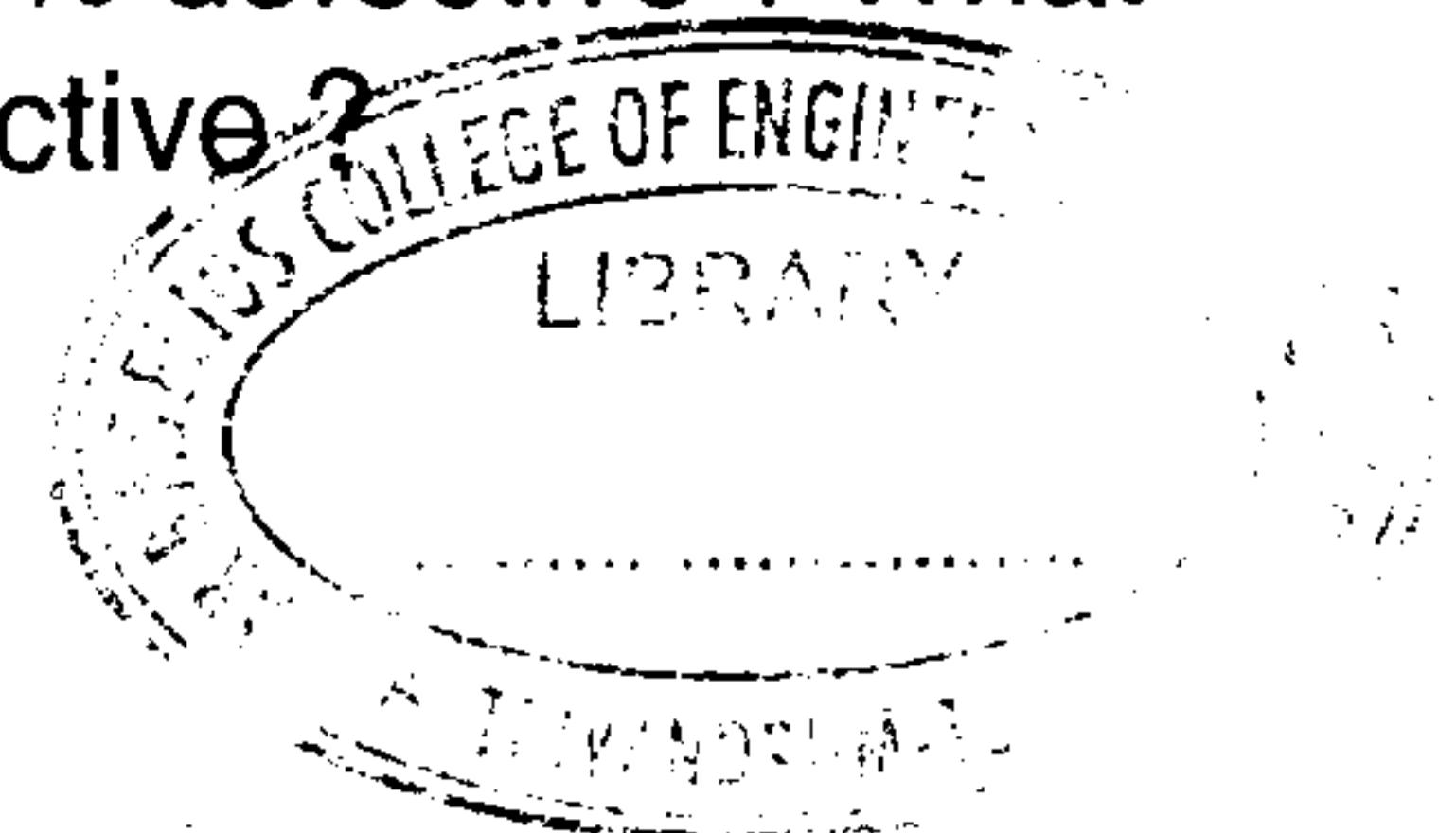
13. a) A single sampling plan has the following parameters.  $N = 4000$ ,  $n = 75$ ,  $C = 2$ . 10
- i) Construct the OC curve
  - ii) Write down the equation for probability of acceptance.
  - iii) If  $AQL = 1.5\%$ , find producer's risk
  - iv) If consumer's risk = 10%. Find LTPD.

- b) A double sampling plan is as follows : 10

$N = 5000$ ,  $n_1 = 100$ ,  $n_2 = 50$ ,  $C_1 = 1$  and  $C_2 = 4$ .

- i) What is the probability of acceptance for 1% defective lot ? If 500 such lots were inspected, how many lots are accepted ?
- ii) Construct the OC curve and AOQ curve.
- iii) What is the AOQ for the above plan, when lot has 1.5% defective ? What is the ATI for the above plan, when lot has 2.5% defective ?

OR





14. a) Given below are the two different types of sampling plans. Assume that the lot size is very large in comparison with the sample size. 15
- Plan A  $n = 100 : c = 2$   
Plan B  $n = 175 : c = 3$
- i) For each plan draw OC curve
  - ii) What is the producer's risk at  $P = 0.8\%$  ?
  - iii) What is the consumer risk at  $P = 4\%$  ?
- State giving reasons for your answer which of the two plans would you consider if you were to be a producer and a consumer.
- b) Explain with sketches the properties of OC curve. 5

#### MODULE – III

15. a) Explain the reasons for poor reliability of components and systems. 10
- b) Explain the utility of 'bath tub curve'. What are the reasons for failure during the three stages of equipment life ? 10
- OR
16. a) Explain the methods of improving system reliability. 10
- b) Discuss the failure pattern for complex products. 10
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