

Roll No.:

B.E/B.Tech. (FT) DEGREE END SEMESTER EXAMINATION APRIL/MAY 2012
INDUSTRIAL ENGINEERING
V SEMESTER
IE373 ENGINEERING QUALITY CONTROL

10

Answer All Questions

PART 'A' (10 x 2 = 20 Mark)

1. Why quality is important in manufacturing?
2. Distinguish between quality assurance and quality control.
3. Write any two limitations of control charts for variables.
4. Name different control charts for attributes.
5. What is process capability index?
6. Differentiate C_p and C_{pk} indices.
7. What do mean by warning control limit?
8. What is demerits control chart?
9. What is the purpose of acceptance sampling?
10. What is an AOQ?

PART -B(5 x 16 = 80 Marks)

11. Explain different quality costs. Also establish relationship between quality and productivity.

12 a i) What is control chart? What are the uses of control charts? (6)

ii) Develop \bar{x} and R chart for the following data . Find whether the process is in control. (10)

Sub group No.	1	2	3	4	5	6	7	8	9	10
\bar{x}	15.72	15.31	15.02	15.06	15.93	15.01	15.71	15.72	15.04	15.47
R	0.04	0.03	0.05	0.01	0.08	0.09	0.05	0.03	0.01	0.08

OR

12 b) The following data refer to the production and number of rejects for 15 consecutive days

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total
No. of Inspected	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	6000
No. of rejects	2	5	0	14	3	0	1	0	18	8	6	0	3	0	6	66

Plot the 100 percent rejected control chart. Suppose the reason for out of control point on 9th day is found and its effect on future production is eliminated, what control limits will you adopt for future production.

13 a) In order to study the machine capability of a certain machine, the characteristic selected is the diameter of gear blanks which this machine is supposed to produce. The diameter specifications are 1.6950-1.7000 inches. The usual procedure for capability study is followed. The data are coded. The measurement unit is 0.0001 inch, and readings are recorded from a 1.6900 inch zero setting. The \bar{x} and R for 20 subgroups of 5 each are recorded as follows.

Subgroup No.	1	2	3	4	5	6	7	8	9	10
\bar{x}	71	72	74	67	79	78	70	80	72	83
R	20	10	25	20	25	25	35	25	20	20

Subgroup No.	11	12	13	14	15	16	17	18	19	20
\bar{x}	81	74	72	71	70	75	74	64	66	68
R	25	30	20	30	40	40	20	20	25	20

- Show the various steps involved in capability study
- Is the machine really capable of meeting the specifications?
- Do you suspect any change in the process by looking at the R chart?
- What is the fraction nonconforming likely to be produced?

OR

13 b) A subassembly of four components is assembled at three workstations.

Workstation 1	A and B	AB
Workstation 2	AB and C	ABC
Workstation 3	ABC and D	ABCD

A process capability study has indicated the following information about the production of four components:

Component	Nominal size	Standard deviation
A	3.16	0.004
B	6.84	0.006
C	8.24	0.005
D	1.76	0.007

If the tolerance range for the subassembly is 0.080, what tolerance ranges needed to be specified for the three workstations?

14 a) Explain the design of multivariate control charts.

OR

14 b) Describe how you will control quality in service sector with example.

15 a i) Write short notes on (8)

i) Double sampling plan.

ii) ATI curve.

ii) Draw OC curve of the single sampling plan $n=200$ and $C=3$ (8)

OR

15 b) i) Differentiate between AQL and AOQL. (6)

ii) A single sampling plan gives $N = 5000$, $n=100$ and $C=2$ (10)

1. Compute the probability of acceptance of lots with 1% defective (approximate using poisson process)

2. Find AOQ value.