CBCS SCHEME

USN | | | | | | | | | | |

18MA732

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Quality Assurance

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of SQC tables is permitted.

Module-1

1 a. Define Quality. List and briefly explain the characteristics of quality. **(08 Marks)**

b. What do you mean by 'Quality of design'? What factors influence quality of design? **(08 Marks)**

c. What do you mean by 'Quality cost'? How are they classified? **(04 Marks)**

OR

2 a. What is 'Quality Audit'? Name and describe the various types of quality audits. **(12 Marks)**

b. Mention the objectives of Quality control. **(08 Marks)**

Module-2

3 a. What is variability? Distinguish clearly between chance cause and assignable causes of variation. **(08 Marks)**

b. Write short notes on:
(i) Principles of rational subgroups.
(ii) Six sigma concept of process capability. **(12 Marks)**

OR

4 a. Define process capability? Explain different types of process capability and mention its applications. **(08 Marks)**

b. Write a short notes on:
(i) Sample size (ii) Sampling frequency **(06 Marks)**

c. Explain various graphical representation of frequency distribution. **(06 Marks)**

Module-3

5 a. A certain types of cylinders are ground to a diameter of 12.5 mm with tolerance of 0.05 mm. If the process is centered at 12.50 mm and dispersion is 0.02 mm. What percentage of product must be scrapped and what percentage must be reworked? To what value the process centre has to be shifted to estimated the scrap to make the scrap zero? What is the percentage of new rework? **(15 Marks)**

b. Discuss Cusum Chart. **(05 Marks)**

OR

6 a. Mention the objectives of control charts. **(05 Marks)**

b. $\overline{X}$ and R control charts have been initiated and maintained for 50 subgroups of 5 each. The specification requirements for the measured quality are 119 ± 10 and σ' of 5 on the assumption that the quality characteristics is normally distributed. Compute approximately what percentage of defective product is being produced. How much of this can be reworked. This process average is 124. **(10 Marks)**

c. List the characteristics of Normal distribution curve. **(05 Marks)**

Module-4

7 a. List the difference between control chart for variables and control charts for attributes. **(05 Marks)**

b. List the purpose of P-chart. **(05 Marks)**

c. An item is made in lots of 200 each. The lots are given 100% inspection. The recorded sheet for the first 25 lots inspected showed that a total of 75 items were defective.

(i) Determine trial control limits for np chart showing number of defectives in each lot.

(ii) Assume that all points falls within the control limits. What is your estimate of the process average fraction defective P'?

(iii) If this P' remains unchanged, what is the probability that the 26^{th} lot will contain exactly 7 defectives? That it will contain for more defectives? **(10 Marks)**

OR

8 a. Distinguish clearly between :

(i) P and nP charts.

(ii) C and U charts. **(10 Marks)**

b. In a manufacturing process the number of defectives found in the inspection of 15 lots of 400 items each are given below.

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of defectives	2	5	0	14	3	0	1	0	18	8	6	0	3	0	6

(i) Determine the trial control limits for nP chart and state whether the process is in control.

(ii) What will be the new value of mean fraction defective if some obvious points outside control limits are eliminated? What will be corresponding upper and lower control limits. Examine whether the process is still in control or not. **(10 Marks)**

Module-5

9 a. List the advantages and disadvantages of sampling plan compared with 100% inspection. **(04 Marks)**

b. A single sampling plan is as follows : N = 5000, n = 80, C = 2.

(i) Plot OC curve for the above plan.

(ii) What is the producer's risk of AQL is 1.5%?

(iii) What is the consumer's risk if LTPD is 4.5%?

(iv) What is the ATI of the bove plan at 1.25% defective of incoming lot?

(v) Plot the AOQ curve and determine the AOQL. **(16 Marks)**

OR

10 a. Describe the benefits of ISO-9000-series standards and mention its disadvantages. **(10 Marks)**

b. A double sampling plan is as follows :

$N = 4000$, $n_1 = 150$, $n_2 = 200$, $C_1 = 4$, $C_2 = 7$, $P' = 0.015$

Calculate : Pa, ATI, AOQ, ASN of the above plan. **(10 Marks)**

* * * * *