

**INDUSTRIAL TOTAL QUALITY MANAGEMENT
(CHEN 4126)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

Candidates are required to give answer in their own words as far as practicable.

**Group – A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Cause and effect diagram is another name of
(a) Ishikawa diagram (b) Frequency distribution diagram
(c) TQM diagram (d) Pareto diagram.
- (ii) In TQM Kaizen means
(a) deplorable condition (b) corporate planning
(c) continuous improvement (d) charitable endeavor.
- (iii) Natural tolerance is also known as _____
(a) specification limits (b) control limit
(c) process capability (d) mean.
- (iv) When is the 100% inspection done?
(a) The supplier's process is so good that defective units are never encountered
(b) The supplier's process is so bad that almost every unit is defective
(c) The component is extremely critical
(d) The component is moderately critical.
- (v) The maximum value of the average outgoing quality over all possible values of the proportion defective, in short form is called
(a) LTPD (b) AOQ (c) AQL (d) AOQL
- (vi) Identify the Scientist who was not associated with TQM.
(a) Deming (b) Mandeliff (c) Shewhart (d) Juran
- (vii) ISO 9000 series is related to Certification of _____ Standard.
(a) Social accountability (b) Environmental management
(c) Quality management (d) Occupational health & safety
- (viii) X chart belongs to
(a) Variable control chart (b) Attributes control chart
(c) Both (a) & (b) (d) None of (a), (b) & (c).

- (ix) Identify the terminology which is associated with the first paradigm of management
 (a) Gemba (b) absence of Dress Code (c) Kaizen (d) Hierarchy
- (x) Which of the following type of histogram represents a normal distribution?
 (a) Bell-shaped (b) Comb (c) Skewed (d) Plateau.

Group- B

2. (a) State the mission of Heritage Institute of Technology. Discuss the status of bottom line of a TQM centric organization. [(CO1)(Remember/LOCQ)]

(b) Let X be a random variable with p.d.f.:

$$f(x) = ax \text{ for } 0 \leq x \leq 1$$

$$f(x) = a \text{ for } 1 \leq x \leq 2$$

$$f(x) = -ax + 3a \text{ for } 2 \leq x \leq 3$$

or 0, elsewhere

Determine the constant α .

[(CO1)(Evaluate/HOCQ)]
(3 + 3) + 6 = 12

3. (a) Analyze Shewart's contribution towards genesis of Statistical Quality Control.

[(CO2)(Analyze/IOCQ)]

(b) Draw the organizational Structure of a process industry and evaluate its various aspects.

[(CO1)(Evaluate/HOCQ)]
6 + 6 = 12

Group - C

4. In Vayuputra aircraft's landing gear assembly, the defects are found as given in the table below:

Aircraft No.	Number of defects		
	A	B	C
1	-	-	5
2	-	1	4
3	-	1	-
4	1	-	2
5	-	2	1
6	-	-	3
7	-	-	3
8	-	-	9
9	-	1	6
10	-	2	1
11	-	-	3
12	1	-	1
13	-	-	-
14	-	4	2
15	-	-	-

If weightages for the different types of defects are:

- A 24
- B 6
- C 1

Construct an appropriate control chart for quality. [[CO2](Evaluate/HOCQ)]
12

5. (a) Draw an Ishikawa diagram mentioning possible causes for the poor quality of cake sold by a baker's confectionery. [[CO2](Analyze/IOCQ)]
 (b) Categorize various control charts used in statistical quality control. How is $\bar{X} - R$ chart constructed? [[CO2](Analyze/IOCQ)]
6 + 6 = 12

Group - D

6. (i) Discuss acceptance sampling plan.
 (ii) With example discuss the construction of operating characteristic (OC) curves.
 (iii) Discuss the effect of parameters on the OC curve. [[CO3](Analyze/IOCQ)]
(4 + 5 + 3) = 12
7. (a) Draw an operating characteristic curve for 100% sampling and explain. [[CO3](Analyze/IOCQ)]
 (b) Explain the construction of the operating characteristic curve for a sampling plan (100,10,1). [[CO3](Evaluate/HOCQ)]
 (c) Discuss, in brief, double sampling procedure. [[CO3](Remember/LOCQ)]
3 + 7 + 2 = 12

Group - E

8. Imagine you as a TQM Specialist in an organization, evaluate the series of activities you are to perform for mock audit of ISO 14000 for the organization. [[CO4] (Evaluate/HOCQ)]
12
9. Enumerate the seven quality management principles as underlined in ISO 9000:2015. Write down brief notes on: (i) Hinshitsu-Hozen (ii) Hall Mark Gold. [[CO4](Remember/LOCQ)]
[7 + (2.5 × 2)] = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	20.83	34.37	44.79

Course Outcome (CO):

After the completion of the course students will be able to

1. Identify and control the quality of processes and hence that of products or goods & services by applying basic statistical tools.
2. Draw various types of Control Charts and analyze to ascertain the state of the process.
3. Develop different sampling plans to evaluate the quality of various types of defects.
4. Apply the techniques of Quality Circles and Kaizen in order to enhance work culture and Total Quality status in an organization.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question;
HOCQ: Higher Order Cognitive Question