

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

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

*Candidates are required to give answer in their own words as far as practicable.
Symbols are of usual significance.*

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) ISO 14000 series is related to Certification of _____ Standard.
(a) Social accountability (b) Environmental management
(c) Quality management (d) Occupational health & safety
- (ii) Which of the following represents India in ISO?
(a) PFRDA (b) FSSAI (c) BIS (d) BCCI.
- (iii) Discrete data is also known as
(a) continuous data (b) variable data
(c) attributed data (d) disputed data.
- (iv) Which of the following is a variable control chart?
(a) C chart (b) P chart (c) nP chart (d) R chart.
- (v) The consumer's risk means the probability that the consumer will
(a) accept a good lot (b) reject a bad lot
(c) accept a bad lot (d) reject a good lot.
- (vi) An ideal size of a Quality Circle is
(a) 5 to 10 members (b) 40 to 50 members
(c) 20 to 40 members (d) none of these.
- (vii) Fish-bone diagram is another name of
(a) PI diagram (b) Network diagram
(c) Ishikawa diagram (d) Pareto diagram.
- (viii) Identify the type A technique among the following:
(a) Brainstorming (b) Stratification
(c) Pareto Analysis (d) SWOT Analysis.
- (ix) The control chart that determines the fraction of rejected parts as non-conforming is
(a) R-chart (b) S-chart (c) P-chart (d) C-chart.

- (x) Small/Mid-sized Six Sigma projects are executed by professionals titled as:
 (a) Champion (b) Green Belt
 (c) Black Belt (d) Site Champion.

Fill in the blanks with the correct word

- (xi) The normal distribution is a _____ distribution.
 (xii) Natural tolerance is also known as _____.
 (xiii) _____ refer to the customer needs that help in keeping a company in the market.
 (xiv) In TQM Muda (無駄) means _____.
 (xv) _____ refers to the operational definition of goals.

Group - B

2. (a) What is Random Variable? [[CO1](Remember/LOCQ)]
 (b) For a series of data points obeying Binomial Distribution, Prove that, $\mu_{np} = E(r) = np$ where symbols stand for usual notations. [[CO1](Evaluate/HOCQ)]
 (c) A cyclist pedals from his house to his college at a speed of 10 km. p.h. and back from the college to his house at 15 km. p. h. Find the average speed. [[CO1](Evaluate/HOCQ)]
2 + 6 + 4 = 12
3. (a) Define the objective of TQM. Describe the difference between quality assurance and TQM. [[CO1](Analyse/HOCQ)]
 (b) State the difference between TQM and six sigma. [[CO1](Remember/LOCQ)]
 (c) State the name of the various tools used for TQM. [[CO1](Apply/IOCQ)]
(2 + 4) + 3 + 3 = 12

Group - C

4. (a) Discuss the role of rational sub groups for solving problems of Control Chart. [[CO2](Remember/LOCQ)]
 (b) An automatic continuous blending process needs to be controlled for the acidity of the output measured in pH. The following samples were taken:

Run	1	2	3	4	5	6	7	8	9	10
pH	5.86	5.31	5.40	5.35	5.67	5.45	5.70	5.62	5.38	5.73

Construct suitable Process mean Chart and [[CO2](Evaluate/HOCQ)]

- (c) Range chart for the system with the help of the following table:

Sample Subgr. Size	A ₁	A ₂	D ₃	D ₄
2	3.76	1.88	0	3.27
5	1.60	0.58	0	2.11

[[CO2](Evaluate/HOCQ)]

2 + 5 + 5 = 12

4. (a) To keep a check a toy shop keeper carried out 100% inspection of his orders from a particular supplier for 10 weeks and the outcome is as follows:

Week	Number Inspected	Number Non-conforming
1	395	42
2	385	41
3	420	51
4	380	37
5	415	54
6	395	43
7	410	48
8	415	61
9	400	49
10	405	53

Prepare a P chart.

[[CO2](Evaluate/HOCQ)]

- (b) What do you understand by SWOT analysis?

[[CO2](Remember/LOCQ)]

10 + 2 = 12

Group - D

6. (a) Mention the advantages of sampling procedure over 100% inspection? [[CO3](Analyse/HOCQ)]
- (b) Write down equations used to calculate probability of acceptance in a sampling plan. With the help of a neat sketch of O.C. curve, explain significance of AQL & LTPD. [[CO3](Apply/IOCQ)]
- (c) Discuss the effects of parameters on O.C. curve. [[CO3](Remember/LOCQ)]
- 3 + (3 + 3) + 3 = 12**
7. (a) What is the role of Steering Committee in a Quality Circle? [[CO4] (Remember/LOCQ)]
- (b) A Q.C. was formed in your working place. In the first meeting an effective brainstorming was conducted and the circle identified a problem pertaining to the same work area. In a next meeting the members identified 20 causes of the selected problem under four sub-heads. Considering you to be the leader of the circle present this case study. [[CO4](Evaluate/HOCQ)]
- (c) Draw a Cause & Effect Diagram based on this case study. [[CO4] (Analyze/IOCQ)]
- 2 + 6 + 4 = 12**

Group - E

8. (a) Discuss the significance and details of ISO 9000 series. Also mention its benefits. [[CO4](Apply/IOCQ)]
- (b) Discuss the difference between ISO 14000 and OSHAS 18000. [[CO4](Apply/IOCQ)]
- (4 + 4) + 4 = 12**
9. (a) Discuss the Gemba principles to achieve total quality of an organization. [[CO4](Analyze/IOCQ)]
- (b) Describe the detailed mode of operation exhibited by Mumbai *Dabbawallahs*. [[CO4](Remember/LOCQ)]

(c) Comment on the achievement of this group which sometimes may be called as the Six Sigma standard.

[[CO4](Analyze/IOCQ)]

4 + 6 + 2 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	20.33	32.29	46.88

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.*