

TOTAL QUALITY MANAGEMENT
(MECH 3236)

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.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) In six-sigma, sigma measures the
 - (a) process mapping
 - (b) capability of the process to perform defect-free work
 - (c) failure mode effect analysis(FMEA)
 - (d) project planning & deliverables
- (ii) Total Quality Assurance is the aggregate of : quality design, quality of conformance and
 - (a) quality audit
 - (b) quality of performance
 - (c) in process inspection
 - (d) quality planning
- (iii) The contribution of Quality Guru Philip Crosby is given by
 - (a) PDCA Cycle
 - (b) Quality Trilogy
 - (c) PDSA Cycle
 - (d) concept to zero defects
- (iv) The average number of units inspected in a double sampling plan is
 - (a) more than that of an equivalent single sampling plan
 - (b) less than that of an equivalent single sampling plan
 - (c) almost the same as single sampling plan
 - (d) both (a) & (c).
- (v) Which quality management programme is related to the maintenance of plants and equipments?
 - (a) Environmental management systems
 - (b) Fault tree analysis
 - (c) Failure mode effect analysis
 - (d) Total productive maintenance.
- (vi) A systematic and independent examination to determine whether quality activities and related results comply with planned arrangements is called
 - (a) quality planning
 - (b) quality audit
 - (c) maintenance audit
 - (d) annual budget.

- (vii) The core values and concepts necessary to sustain a total quality environment are
 (a) customer driven quality
 (b) leadership
 (c) continuous improvement and learning
 (d) commitment to customers.
- (viii) ISO 14011 is a part of
 (a) environmental management system
 (b) quality management system
 (c) environmental auditing
 (d) environmental performance evolution.
- (ix) Pareto chart helps the QC Manager to
 (a) focus on the most critical issues to improve quality
 (b) determine if a process is out of control
 (c) face quality audit
 (d) focus stimulating thinking.
- (x) Which Japanese word means “neatness” in English?
 (a) seiri (b) seiso (c) seiton (d) seiketsu.

Fill in the blanks with the correct word

- (xi) Who developed the concept of the "cost of quality" ? _____.
- (xii) The control chart for number of defects per sample is _____.
- (xiii) _____ identifies the potential cause for a particular quality problem.
- (xiv) Inspection, scrap, and repairs are examples of _____.
- (xv) When the process capability is more than the specified tolerance, the rejections are _____.

Group - B

2. (a) Enumerate briefly the major points that distinguishes between Quality Control and Inspection. [[C01](Remember/LOCQ)]
 (b) Mention the special characteristics of quality in regard to manufacturing and service industry. [[C02](Analyze/IOCQ)]
6 + 6 = 12
3. (a) Define quality cost. What are the different categories of Quality Costs? Briefly discuss about the Internal Failure Costs. [[C02](Analyze/IOCQ)]
 (b) Write short notes on: (i) “Employee Involvement” (ii) “Customer Satisfaction”. [[C01](Remember/HOCQ)]
6 + (3 + 3) = 12

Group - C

4. (a) What do you understand by ISO 9000? Describe in brief the purpose of ISO 9000 quality system. [[CO2](Remember/IOCQ)]
 (b) Mention the steps that are necessary to implement a QMS effectively. [[CO2](Analyze/IOCQ)]
(2 + 4) + 6 = 12
5. (a) Discuss in brief the two specific areas of ISO 14000 series standards. [[CO4](Remember/IOCQ)]
 (b) Briefly mention the benefits of ISO 14000. [[CO4](Remember/IOCQ)]
6 + 6 = 12

Group - D

6. (a) What is meant by the term KAIZEN? Mention briefly the elements that are relevant to 5-S principle. [[CO3](Analyze/LOCQ)]
 (b) Write short notes on: (i) PDCA Cycle (ii) Cause and Effect diagram. [[CO3](Remember/LOCQ)]
(2 + 4) + (3 + 3) = 12
7. (a) Illustrate the characteristics of Quality Circles as a management tool for improving quality. [[CO3](Analyze/IOCQ)]
 (b) Explain the following QC tools that are used for enhancing the quality of an organization: (i) Histogram (ii) Scatter Diagram (iii) Cause and Effect diagram. [[CO3](Remember/LOCQ)]
6 + 6 = 12

Group - E

8. (a) When would you use the following control charts: (i) number of defective chart (ii) fraction defective chart. [[CO5](Evaluate/HOCQ)]
 (b) In a blade manufacturing factory 1,000 blades are examined daily. The following information shows number of defective blades obtained thereto. Draw the np-chart and give your findings.

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No.of defective blades(p)	9	10	12	8	7	15	10	12	10	8	7	13	14	15	16

[[CO5](Evaluate/HOCQ)]
(2 + 2) + 8 = 12

9. (a) Draw a suitable control chart for the following data pertaining to the number of foreign coloured threads (considered as defects) in 15 pieces of cloth 2m x 2m in certain make of synthetic fibre and state your conclusions.
 7,12,3,20,21,5,4,3,10,8,0,9,6,7,20 [[CO6](Evaluate/HOCQ)]
 (b) The design specifications for a component are 100 ± 0.5 mm, whereas the process report shows that process average is 99.9 mm and standard deviation is

0.18. Do these figures call for any action by anybody? What action is necessary and by whom?

[[CO5](Evaluate/HOCQ)]

6+ 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	31.25	37.5	31.25

Course Outcome (CO):

At the end of the course, a student will be able to

- CO 1 Explain the concepts of Total Quality Management and Total Quality Education , Report Quality Cost measure, Customer Satisfaction Index
- CO 2 Identify the problems in Quality Improvement Process , Use various QC tools, appreciate the benefits of implementing 5-S Techniques
- CO 3 Apply various Quality Function Deployment (QFD) Techniques
- CO 4 Analyze Statistical Process Control(SPC) data to improve processes, Design experiments for arriving at optimal solutions
- CO 5 Appreciate the incorporation of ISO System standard and its benefits , Address issues relating to closure of NCR'S
- CO 6 Propose how business leaders might plan and execute quality management in an organization , struggles to gain and sustain competitive advantage in today's global business arena

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