

B.TECH/ME/5TH SEM/MECH 3141/2016

**TOTAL QUALITY MANAGEMENT
(MECH 3141)**

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) After the world war II, Japanese product quality started to improve faster mainly due to
 - (a) massive quality related training program
 - (b) annual programs of quality improvement
 - (c) upper management leadership of the quality function
 - (d) all of the above.
 - (ii) PDCA cycle to enhance quality was introduced by
 - (a) Edwards Deming
 - (b) J. M. Juran
 - (c) K.Ishikawa
 - (d) G.Taguchi.
 - (iii) Statistical process charts are used to control
 - (a) assignable causes
 - (b) chance causes
 - (c) differential causes
 - (d) all of above.
 - (iv) Which one of the following is not a cost of non-conformance?
 - (a) quality training
 - (b) rework
 - (c) scrap
 - (d) warranty cost.
 - (v) Kaizen (in respect of Quality) means
 - (a) continuous improvement
 - (b) continuous clean up
 - (c) continuous discipline
 - (d) continuous study.
 - (vi) 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).

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- (vii) Fish bone diagram, used for identifying the possible causes of a problem, was first conceptualized by
 - (a) Joseph M. Juran
 - (b) Edward Deming
 - (c) Kaoru Ishikawa
 - (d) Philip B. Crosby.
- (viii) 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.
- (ix) The objective of Quality Function Deployment is
 - (a) to improve product development cycle
 - (b) to improve quality of the product
 - (c) to develop product at lower cost
 - (d) all of these.
- (x) 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.

Group - B

2. (a) Define the term "TQM". Mention few of the roles of Senior Management in TQM.
- (b) Write briefly about any two of the following Quality Gurus with respect to the country they belong, specific tool or methods they devised and how it helped to improve the quality of product or service.
(i) Edward Deming (ii) Kaoru Ishikawa (iii) Genichi Taguchi
(iv) Joseph Juran.
- 6 + (3 + 3) = 12**
3. (a) (i) What is quality planning? (ii) What are the basic questions that an organisation must answer before freezing on the quality plan?
- (b) (i) What are the different categories of quality cost involved in making a product?
(ii) Explain in details the best quality cost and the worst quality cost and why they are so?

(1 + 5) + (2 + 4) = 12

Group - C

4. (a) Define the following terms as per International Organisation for Standardisation. (i) Quality (ii) Quality Audit (iii) Non conformance Report (iv) Objective evidence.
- (b) ISO 9000 certification process may be summed up as "Say What You Do" and "Do What You Say"- Explain in details.

6 + 6 = 12

5. (a) What are the steps in ISO 9000 certification in an organisation and who are responsible for implementing those steps? Write in tabular form.
- (b) (i) In which year did Environmental Management System was developed?
(ii) What is the full form of SAGE?
(iii) In which year was technical subcommittee TC 207 for EMS was formed?
(iv) What are the benefits of implementing ISO 14000?

6 + (1 + 1 + 1 + 3) = 12**Group - D**

6. (a) Explain the PDCA cycle for continuous improvement as modified by Deming.
- (b) (i) What is the objective of Quality Function Deployment?
(ii) Describe various sub- processes that are involved in QFD implementation?

6 + (2 + 4) = 12

7. (a) What are the seven QC tools? Briefly describe any two of them.
- (b) An organisation that fills the bottles of shampoo tries to maintain a specific weight of the product. The table gives the weight of 110 bottles that were checked at random intervals. Make a tally of these weights and construct a frequency histogram. (Weight is in Kilogram.)

6.00	5.98	6.01	6.01	5.97	5.99	5.98	6.01	5.99	5.98	5.96
5.98	5.99	5.99	6.03	5.99	6.01	5.98	5.99	5.97	6.01	5.98
5.97	6.01	6.00	5.96	6.00	5.97	5.95	5.99	5.99	6.01	5.98
6.01	6.03	6.01	5.99	5.99	6.02	6.00	5.98	6.01	5.98	5.99
6.00	5.98	6.05	6.00	6.00	5.98	5.99	6.00	5.97	6.00	6.00
6.00	5.98	6.00	5.94	5.99	6.02	6.00	5.98	6.02	6.01	6.00
5.97	6.01	6.04	6.02	6.01	5.97	5.99	6.02	5.99	6.02	5.99
6.02	5.99	6.01	5.98	5.99	6.00	6.02	5.99	6.02	5.95	6.02
5.96	5.99	6.00	6.00	6.01	5.99	5.96	6.01	6.00	6.01	5.98
6.00	5.99	5.98	5.99	6.03	5.99	6.02	5.98	6.02	6.02	5.97

(2 + 4) + 6 = 12**Group - E**

8. (a) Explain the term OC curve with a neat sketch.
- (b) The average percentage of defectives in 27 samples of size 1500 each was found to be 13.7%. Construct a suitable control chart for this situation. Explain how the control chart can be used to control quality?

6 + 6 = 12

9. (a) (i) What do you understand by six sigma? (ii) What are the interpretations when the UCL and LCL lie within specification limits, USL and LSL, and the (a) mean is exactly centred and the (b) mean is shifted towards the right.
- (b) (i) What is experimental design? (ii) What are benefits of designed experiments?

6 + 6 = 12