TOTAL QUALITY MANAGEMENT(TQM)
(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)   The core principle of Total Quality is:
          (a) customer focus
          (b) continuous improvement
          (c) employee involvement and empowerment
          (d) all of these.

   (ii)   The costs associated with measuring , evaluating or auditing the product comes under
          (a) cost of prevention   (b) cost of appraisal
          (c) cost of internal failure   (d) cost of external failure.

   (iii) Who developed the concept of the "cost of quality?"
          (a) Crosby   (b) Deming
          (c) W.Shewhart   (d) Juran.

   (iv)   The quality of the product means
          (a) fitness for use at minimum cost   (b) Degree of accuracy
          (c) degree of perfection at any cost   (d) fitness for use.

   (v)   When the process capability is more than the specified tolerance, the rejections are
          (a) Less   (b) very high
          (c) high   (d) nil.

   (vi)   If the lower limit of a 'p' chart has a negative value, it is
          (a) eliminated from the chart   (b) equated to zero
          (c) treated as negative only   (d) either (a) or (b).

(vii)   X̄ and R charts are used to find out
(a) Production control   (b) cost control
(c) process control   (d) material control.

(viii)   The maximum percent defective that the consumer finds definitely acceptable is called
(a) AOQL   (b) AQL
(c)LTPD   (d) AOQ.

(ix)   The control chart for number of defects per sample is
(a) p chart   (b) np chart
(c) c chart   (d) R chart.

(x)   The team responsible for the total quality implementation project uses "P-D-C-A" cycle in the following phase
(a) the preparation phase   (b) the planning phase
(c) the execution phase   (d) none of these.

Group - B

2. (a)   Define the terms "Quality Control" & "Quality Assurance". How do you distinguish between these two terms?

   (b)   Mention the steps that are required to implement TQM in an organization.

   (2 + 4) + 6 = 12

3. (a)   Illustrate each of the four types of Cost of Quality. Draw a suitable diagram for a "Total Quality Cost Curve".

   (b)   Briefly mention the role of Senior Management in TQM.

   (4 + 2) + 6 = 12

Group – C

4. (a)   What do you understand by ISO 9000?

   (b)   Describe in brief the Principles of QMS.

   4 + 8 = 12

5. (a)   Illustrate the general guidelines on principles, systems and supporting techniques for implementing "Environmental Management System ".

   (b)   Discuss briefly the benefits of ISO 14000.

   6 + 6 = 12

Group – D

6. (a)   Explain the concept of P-D-C-A cycle in "Continuous Improvement" in TQM.

   (b)   Describe the concept of Kano's model in the context of "Customer Satisfaction" in TQM.

   6 + 6 = 12

7. (a)   What is meant by the term KAIZEN? Mention briefly the elements that are associated with 5 S Principles.

   (b)   What is meant by "House of Quality"? What are the benefits of QFD?

   (2 + 4) + (2 + 4) = 12

Group - E

8. (a)   What is meant by "Six-Sigma Quality"? Outline the concept of Six – Sigma Process Capability.

   (b)   Explain the OC curve with reference to sampling inspection with the terms AQL, LTPD, IQL, Producer's risk & Consumer's risk.

   (2 + 4) + 6 = 12

9. (a)   Samples of size 100 were taken from mass production of a product and the average of sample mean was found to be 40 cm. It is known from past experience that it is reasonable to take 13 cm as the population standard deviation. Determine the control limits.

   (b)   A company manufactures screws to a nominal diameter 0.500±0.030 cm. Five samples were taken randomly from the manufactured lot and 3 measurements were taken on each sample at different positions along the length. The readings are shown in the table below:

SAMPLE NO.	MEASUREMENTS PER SAMPLE(cm) x		
	1	2	3
1	0.488	0.489	0.505
2	0.494	0.495	0.499
3	0.498	0.515	0.487
4	0.492	0.509	0.514
5	0.490	0.508	0.499

Calculate the control limits and draw the charts. (Given : A_2 = 1.02, D_3 = 0 & D_4 = 0.018 for n = 3)

   4 + 8 = 12