QUALITY CONTROL AND MANAGEMENT
(MECH 4129)

Time Allotted : 3 hrs   **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> 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 view of quality that focuses on "fitness for use" and "user perception" is Known as: [CO1, LOCQ]
   (a) transcendental view   (b) product based view
   (c) user – based view   (d) value-based view.

   (ii)   "Quality is meeting or exceeding customer expectations". This definition of quality is known as: [CO1, LOCQ]
   (a) perceived quality   (b) customer driven quality
   (c) indifferent quality   (d) expected quality.

   (iii)   To initiate total quality management, an organization must establish a culture based on [CO1, LOCQ]
   (a) customer satisfaction   (b) continuous improvement
   (c) leadership   (d) team work.

   (iv)   Which Japanese word means "neatness" in English? [CO1, LOCQ]
   (a) seiri   (b) seiso   (c) seiton   (d) seiketsu.

   (v)   Which Quality Guru's work is based on "theory of variance"? [CO1, LOCQ]
   (a) Juran   (b) Crosby   (c) Deming   (d) Taguchi.

   (vi)   The control chart for number of defects per sample is [CO5, IOCQ]
   (a) p-chart   (b) np-chart   (c) C-chart   (d) R-chart.

   (vii)   The success of a sampling inspection depends upon [CO6, IOCQ]
   (a) sample size   (b) lot size
   (c) acceptance number   (d) all of the above.

   (viii)   Statistical process charts are used to control [CO6, HOCQ]
   (a) assignable causes   (b) chance causes
   (c) differential causes   (d) all of the above.

(ix)   When the process capability is more than the specified tolerance, the rejections are [CO5, HOCQ]
(a) less   (b) very high   (c) high   (d) nil.

(x)   Which quality management programme is related to the maintenance of plants and equipments? [CO3, IOCQ]
(a) Environmental management systems   (b) Fault tree analysis
(c) Failure mode effect analysis   (d) Total productive maintenance.

Group – B

2.   (a)   Describe the four major categories of costs associated with quality management. [(CO2) (Remember/LOCQ)]
     (b)   Distinguish between Quality Control and Quality Assurance. [(CO2) (Understand/LOCQ)]

6 + 6 = 12

3.   (a)   Write short notes on the following Quality Gurus with respect to their country of origin and their contribution towards enhancement of quality.
           (i) Edward Deming (ii) Kaoru Ishikawa (iii) Philip Crosby.
           [(CO1)(Remember)/LOCQ]
     (b)   Briefly explain the methods that are followed for "Customer Satisfaction". [(CO2) (Understand)/LOCQ)]

6 + 6 = 12

Group – C

4.   (a)   Mention briefly the elements that are associated with the 5-S principles to implement "Kaizen". [(CO2) (Remember)/IOCQ)]
     (b)   Explain the role of management in supporting and sustaining Quality Circles. [(CO1) (Analyze)/LOCQ)]

6 + 6 =12

5.   (a)   Mention the advantages of QFD. [(CO3) (Understand/IOCQ)]
     (b)   Briefly discuss the concept of PDCA cycle for continuous improvement in quality as modified by Deming. [(CO2) (Understand/LOCQ)]

6 + 6 = 12

Group – D

6.   (a)   Discuss in brief the elements of Quality Management System (QMS). [(CO3) (Remember) /IOCQ]
     (b)   Enumerate the major objectives of ISO 9000. [(CO3) (Remember) /LOCQ]

6 + 6 = 12

7.   (a)   Discuss in brief the two specific areas of ISO 14000 series standards. [(CO4) [Remember /IOCQ]

(b)   Mention the relevant points pertaining to the requirements of ISO 14000. [(CO4) (Understand/LOCQ)]

6 + 6 = 12

Group – E

8. (a)   Samples of size 100 were taken from mass production of a product and the average sample mean was found to be 40 cm. It is known from the past experience that it is reasonable to take 13 cm as the population standard deviation. Determine the control limits. [(CO5) (Evaluate)/HOCQ)]

   (b)   A drilling machine bores holes with a mean diameter of 0.523cm and a standard deviation of 0.0032 cm. Calculate the 2-sigma and 3-sigma upper and lower control limits for means of sample of 4. [(CO5) (Evaluate)/HOCQ)]

6 + 6 = 12

9. (a)   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.
   [(CO5) (Evaluate)/HOCQ)]

   (b)   Twenty five –engine mounts are sampled each day and found to have an average width of 2 inches, with a standard deviation of 0.1 cinch. What are the control limits that include 99.73% of the samples mean? [(CO5) (Evaluate)/HOCQ)]

6 + 6 = 12

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Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	44.34%	31.14%	24.52%

Course Outcomes (CO):

	At the end of the course, a student will be able to
CO 1	Define and measure quality, distinguish between quality control and quality assurance
CO 2	Explain various quality control tools and their uses to improve quality
CO 3	Differentiate between product quality and system quality, awareness of various ISO 9000 system standard
CO 4	Understand the importance of ISO 14000 environment management system and its implication
CO 5	Apply various quality control charts, operating characteristics curve for quality improvement
CO 6	Define process capability, apply the principles of design of experiments, Taguchi Methodology and six sigma

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

Department & Section	Submission link:
CE	https://classroom.google.com/c/NDA1Mjk5Nzg3NDA5?cjc=r5s4k7i