Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (CHE-NEW)/SEM-8/CHE-804E/2011

2011
TOTAL QUALITY MANAGEMENT

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any ***ten*** of the following : $10 \times 1 = 10$

   i) "Customer is the most important visitor in our premises....", who said this ?

   a) Prince Charles b) Taguchi

   c) Henry Ford d) Lal Bahadur Shastri.

   ii) Kaizen is the word used in relation to quality first in

   a) US b) USSR

   c) Japan d) France.

   iii) The 95% confidence interval means the following % level of significance

   a) 5 b) – 5

   c) 100 d) 0.

iv) In Japan, the land of Kaizen, at Nissan Motor Company which was in a financial and operational crisis, a transformational change was brought about by

a) Deming b) Carlos Ghosn

c) Taguchi d) Juran.

v) The term "ISO" in quality management system stands for

a) International Standard Organisations

b) International Safety Organisations

c) International Organisation for Standardisation

d) Internal Standard Organisations.

vi) The Quality Control activities lay primary emphasis in

a) testing of products to uncover defective products

b) an attempt to improve and stabilize production

c) develop associated processes, to avoid, or at least to minimize the defective products

d) sort out the issues that led to the products which do not meet the customer's needs.

vii) If the unit cost rises, optimum order quantity will

a) increase

b) decrease

c) either increase or decrease

d) none of these.

viii) SWOT Analysis is a type ..... technique.

a) A b) B

c) C d) D.

ix) The expected value of X^2 where X is a random variable is

a) mean b) process capability

c) standard deviation d) variance.

x) The person who contributes maximum to the quality circle is

a) chief of the steering committee

b) departmental head

c) leader

d) coordinator.

xi) Pareto analysis is a statistical technique in decision making that is used for

a) selection of a limited number of tasks the produce significant overall effect

b) overall examination of the total process for fault finding

c) a failure mode analysis

d) fault tree analysis.

xii) The concept of total quality management includes

a) involvement of working personnel only

b) involvement of top management only

c) involvement of the customers & vendors

d) all of (a), (b) & (c).

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Explain what do you mean by Taguchi's quality loss function.

3. Explain the different steps of Pareto analysis.

4. Explain the following terms : $2\frac{1}{2} + 2\frac{1}{2}$

   i) Consumers' risk

   ii) Producers' risk.

5. Write down the concept of Deming Chain Reaction.

6. Using the method of random variables deduce the upper control limit of control chart for proportion defectives.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Determine the single sampling plan for AOQL of 2%, an estimated process average of 1%, and lot size of 200, 1000, and 5000 respectively. What percentage of the product will be subject to sampling inspection with each lot size ?

8. a) Interpret the patterns of variation on $\overline{X}$ and R chart for the following cases :

   i) Jumps in process level

   ii) High proportion of points near or outside the limits.

   b) An automatic continuous blending process needs to be controlled for the acidity of the output measured in pH. The following samples were taken where process was running smoothly :

Sample No.	Values of pH
1	5.32, 5.29, 5.38, 5.28, 5.41
2	5.40, 5.33, 5.37, 5.30, 5.40
3	5.34, 5.27, 5.29, 5.35, 5.33
4	5.29, 5.32, 5.31, 5.40, 5.39
5	5.31, 5.27, 5.38, 5.36, 5.40
6	5.41, 5.38, 5.33, 5.37, 5.42

9. Construct $\overline{X}$ and R charts from the following table. For n=5, $A_2 = 0.5$, $D_4 = 2.11$, $D_3 = 0$. Comment on the state of control.

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
$\overline{X}$	69.4	63.4	57.0	64.0	57.4	82.0	85.0	33.4	46.0	112.4	93.6	95.6
R	45	48	62	48	36	81	78	42	69	84	48	75

10. A Q.C. was formed in an R & D centre dealing with Biotechnological Processes. In the first meeting an effective brainstorming was conducted and the circle identified a problem pertaining to the same work area. In the 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 and draw an Ishikawa diagram.

11. State the factors which have enabled the Mumbai Dabbawallahs to achieve the six sigma distinction. A process engineering industry has retained you as a consultant for preparation and ultimate steps for ISO 1400 certification. Prepare the basic activity chart for this operation. 6 + 9

12. Write notes on any two of the following : $2 \times 7\frac{1}{2}$

a) TQM

b) Profit *vs* Quality

c) Sampling techniques

d) Process capability.