B.TECH/ CHE /8TH SEM/ CHEN 4242/2018

TOTAL QUALITY MANAGEMENT
(CHEN 4242)

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) What is the primary goal of quality improvement in an organisation?
(a) Better specification of the product (b) Customer's satisfaction
(c) Low cost for the product (d) Increasing profit.

(ii) Fish-bone diagram is used for the propose of
(a) work-study & motion-study,
(b) finding out the root causes of a problem
(c) estimating the weightage of the individual factors
(d) sorting out major factors responsible for a problem.

(iii) In relation to quality management programme, Kaizen is the word used to mean
(a) just in time (b) continuous Improvement
(c) systematic process (d) random Sampling.

(iv) The term Quality (Q) is related to performance (P) of the product and expectation of the customer (E) as under
(a) P × E (b) P/E (c) E/P (d) P + E.

(v) If an event may happen in 2 ways and fail to happen in 3 ways, and all these ways are mutually exlusive and equally likely to occur, then the probability of success is
(a) 100% (b) 60% (c) 40% (d) 66%.

(vi) ISO 14000 quality standard deal with
(a) installation & production
(b) environmental management
(c) implementation of Quality Assurance procedures
(d) industrial safety operations

(vii) Process control chart makes use of the data involving
(a) mean and dispersion (b) only mean
(c)only dispersion (d) only customers specification

(viii) Pareto analysis is a statistical technique in decision making that is used for
(a) selection of a limited number of tasks that produce significant overall effect.
(b)overall examination of the total process for fault finding
(c) a failure mode analysis
(d) fault tree analysis.

(ix) The 95% confidence interval means which of the following % level of significance?
(a) 5 (b) -5 (c) 100 (d) 0.

(x) Six Sigma process capability corresponds to defects per million of the magnitude
(a) 5 (b) 3.4 (c) 2.66 (d) 6.

Group – B

2. (a) What are seven quality control techniques adopted in the manufacturing & service sectors? Explain the each technique in brief with illustration.

(b) Define Central tendency and dispersion of a collection of data with the help of suitable example of marks obtained by 80 students as given in the table below:

Marks	0 -10	10-20	20-30	30-40	40-50	50-60
Frequency	3	9	15	30	18	5

Read off the value of the median of the distribution by graphical means and compare with that obtained by calculation.

6 + 6 = 12

3. (a) Narrate in brief about the paradigm shift in the concept of quality assessment of products.

(b) What do you understand by Total Quality Management in an organisation?

(c) Mention the different quality management tools and techniques adopted for the total quality management in an organisation.

4 + 4 + 4 = 12

Group – C

4. (a) Draw a $\overline{\overline{X}}$ & $\overline{R}$ process control chart with following data set as given in the table for a manufacturing organisation and comment on the state of control in the process.

Sub groups No. / samples	1	2	3	4	5	6	7	8	9
X_1	15.3	14.4	15.3	15	15.3	14.9	15.6	14	14
X_2	14.9	15.8	15.1	14.8	16.4	15.3	16.4	15.8	15.2
X_3	15	14.8	15.3	16	17.2	14.9	15.3	16.4	13.6
X_4	15.2	15.6	18.9	15.6	15.5	16.5	15.3	16.4	15
X_5	16.4	14.9	14.9	15.4	15.5	15.1	15	15.3	15

The following table gives the values of the constants A_2 to be used for setting the limits of control' against the sample size:

n	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
A_2	**1.88**	**1.023**	**0.729**	**0.577**	**0.483**	**0.419**	**0.373**	**0.337**	**0.308**
D_4	**3.627**	**2.574**	**2.282**	**2.114**	**2.004**	**1.924**	**1.864**	**1.816**	**1.777**

(b) What is the significance of control limits in a Process Control Chart?

8 + 4 = 12

5. (a) How would you draw line of comparison of definition or perception of quality between the manufacturing sector and service sector?

(b) Explain the implications of continuous improvement with the help of Deming's wheel in terms of PDCA cycle.

(c) Enumerate 7-S principles for Continuous Process Improvement known as CPI-7 cycle used in the industry.

4 + 4 + 4 = 12

Group – D

6. (a) What are Sampling and Non-Sampling errors?

(b) How would you classify the sampling inspection on various modes of operations?

(c) What are different kinds of 'Lot Acceptance sampling Plans' (LASP) practiced generally?

3 + 4 + 5 = 12

7. (a) Draw a p chart from the following results of inspection of a lot of machine parts where the % of scraps are calculated for 1st to 15th day in a month as given in the following table:

Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
%Scrap	**19.1**	**20**	**17.7**	**15.2**	**21.3**	**16**	**14.9**	
Date	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
%Scrap	**18.3**	**18.9**	**16.2**	**18.8**	**17.5**	**19.2**	**20.1**	**21.5**

(b) Discuss about 6σ as a spread for the control limit in a process control chart.

6 + 6 = 12

Group – E

8. (a) What are the merits and demerits of 'Complete Enumeration' and 'Sampling Inspection' of the quality characteristic of a population of products or services?

(b) What are Sampling and Non-Sampling errors?

(c) Define and explain briefly the simple sampling plan for sampling of attributes.

6 + 2 + 4 = 12

9. (a) Write short notes on any two of the following:
i) Ishikawa diagram;
ii) SWOT Analysis;
iii) Kaizen

(b) Discuss about the ISO 9000 family of standars in regard to implementation of TQM.

(4 + 4) + 4 = 12