



INDIAN INSTITUTE OF MATERIALS MANAGEMENT

Post Graduate Diploma in Materials Management - 2 years

Dec 2022

PAPER No.18 (enrolment code –CPM)

Total Quality Management

Date : 23.12.2022

Time : 10.00 a.m to 1.00 p.m.

Max. Marks : 70

Duration : 3 Hrs.

Instructions:

- From Part A – answer all questions (compulsory). Each sub questions carries 1 mark. **Total : 20 Marks**
- From Part B – Answer any 3 questions out of 5 questions. Each question carries 10 marks. **Total :30 Marks**
- Part C is a case study (compulsory) with questions. Read the case study carefully and answer the questions **Total: 20 Marks**

Part – A

[20 Marks]

Q. 1) Expand the following terms: [5 marks]

- a) SMED b) ASQ c) DoE d) QFD e) QMS

Q. 2) Fill in the blanks: Select appropriate option [5 marks]

- a) Quality can be quantified as(Q=quality, P=performance, E=expectations)
 (i) $Q = P/E$ (ii) $Q = P + E$ (iii) $Q = P - E$ (iv) $Q = P * E$

- b) Statistical Quality Control was developed by
 (i) Frederick Taylor (ii) Walter Schwhart
 (iii) George Danzig (iv) W E Deming

- c) The term “common causes of variability” is also referred to as -----
 i) Process variability ii) Random cause
 iii) Assignable cause iv) Process capability

- d) When practicing QFD, customer requirements are communicated to ----- teams
 i) Marketing (ii) Quality control
 iii) Purchase department (iv) Design and production

- e) X-Bar chart is used to control -----
 (i) Central tendency of the variable (ii) Dispersion of the variable
 (iii) Number of defects (iv) All the above

Q. 3) State 'True' or 'False' [5 marks]

- TQM is only concerned with product quality
- Quality Control (QC) is considered as a reactive and corrective technique
- Final inspection of product is an example of prevention cost in quality management
- ISO 14001 is an international standard that specifies the requirements for an effective Quality management System
- The main objective of TPM is to improve the efficiency of the equipment.

Q. 4) Match the following [5 marks]

Column A

Column B

1	PDSA Cycle	A	Variables
2	X-bar chart	B	Work-related problems
3	Fishbone Diagram	C	In Station Process Control
4	Jidoka	D	WalterShewhart
5	Quality Circles	E	Kaoru Ishikawa

Part B

(Answer Any Three)

(3 X 10 = 30 Marks)

- Q. 5)** (a) How will you proceed to implement TQM in an organization? What factors are necessary for TQM implementation? **[5 marks]**
- (b) What do you understand by Flow Charts? What is its use in Quality Control? Illustrate your answer with a neat diagram. **[5 marks]**
- Q. 6)** (a) What do you understand by the term "Process Capability"? Explain the objectives of process capability. **[5 marks]**
- (b) Explain with the help of diagrams the relationship between process capability and design specifications. **[5 marks]**
- Q. 7)** (a) Explain the concept of Statistical Process Control. Discuss the objectives and methods of SPC. **[5 marks]**
- (b) Construct both X-bar and R chart from the following data. Comment whether the process is under statistical control. If not what should be the next step? **[5 marks]**

Sub-group no:	X-bar	R	Sub-group no:	X-bar	R
1	6.36	0.10	11	6.32	0.18
2	6.38	0.18	12	6.30	0.10
3	6.35	0.17	13	6.34	0.11
4	6.39	0.20	14	6.39	0.14
5	6.32	0.15	15	6.37	0.17
6	6.34	0.16	16	6.36	0.15
7	6.40	0.13	17	6.35	0.18
8	6.33	0.18	18	6.35	0.13
9	6.37	0.16	19	6.34	0.18
10	6.33	0.13	20	6.34	0.16

Assume constant values: $A_2 = 0.73$, $D_3 = 0$, $D_4 = 2.28$

- Q. 8)** (a) Formation of Quality Circles is based on certain underlying assumptions. Discuss this statement, and elaborate how QCs are organized. **[5 marks]**
- (b) Discuss the different types of audit and the objectives of these audits. What steps are required to perform audit?
- Q. 9)** Write Short Notes on **(Any two)** **[2 x 5 = 10 marks]**
- (a) Barriers in TQM implementation
- (b) Pareto Charts
- (c) Control charts for attributes
- (d) Quality Assurance in services

PART- C (Compulsory)

(20 marks)

Q 10. Read the case study carefully and answer the questions given at the end

The general manager of an elevator company had a common problem. He was utterly frustrated with the lack of coordination between the mechanical engineers who designed new elevators and the manufacturing engineers who determined how to produce them in the factory. The mechanical engineers would often completely design a new elevator without any consultation from the manufacturing engineers and then expect the factory to somehow figure out how to build it.

Often the new products were difficult or nearly impossible to build and their quality and cost suffered as a result. The designs were usually sent back to the mechanical engineers (often more than once) for engineering changes to improve their manufacturability. While design and manufacturing played volleyball with the design, customers were forced to wait – often for months – for deliveries.

The general manager knew that if the two sets of engineers would simply communicate early in the design process, many of these problems could be eliminated before they occurred. At his wits' end, he found a large empty room in the facility and had the mechanical and manufacturing engineers working on the next product, move into the room, one group on one side and one on the other. Certainly if all they had to do to communicate was, to walk from one side of the room to the other, communication would improve.

The manager relaxed somewhat, feeling that his problem had finally been solved. Upon returning to the new home of the engineers a few weeks later, he was in for a big surprise. The two sets of engineers had finally learned to cooperate! They had cooperated in building wall of bookcases and file cabinets right down the middle of the room, effectively separating the large room into two separate offices, so they could continue as before.

Questions

- a** What principles of TQM are illustrated or violated in this case?
- b** Why do people feel such strong allegiance to their functional departments?
- c** What could the general manager have done to improve the communication and the quality of the designs?
- d** What type of organization structure would you suggest which takes into account the concerns of all the stakeholders and addresses them in the design and manufacture of elevators?
- e** What do you think are the learning points from this case?
