



INDIAN INSTITUTE OF MATERIALS MANAGEMENT

June 2016

Post Graduate Diploma in Materials Management Paper 18.E (New) Total Quality Management

Date: 18.06.2016
Time: 2.00 to 5.00 p.m

Max. Marks 100
Duration 3 hours

Instructions

1. The question paper is in three parts A, B & C.
2. Part A is compulsory. Each question carries one mark. Total : 32 Marks
3. In Part B, answer 3 questions out of 5. Each question carries 16 marks.Total : 48 Marks
4. Part C is a case study with sub questions and it is compulsory. It carries 20 marks.
5. Use of calculator is allowed wherever necessary.
6. Graph sheets can be used wherever necessary.

PART A

32 marks

(compulsory. Each question carry 1 mark)

Q.1. Fill in the blanks. (Do not reproduce the statement) 8 marks

- a) Scientific management emphasized product quality through _____
- b) _____ organization continually expand its capacity to create its future.
- c) Theory Z emphasizes _____ management.
- d) Supplier _____ by a buyer is a detailed examination of the policies and capabilities of a supplier.
- e) _____ is a technique used to present data into different groups/categories.
- f) Striving to be best of the best is called _____
- g) Absence of _____ factors makes employees dissatisfied.
- h) _____ reduces the time required for new product development.

Q.2. State True or False. (Do not reproduce the statement) 8 marks

- a) Customer in the TQM culture means only the recipient of the end product/service.
- b) Quality and productivity are not mutually exclusive.
- c) Team is a group of people working together to achieve common objectives.
- d) ISO 9000 is a quality control model.
- e) Deming developed project by project improvement approach.
- f) Small 'q' emphasizes product, process and customer focus.
- g) Durability is defined as the probability of performing without failure.
- h) Employee empowerment is archived through job enrichment.

Q.3. Match A and B

8 marks

A	B
a) Motivators	1) Shingo
b) Zero Defects	2) Quality level 4
c) Spiral of progress	3) Control chart
d) Imagineering	4) 80/20 rule
e) Zero quality control	5) Intrinsic
f) Fitness to hidden need	6) Crosby
g) Assignable causes	7) Juran
h) Pareto law	8) Conway

Q.4. Expand the following

8 marks

- a) SQC
- b) DFM
- c) FMEA
- d) PDSA
- e) CWQC
- f) QLF
- g) MBWA
- h) MTTR

PART B

48 marks

(Attempt any three. Each Question carry 16 marks each)

- Q.5. a) Define TQM. Explain various elements of TQM in your own words.
b) Briefly explain Juran's quality trilogy.
- Q.6. a) Distinguish between quality and total quality based on small q and Big Q factors.
b) Explain the problem solving process.
- Q.7. a) Explain various stages of quality audit as per ISO 9000.
b) Explain in brief your understanding about ISO 14000.
- Q.8. a) Explain briefly the contributions of Deming in the development of TQM
b) Explain the steps involved in QFD.

Q.9. Write short notes on any four

- a) Operating characteristic curve
- b) Crosby's four absolutes of quality
- c) Concurrent engineering
- d) Dimensions of service quality
- e) Pareto diagram

Part C

Q. 10 Answer case study :

20 marks

Modern Steel Technologies Inc. (MST) is a supplier of custom-designed, hardened steel components and replacement parts to heavy industries worldwide. Steel mills and mining companies account for 75 percent of sales. Aluminum, paper, chemical and cement industries account for the remaining 25 percent. The main product groups are gears, couplings, wheels, and rolls. MST operates three plants – two in Pennsylvania and one in Canada- and employ 374 people.

The MST mission is to “serve our customers by producing and delivering products of superior quality and value, maintain a commitment to continuous improvement, and provide long-term value to shareholders.” Each year president and his staff meet off-site to develop and refine plan for the next year. Here they discuss goals, strategies, and objectives, and make capacity, personnel, and quality decisions. This plan is passed down to middle management for review and suggestions. Middle management takes the yearly plan and determines monthly goals for sales, production, inventory, backlog expenses and revenues. All employees have access to these plans. Every three months, managers review their department's progress against the plan and present the result to the president. If the plan is not being met, suggestions for improvement are discussed.

MST is conscious of its community responsibilities at its Pennsylvania headquarters. The CEO is a board member of the United Way, the Fine Arts Council, and other local community efforts. Annually, MST employees are encouraged to contribute to these causes. MST complies with all EPA and OSHA regulations and offers flu shots and health-related seminars to its employees.

MST understands its customer requirements. In a highly competitive industry, failure to meet a customer need usually results in a lost customer. For example, European Union customers required ISO 9000 certification, which MST was able to obtain in June 1995. Customer satisfaction is determined by on time delivery and quality results. Each year, the roll product

manager visits all customers and conducts a survey on product performance. Often, a latent customer need is determined, and MST seeks ways to fulfill this need.

MST uses a mainframe computer-based information system to track quotes, orders, inventory, schedules, and purchasing activities. Networked PCs within the company allow different department to access the same information. Departments have access only to those databases they use. For example, the Quality department monitors on-time delivery, cycle time, and cost. Several improvements have been made. For example, roll heat treat recipes were kept in duplicate books by both the Metallurgy and Heat Treat departments, resulting in errors if one book was updated. These are now maintained in common database, accessible to both departments.

MST compares its performance to that of competitors by examining product performance of rolls at steel mills. In addition, the company uses annual surveys of the gear industry published by a manufacturing association to compare its gears against others, based on performance and production cost. The company also uses cost-of-quality indicators to measure performance. An external measure is defined as the cost to repair or replace a product after it fails, and an internal measure is the cost of rework or scrap. Each internal incident is traced back and charged to the budget of the responsible department. These are analyzed in total to determine possible corrective actions.

Employee excellence is recognized through the use of annual employee appraisals. The employee and his or her immediate supervisor sit down and discuss the appraisal and the employee's score. Merit raises are based on the appraisal. The discussion also identifies any weakness the employee may have, and additional training may be suggested to strengthen weak areas. Vacancies are usually filled by promotion from within MST. Consequently, turnover of salaried employees is relatively high. MST has an employee stock ownership plan. In 1997, the last of the company stock was distributed. New employees contribute to base retirement plan and are unable to participate in company ownership.

Customer requirements are transmitted through blueprints. Blueprints are generated by the Engineering Department and contain product dimensions, specified hardness requirements, and other information necessary to manufacture the product.

Quality control measurement techniques are defined and vary by product. Key product characteristics, such as gear tooth thickness, are measured against tolerances. Inspection personnel are trained and certified in applicable testing techniques. If a dimension is out of tolerance, the inspector must call a technician who will decide if immediate corrective action

should be taken. A department manager makes the decision to take preventive action to stop an undesirable condition from recurring.

MST maintains an informal partnership with a supplier of forging. MST meets periodically to convey its requirements.

Currently, on-time delivery is above 90 percent for all product groups except gears, which is at a 60 percent level. Delivery dates for gears are difficult to determine because the product mix is constantly changing, cycle times vary, and machines used for production are common to several products, creating a challenge for capacity planners.

Questions:

- 1) Does the company have TQM process in place? Enumerate points that support your answer.
- 2) What are the benefits of TQM based on the case study?
- 3) How the company measure quality costs?
