



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, August 2020

Course: TQM AND VALUE ENGINEERING

Semester: 8th

Program: B.Tech.(Mechanical) and B.Tech.(Mechanical+Splz)

Time 03 hrs.

Course Code: IPEG 431

Max. Marks: 100

SECTION A (30 X 1 = 30)

Multiple choice questions:

1. MCQ: (3X1=3)

- i. Which of the following is the limitation of Quality circle?
 - a. Higher Cost
 - b. Training Time And Cost
 - c. Development Of Leadership
 - d. All Of The Above

- ii. Quality circle can solve problem related to
 - a. Material quality
 - b. Customer need
 - c. Market demand
 - d. Continuous Improvement

- iii. Which is not an attributes of QC?
 - a. Participation management
 - b. Human resource development technique
 - c. Market survey
 - d. Problem solving technique

2. MCQ: (3X1=3)

- i. Defective products according to Taguchi, before shipment are not considered part of loss are:
 - a. Scrapped
 - b. Repaired

- c. Reworked
 - d. All the above
 - ii. Cause & Effect diagram used to
 - a. Identify possible causes of problem
 - b. organize possible causes of problem
 - c. Determine its relation
 - d. All the above
 - iii. When using a statistical control chart (SPC), a point outside the control limits is attributed to
 - a. Common or random causes.
 - b. Assignable or special causes.
 - c. Problem caused by the system.
 - d. a and c.

3. MCQ: (3X1=3)

- i. MTTF stands for
 - a. Minimum time to failure
 - b. Mean time to failure
 - c. Maximum time to failure
 - d. None of the mentioned
- ii. The system reliability of a parallel system
 - a. Is greater than the reliability of any subsystem
 - b. Is equal to the reliability of the “best” subsystem
 - c. Decreases as more redundant subsystems are added to the system.
 - d. Increase if the subsystem with the lowest reliability is removed.
- iii. A characteristics of a series system model is
 - a. Lowest reliability of any system model
 - b. Simplest of any system model

- c. Fewest number of components of any system model
- d. All of the above

4. MCQ: (3X1=3)

- i. In accordance with ISO 9001:2015, which of the following requires documented information to be retained by the organization?
 - a. Evidence of competence
 - b. Internal audit results
 - c. Management review results
 - d. All of the above
- ii. Which of the following is for environment management?
 - a. ISO 9000
 - b. ISO 9001
 - c. ISO 14000
 - d. ISO 26000
- iii. Which focuses on how to make a quality management system more efficient and effective
 - a. ISO 9000
 - b. ISO 9001
 - c. ISO 14000
 - d. ISO 9004

5. MCQ(3X1=3)

- i. The law of demand states that, other things remaining the same, the higher the price of a good, the
 - a. Smaller is the demand for the good.
 - b. Smaller is the quantity of the good demanded.
 - c. Larger is the quantity of the good demanded.
 - d. Larger is the demand for the good.
- ii. The demand curve for a good is derived from the:
 - a. Marginal cost of the good.
 - b. Marginal benefit of the good.

c. Marginal benefits of the good minus marginal costs of the good.

d. Production Possibilities Frontier

iii. The interaction of supply and demand explains

a. Both the prices and the quantities of goods and services.

b. The quantities of goods and services but not their prices.

c. The prices of goods and services but not their quantities.

d. Neither the prices nor the quantities of goods and services.

Fill in the blanks:

1. The participation of quality circle members should be _____.
2. When using the SPC methodology, a system is said to be stable when the mean and range of variation caused by the system are _____.
3. _____ is the time needed to repair a failed hardware module in reliability calculation.
4. Action to eliminate the cause of a nonconformity and to prevent recurrence" is called a _____.
5. _____ specifies the purpose of the product or what the product does, what is its utility etc.

True/False:

1. Quality improvement programs may require the product itself to be changed.
2. Using the terminology of statistical process control, a variation caused by the system is common cause variation
3. QFD identifies how the good/service will satisfy customer wants.
4. ISO 9001:2015 requires organizations to appoint a Management Representative.
5. If price falls and quantity demanded increases, this is represented by a movement along a given demand curve.

Match the following:

1. Quality Circle –Consistency of performance
2. Stages of quality –Process oriented
3. Reliability –Steering committee
4. Quality assurance - Product oriented
5. Quality control - System design

SECTION B (5 X 10 = 50)

1. List the operations of quality circle and write a note.
2. Explain the stages of quality control in Taguchi's quality loss function.
3. Briefly explain the seven management tools.
4. (a) The tensile strength of nonferrous pipes is of importance. Samples of size 5 are selected from the process output, and their tensile strength values are found. After 30 such samples, the process mean strength is estimated to be 3000 kg with a standard deviation of 50 kg.
(i) Find the 1σ and 2σ control limits. (ii) Find the 3σ limits.
(b) The length of industrial filters is a quality characteristic of interest. Thirty samples, each of size 5, are chosen from the process. The data yields an average length of 110 mm, with the process standard deviation estimated to be 4 mm. (i) Find the 1σ and 2σ control limits.
(ii) Find the 3σ limits.
5. Explain the processes in Quality Function Deployment(QFD)?

OR

The reliabilities of A, B, and C are 0.95, 0.92, and 0.90, respectively. Find the reliability of the system with three components (A, B, and C) in parallel.

- a. Determine the system reliability for 2000 hours of operation, and find the mean time to failure.
- b. Assume that all three components have an identical time-to-failure distribution that is exponential, with a constant failure rate of 0.0005/ hour. What is the mean time to failure of each component?
- c. If it is desired for the system to have a mean time to failure of 4000 hours, what should the mean time to failure be for each component?

SECTION C (1 X 20 = 20)

1.
 - a. Discuss the features in ISO 9000:2000 Quality Systems?
 - b. An item has a yearly demand of 2,000 units. The different costs in respect of make and buy are as follows. Determine the best option. If Item cost/unit of BUY is Rs. 8.00 & MAKE is Rs. 5.00, Procurement cost/order of BUY is Rs. 120.00, Set-up cost/set-up of MAKE is Rs. 60.00, Annual carrying cost/ item/year of BUY is Rs. 1.60 & MAKE is Rs. 1.00, Production rate/year of MAKE is 8,000 units.

OR

- a. Explain the requirements and benefits of ISO 14000?
- b. There are three alternatives available to meet the demand of a particular product. They are as follows: (a) Manufacturing the product by using process A (b) Manufacturing the product by using process B (c) Buying the product The details are : Fixed cost /year(Rs.) of Process A is Rs. 5,00,000/- & of Process B is Rs. 6,00,000/- , Variable cost/ unit(Rs.) of Process A is Rs. 175/- & of Process B is Rs. 150/- , where as the Purchase price/unit (Rs.) 125. The annual demand of the product is 8,000 units. Should the company make the product using process A or process B or buy it.