

Name:
Enrolment No:



UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM & ENERGY STUDIES

Online End Semester Examination – May, 2021

Program: BBA (LM) and BBA (AM)
Subject/Course: Total Quality Management
Course Code: LSCM 3004

Semester: VI
Max. Marks: 100
Duration: 03 Hours

SECTION A

1. Each Question will carry 5 Marks
2. Instruction: Complete the statement / Select the correct answer(s)

Q.No		COs
1	From the following options select the old planning tools; a. Check Sheet b. Affinity diagram c. Matrix diagram d. Scatter Diagram e. Cause and effect diagram.	CO 1
2	Mention five process mapping tools _____, _____, _____, _____ and _____.	CO 1
3	Mention any five dimensions of defining service quality _____, _____, _____, _____ and _____.	CO 2
4	Select the benchmarking type(s) that is/are not correctly matched; a. Internal - departments within the business b. Competitor - within the same industry sector c. Functional - all industry fields d. Generic - same function across all industry fields	CO 3
5	Mention any five tools for six sigma and quality improvement - _____, _____, _____, _____ and _____.	CO 4
6	Write any five benefits of implementing total quality management - _____, _____, _____, _____ and _____.	CO 3

SECTION B

1. Each Question will carry 10 Marks
2. Instruction: Write short / brief notes

7	Discuss about business process, its importance and disadvantages of not having standard business process.	CO 4
8	Explain the difference between the concept of quality control and quality assurance.	CO 2
9	Discuss the quality loss concept given by Taguchi. Company XYZ received an average of 15 complaints per month last year. In November they received 19 complaints. Management sets an acceptable level (tolerance) at 2. It	CO 2

	costs the company \$15 directly per complaint to correct the problems. They determined the cost in lost sales to be \$30. Using Taguchi's loss function calculate the loss in the month of December.	
10	Discuss each phase of DMAIC methodology of Six Sigma.	CO 3
11	What are the requirements of ISO 9001:2015?	CO 1
SECTION C		
<p>1. Each Question will carry 20 Marks</p> <p>2. Instruction: Write long answer.</p>		
12	<p>MRC Bearing, the largest producer of aero-engine bearings in the world, is located in Falconer, New York. The company is the primary aerospace bearings supplier to General Electric, Pratt–Whitney and Rolls Royce, as well as to the world's leading military and helicopter programmes.</p> <p>Problem Identification</p> <p>In 1996, the company realised that it was behind on orders. Their customers were aggressive in their demands for cost reductions and shorter lead times. The majority of their maintenance hours were dedicated to emergency work orders. The company decided to implement a total productive maintenance (TPM) programme in order to achieve a turnaround. After the implementation of TPM, the company was able to achieve a 98 per cent decrease in unplanned maintenance hours.</p> <p>TPM Journey</p> <p>The company started its TPM programme by focusing on a small area, which was critical to processes but was experiencing chronic problems. At first, a lot of people were skeptical and not really interested in getting involved with the TPM activities. The company had a core team of people who were excited about TPM. It also enlisted the help of people outside the organization to work with the core team.</p> <p>TPM at MRC began with a week long TPM event. It started by cleaning, inspecting lubricating and performing corrective work on a piece of machinery. Once a machine was cleaned, it would be painted. At first, people were reluctant to participate in TPM events and ridiculed the TPM programme as “Totally Painted Machines.” As time elapsed, people started appreciating the improvements brought about by TPM events. Employees who were totally against TPM started participating in TPM workouts.</p> <p>MRC formed equipment improvement teams (EITs) to work on resolving equipment related issues. The teams initially worked on a piece of equipment with chronic problems. The equipment was breaking down on a monthly basis and required three or four days each time to fix it. The team discovered the original manufacturer had used a sub-spec coupling on a drive unit. The problem was solved by upgrading to the proper coupling. The problem was solved by taking the time out to find the root cause of the failures, rather than just fixing the symptoms. In the years following this repair, the problem was completely eliminated. That success showed a lot of people in the company that TPM can make everyone's daily life easier as well as improve productivity.</p> <p>After the initial success, MRC expanded their TPM efforts to their second facility. They created a TPM Steering Committee at their second site and also created a policy group to co-ordinate the efforts of both facilities. MRC trained 10 TPM Area Co-ordinators who</p>	CO 4

undertake TPM activities for one week in each month. These TPM Co-ordinators organize TPM events in their areas, also lead EITs and make sure the process keeps working. MRC has begun to create full-time TPM teams. One such team was able to correct a long-standing equipment problem. This resulted in reducing the scrap produced by that equipment to almost zero. The areas that MRC focused on were:

1. Preventive maintenance
2. Putting predictive maintenance process in place (i.e. vibration analysis equipment)
3. Cleaning the machines, resulting in inspection
4. Creating standards on the equipment for cleaning, lubrication and daily checks
5. Collecting data on downtime
6. Creating equipment improvement teams
7. Creating TPM area co-ordinators

Lessons Learnt

The most important lesson learnt was that training is the key to being successful with TPM. The company had organized some initial TPM awareness training programmes for the organization for both operators and mechanics. However, looking back they could have had achieved success faster if more training had been imparted. The support of the top management, the union, the hard work of the people at MRC and the support of their customers were the factors instrumental to the success of the TPM initiative.

Questions;

- a) What were the problems faced by MRC?
- b) What were the attributes responsible for the successful implementation of TPM at MRC?

OR

A quality inspector took six samples, each with five observations ($n = 5$), of the length of time for glue to dry. The analyst computed the mean of each sample and then computed the grand mean. All values are in minutes. Use this information to construct \bar{X} - Chart and determine whether the process is in control. (The value of A_2 in the case of five observations is 0.58).

Samples	Observations				
	1	2	3	4	5
1	12.11	12.10	12.11	12.08	12.07
2	12.15	12.12	12.10	12.11	12.14
3	12.09	12.09	12.11	12.15	12.08
4	12.12	12.10	12.08	12.10	12.11
5	12.09	12.14	12.13	12.12	12.12
6	12.07	12.12	12.14	12.13	12.10