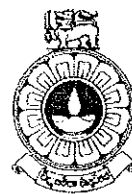


The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Textile & Apparel Technology



Study Programme	: Postgraduate Diploma in Technology
Name of the Examination	: Final Examination
Course Code and Title	: TTM7138 Quality Management
Academic Year	: 2017/18
Date	: 11 th February 2019
Time	: 0930-1230hrs
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Six (6)** questions in **four (4)** pages.
3. Answer any **Five (5)** questions only. All questions carry equal marks.
4. Answer for each question should commence from a new page.
5. This is a Closed Book Test (CBT).
6. Answers should be in clear hand writing.
7. Do not use Red colour pen.

- Q1. (a) What is meant by the term “ Quality management” and state the tasks involved in each of four major components of quality . (10 marks)
- (b) Briefly explain the importance of Total quality management (TQM) in today’s business environment. You may refer the objectives of TQM. (6 marks)
- (c) Why Quality assurance is more recommended than Quality control to practice in the industry to produce a quality product? (4 marks)

- Q2. (a) Following are Deming’s two points. Briefly explain their importance and how you can apply them to your production organization. (8 marks)

(i) “*End the practice of awarding business on the basis of price tag alone*”

(ii) “*Institute training*”

- (b) The quality of a service can be measured by two dimensions. List out and explain how each of these factors are used to assess the quality of a service, with providing suitable examples. (6 marks)
- (c) Quality and productivity are two main indexes for a manufacturing industry. Briefly explain this statement using their meanings. (6 marks)

- Q3. (a) Briefly explain how the Pareto analysis and Cause effect diagram are used to improve the quality of a product (4 marks)

- (b) STD Lanka Pvt Ltd manufactures metal rings. Quality control department decided to check the diameter of metal rings (in inches)of 5 samples (one sample/hour) in a 6hrs shift. Each sample has 5 items and observations are given below. Draw mean control chart and range control chart with indicating warning and critical limits and give your comments for the variations of diameter of rings in the particular shift.

Sample	Item 1	Item 2	Item 3	Item 4	Item 5
0800hrs	8.30	6.56	8.01	9.34	9.15
0900hrs	8.54	8.12	8.15	10.00	10.14
1000hrs	7.86	7.24	10.03	9.03	11.24
1100hrs	8.45	8.12	10.05	6.15	7.24
1200hrs	8.56	8.01	9.14	6.16	8.16

- (i) Draw mean control chart with indicating warning limits and critical limits. (14 marks)
- (ii) Give your comments for the variations of diameter of rings in the particular Shift. (2 marks)

Q4. (a) (i) How do you differentiate the capable process and incapable process using a suitable diagrams? (4 marks)

(b) How do you calculate the C_p index and briefly explain how do use this index to decide the stable or unstable situation of a production process? You may draw the process variation charts for each variation of C_p to support your answer. (8 marks)

(c) Draw a sample diagram of an Operating characteristics (OC) curve and briefly explain how you determine the Producer's risk (α) and Consumer's risk (β) using the drawn diagram, with discussing their importance in quality management. (8 marks)

Q5. (a) Briefly describe the importance of following quality management principles explained in the ISO 9001 to produce a good quality product. (6 marks)

(i) Customer focus (ii) Involvement of people (iii) Continual improvement

(b) Draw a diagram to illustrate the variations of quality cost components with the quality level of a product and explain the possible reasons for these variations. (5 marks)

(c) Write short notes on bench marking process, six sigma and lean manufacturing used in production organizations, with considering their importance of applying in the industry. (9 marks)

Q6. (a) Technical officer has noted the following data for the failure of 1000 electronic circuit components. Test was done for 5 days.

Day	Number of failures
01	05
02	06
03	08
04	10
05	30

Calculate the ,

(i) Average failure density for the considered time period

(ii) Mean failure rate (MFR)

(iii) Average reliability for the considered time period

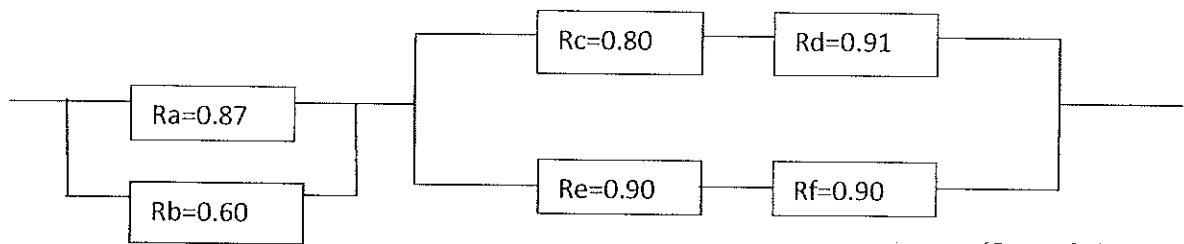
(12 marks)

- (b) LED bulb manufacturing company collected the following data from the testing of 1000 bulbs for 3000hrs. The time interval is 500hrs. Calculate the Mean Time to Failures up to 8000hrs.

Time interval hours	No. of failures
$T < 500$	12
$500 < T < 1000$	08
$1000 < T < 1500$	22
$1500 < T < 2000$	16
$2000 < T < 2500$	15
$2500 < T < 3000$	10

Determine the Mean Time to Failures (MTTF) at the 3000hour. (3 marks)

- (c) Calculate the system reliability of the following electric circuit.



(5 marks)