



UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: BME 3043
COURSE	: QUALITY MANAGEMENT
SEMESTER/SESSION	: 1-2024/2025
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **4** questions. Answer **all** questions
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, rise up your hand and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE

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QUESTION 1

The purpose of Total Quality Management (TQM) is to provide a quality product or service to customers which will in turn increase productivity and lower costs.

- a) "Providing extraordinary customer satisfaction" is the new concept of quality that some Japanese companies have begun to employ. Give **evidence** to support that statement with reference to Figure 1. (3 marks)



Figure 1: Samsung Galaxy Smart Watch FE

- b) **Present** two (2) ways that technology has had an impact on quality. (4 marks)
- c) **Analyse** four (4) obstacles to implementing Total Quality Management (TQM) and their impact on the company in terms of customer satisfaction and product quality. (10 marks)
- d) Six Sigma is a methodology aimed at enhancing quality, cutting costs, and boosting customer satisfaction. The DMAIC (Define, Measure, Analyze, Improve, and Control) framework within Six Sigma provides a structured problem-solving approach. As a quality engineer, **summarise** your breakthrough strategy for ensuring your organization's success using DMAIC. (10 marks)

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QUESTION 2

Manufacturers use a blend of quality control and quality assurance to maintain and enhance the quality of their products. These approaches work together, complementing one another to ensure that the final product or service consistently meets the required quality standards and specifications.

- a) Based on your understanding, **explain** the phrase "work together" as used in the statement above. Include an example of a defective item to support your explanation and demonstrate how the collaboration between quality control and quality assurance functions in practice. (5 marks)
- b) **Differentiate** between quality control, quality assurance and testing in terms of purpose, goals, planning, and results, incorporating examples of processes. Any product within the production domain can serve as an illustration in your explanation. (14 marks)
- c) **Categorise** four (4) inspection point area based on the typical inspection point. (8 marks)

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QUESTION 3

Statistical process control (SPC) is a powerful tool for improving product and service quality. Alongside it, process capability studies evaluate how well processes perform over time when they are under statistical control.

- a) A car repair shop has documented the types of work carried out in their workshop over the past month. The various types of work are listed below.

Table 1 : Type of work done per ticket over the past month

Ticket No.	Work	Ticket No.	Work
1	Tires	16	Tires
2	Lube & oil	17	Lube & oil
3	Tires	18	Brakes
4	Battery	19	Battery
5	Lube & oil	20	Brakes
6	Lube & oil	21	Lube & oil
7	Lube & oil	22	Brakes
8	Brakes	23	Transmission
9	Lube & oil	24	Brakes
10	Tires	25	Lube & oil
11	Brakes	26	Battery
12	Lube & oil	27	Lube & oil
13	Tires	28	Battery
14	Lube & oil	29	Brakes
15	Lube & oil	30	Tires

Construct the check sheet and then Pareto diagram and identify the most critical types of defects. (12 marks)

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- b) As a quality engineer, you are performing quality control measurements on the weights (in grams) of 40 randomly selected chocolate bars from a production line. Using the data in Table 2, **construct** an X-mean chart and an R-chart with 3σ control limits, plot the sample range values, and assess the process control status. (15 marks)

Table 2 : Sample's data from production

Samples	Weights (oz)				
1	38.2	37.9	38.0	38.1	38.3
2	38.0	38.2	38.0	38.1	38.0
3	38.2	38.1	38.3	38.2	37.9
4	38.0	38.1	38.0	38.2	38.0
5	38.1	38.0	38.2	38.1	38.3
6	38.2	38.0	38.1	38.0	38.2
7	38.1	38.0	38.2	38.0	38.1
8	38.0	38.2	38.1	38.3	38.2

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QUESTION 4

Founded in 1946, the International Organization for Standardization (ISO) focuses on promoting international standards to facilitate global trade in goods and services. As the appointed Quality Management System (QMS) consultant for "Delightful Bites," a food company based in Singapore, your goal is to support the company in effectively marketing its products both locally and internationally.

Outline the key steps necessary for successfully implementing the ISO 9001:2015 quality management system within the company. (18 marks)

-----End of questions -----

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Appendix**Control chart**

Table 1

n	A2	D3	D4
2	1.880	-	3.267
3	1.023	-	2.574
4	0.729	-	2.282
5	0.577	-	2.114
6	0.483	-	2.004
7	0.419	0.076	1.924

$$CL_{\bar{X}} = \bar{\bar{X}} = \frac{\sum \bar{X}_i}{k}$$

$$CL_R = \bar{\bar{R}} = \frac{\sum R_i}{k}$$

$$UCL_{\bar{X}} = \bar{\bar{X}} + A_2 \bar{\bar{R}}$$

$$LCL_{\bar{X}} = \bar{\bar{X}} - A_2 \bar{\bar{R}}$$

$$UCL_R = D_4 \bar{\bar{R}}$$

