UNIVERSITI KUALA LUMPUR
MALAYSIA ITALY DESIGN INSTITUTE

FINAL EXAMINATION

MARCH 2026 SEMESTER

COURSE CODE	:	PMB30203
COURSE TITLE	:	QUALITY ENGINEERING
PROGRAMME NAME	:	BACHELOR OF ENGINEERING TECHNOLOGY (MANUFACTURING SYSTEMS)
DATE	:	29 JUNE 2026
TIME	:	2:00PM - 5:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

Question 1

Quality Assurance and Quality Control are very important parts of Quality Management in an organization.

(a) Explain why Quality Assurance and Quality Control are very important parts of Quality Management.

(8 marks)

(b) W. Edwards Deming was a pioneering statistician and consultant who emphasized that improving quality reduces expenses (through less rework/errors) while boosting productivity and market share , summarized in his 14 Points, the PDCA cycle, and the System of Profound Knowledge.
Explain how PDCA cycle can promote Quality management with a suitable example.

(12 marks)

Question 2

Quality assurance activities at the design stage is very critical as any overlook at this stage can cause serious problems down the production line.

(a) Explain any FOUR (4) activities that can enable manufacturers to produce a quality product at the design stage.

(10 marks)

(b) Cost of quality is a part of profit implication in the business sector. Elaborate the various categories of cost of quality. Provide an example for each category.

(10 marks)

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

A quality Inspector took five samples, each with four observations, of the length of time to process loan applications at a bank. The analyst computed the mean of each sample as shown in Table below and all values are in minutes. Use this information to obtain 3-sigma (ie Z=3) control limits for means of future times. It is known from previous experience that the Standard deviation of the process is 0.02 minute.

Refer Below - Table1 : Observation samples .

Table 1: Observation samples

		Sample				
		1	**2**	**3**	**4**	**5**
Observation	1	12.11	12.15	12.09	12.12	12.09
	2	12.10	12.12	12.09	12.10	12.14
	3	12.11	12.10	12.11	12.08	12.13
	4	12.08	12.11	12.15	12.10	12.12
	X bar	12.10	12.12	12.11	12.10	12.12

(a) Use the above information to obtain 3-sigma (ie Z=3) control limits for means of future times. Obtain the UCL and LCL for the Control chart

(8 marks)

(b) Upon obtaining the control limits, check whether the process is in a state of statistical control. If it is not in a state of statistical control, determine the sample points which are outside the control limits.

(4 marks)

(c) Illustrate with a rough sketch any FOUR (4) conditions which can help you to decide that the process is outside the control limits.

(8 marks)

Question 2

Quality Function Deployment (QFD) is a structured, customer-driven method used to transform user needs ("Voice of the Customer") into specific technical requirements and design specifications for products or services. It uses a matrix framework known as the "House of Quality" to align design, development, and manufacturing with customer demands.

(a) Illustrate the concept of QFD in improving customer requirements for a product with a suitable example.

(12 marks)

(b) Discuss any two tools to capture the customer's requirements in a QFD process.

(8 marks)

Question 3

The operations manager of a firm that produces frozen dinners had received numerous complaints from supermarkets about the firm's Chicken–n-Gravy dinners. The manager then asked her assistant Ms. Noraini to investigate the matter and to report her recommendations. Noraini's first task was to determine what problems were generating the complaints. The majority of the complaints centered on five defects: underfilled packages, a missing item, spills/mixed items, unacceptable taste and improperly sealed packages. Next she took samples of dinners from the two production lines and examined each sample. Making note of any defects that she found, a summary of those results are shown in Table below. As Ms, Noraini is new to this job, you are appointed as a consultant to help Ms. Noraini to investigate the complaints and to provide recommendations to the company to eliminate the problems.
Refer Below - Table2 : Defects Observed .

Table 2: Defects Observed

Defects Observed							
Date	Time	Line	Underfilled	Missing items	Spill/Mixed	Unacceptable Taste	Improperly sealed
5/12	0900	1		2	1	3	
5/12	1330	2			2		2
5/13	1000	2				1	3
5/13	1345	1	2		2		
5/13	1530	2		2	3		1
5/14	0830	1		3		3	
5/14	1100	2	1		1	2	
5/14	1400	1			1		1
5/15	1030	1		3		5	
5/15	1145	2			1	2	
5/15	1500	1	1		1		
5/16	0845	2				2	2
5/16	1030	1		3	1	3	
5/16	1400	1					
5/16	1545	2	1	4	1	1	2

(a) Illustrate the methodology that you would adopt to solve this problem.

(10 marks)

(b) What are the Quality tools that you would use in this problem? Justify the usage of the tools.

(10 marks)

Question 4

Quality Risk Management (QRM) is a systematic, proactive process for assessing, controlling, communicating, and reviewing risks to product quality and patient safety throughout a product's lifecycle .

(a) Discuss the importance of effective risk management in achieving successful quality management in an organization. Support your answer with a suitable real-world example.

(10 marks)

(b) Supply chain leaders know how crucial supplier quality management is for a business's bottom line, brand reputation, productivity of operations and customer satisfaction. Elaborate the above statement using examples.

(10 marks)

END OF EXAMINATION PAPER