UNIVERSITI KUALA LUMPUR
MALAYSIA ITALY DESIGN INSTITUTE

FINAL EXAMINATION

MARCH 2026 SEMESTER

COURSE CODE	:	PMB30303
COURSE TITLE	:	SIX SIGMA METHODOLOGY
PROGRAMME NAME	:	BACHELOR OF ENGINEERING TECHNOLOGY WITH HONOURS
DATE	:	24 JUNE 2026
TIME	:	9:00AM - 11:30AM
DURATION	:	2 HOURS 30 MINUTES

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 ONE sections.
4. Section A consist of five questions. Answer FOUR (4) questions only.
5. Please write your answer on the answer booklet provided.
6. Please answer all questions in English only.
7. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

SECTION A (Total: 100 marks)

Answer FOUR (4) questions.

Please use the answer booklet provided.

Question 1

A telecom call center faces high customer wait times, causing dissatisfaction. Management wants to apply Six Sigma principles to improve efficiency and customer experience.

(a) Define what a "defect" is in the context of Six Sigma, and identify a potential defect in this call center case.

(5 marks)

(b) Explain 'VOC' and how it should guide the Six Sigma project in this context.

(5 marks)

(c) Suggest TWO **(2)** Critical to Quality (CTQ) characteristics that the team should monitor.

(6 marks)

(d) Choose and briefly describe **THREE (3)** Six Sigma chart or diagram that could be applied in this project.

(9 marks)

Question 2

A fast-food chain has received frequent complaints about long waiting times during lunch hours. The management decides to apply the DMAIC methodology to solve the issue and improve customer service.

(a) Briefly interpret each phase of the DMAIC cycle based on the case.

(15 marks)

(b) Based on the case, construct **ONE** technique the company can perform in the **IMPROVE** phase of the DMAIC cycle to address the problem.

(10 marks)

Question 3

A juice manufacturing company, FreshFlow Beverages Sdn Bhd, has received several complaints from customers about inconsistent juice taste and incorrect fill volumes in their 300ml bottled orange juice. The management decided to launch a Six Sigma DMAIC project to address the problem, starting with the Define phase using a SIPOC diagram.

As a member of the Six Sigma team, you are required to:

(a) Develop a SIPOC diagram for the juice bottling process, identifying at least three elements for each component.

(20 marks)

(b) Explain how the SIPOC diagram helps the project team in defining the problem clearly and aligning process improvement efforts.

(5 marks)

Question 4

A company that produces bottled juice has received several customer complaints about leaky bottles and missing expiration dates on the labels. Management decides to use FMEA to prevent these issues in the future.

(a) Explain FMEA and why is it important in quality management?

(4 marks)

(b) Identify THREE (3) possible failure modes in the juice bottling process based on the case.

(6 marks)

(c) Based on the identified failure modes, construct an FMEA report.

(15 marks)

Question 5

A food manufacturing company producing packaged snacks wants to evaluate the consistency and quality of its product weight. A sample of 30 packages was collected and analyzed using Minitab. The output includes a boxplot and a normality test for the product weight data.
Based on the Minitab output provided, answer the following questions:

(a) Interpret the boxplot results.
Refer Below - Figure1 : Boxplot Results .

(10 marks)

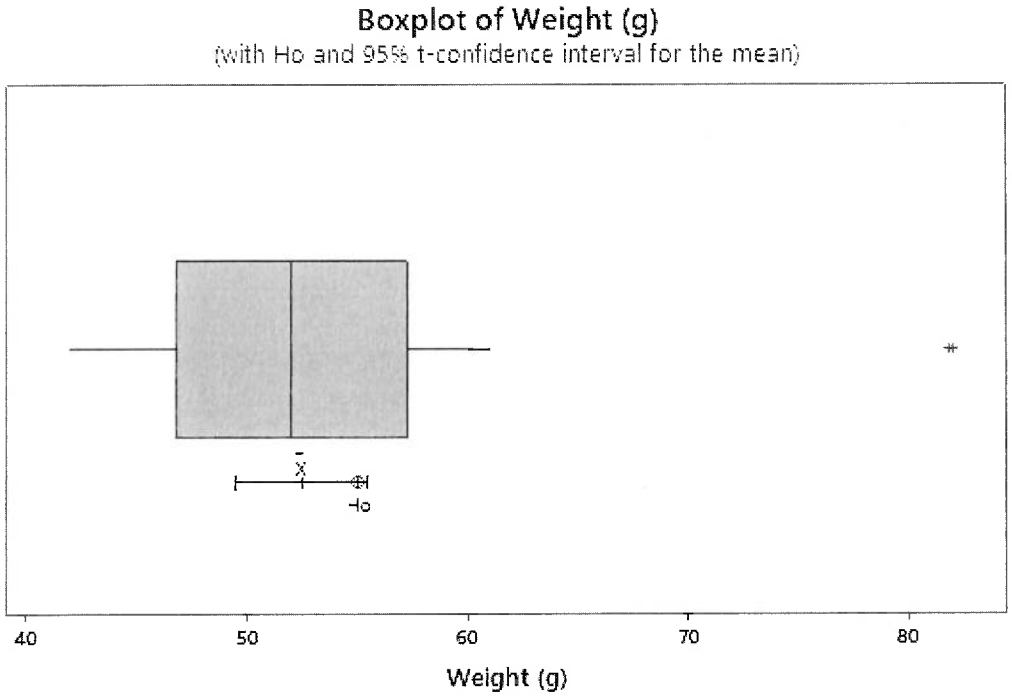


Figure 1: Boxplot Results

(b) Interpret the Normality results.
Refer Below - Figure2 : Normality Test .

(10 marks)

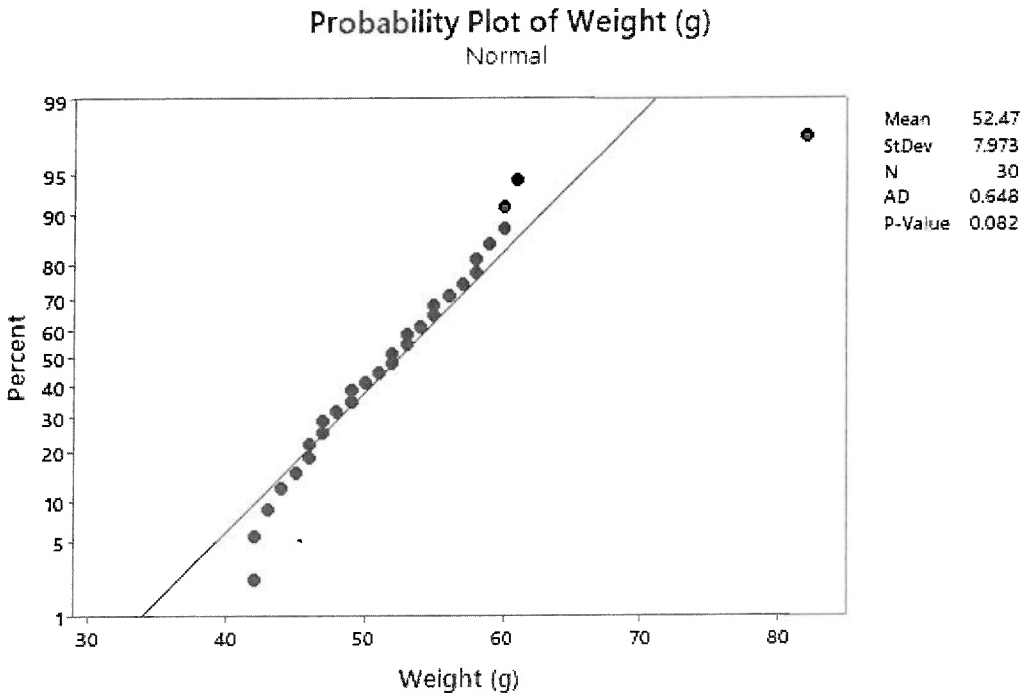


Figure 2: Normality Test

(c) Based on the boxplot and normality test results, suggest TWO actions that the company should take to improve the quality control of the snack production process. Justify your answers based on the patterns observed in the data.

(5 marks)

END OF EXAMINATION PAPER