UNIVERSITI KUALA LUMPUR
MALAYSIA ITALY DESIGN INSTITUTE

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE	: PMB 40103
COURSE NAME	: LEAN & AGILE MANUFACTURING
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	: BACHELOR OF ENGINEERING TECHNOLOGY WITH HONOURS
DATE	: 29 JUNE 2026
TIME	: 09.00 AM – 11.00 AM
DURATION	: 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please CAREFULLY read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of ONE(1) sections.
4. Section A consist of five questions. Answer FOUR(4) questions only.
5. Please write your answers on the answer booklet provided.
6. Answer all questions in English language ONLY.

THERE ARE 2 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 100 marks)

INSTRUCTION: Answer FOUR(4) questions only.

Please use the answer booklet provided.

Question 1

Multicode Sdn Bhd produces plastic covers for electrical products. The factory is currently experiencing high Work-In-Process (WIP) at the trimming station, long waiting time during the painting process, and a high number of rejected products. Production is carried out based on forecast demand, resulting in warehouse congestion and delayed customer deliveries.

(a) Identify FOUR (4) types of waste (Muda) that may occur in the factory. Briefly explain each waste based on the situation above.

(8 marks)

(b) Explain the differences between a Push System and a Pull System in manufacturing operations.

(8 marks)

(c) Explain with example THREE (3) type manufacturing system available in the industry.

(9 marks)

Question 2

Pesaka Nuri (M) Sdn Bhd is experiencing a high defect rate in its metal bracket production line. Common issues include incorrect hole sizes, surface scratches, and missing parts. As a result, the company has received increasing customer complaints regarding product quality.

(a) Explain the definition of Six Sigma in manufacturing.

(5 marks)

(b) Describe and explain the FIVE (5) phases of the DMAIC methodology.

(10 marks)

(c) Suggest THREE (3) quality improvement tools that are suitable for reducing product defects. Explain the function of each tool.

(10 marks)

Question 3

An assembly factory is experiencing long machine setup times during mould and die changeover activities. Machines also frequently break down due to poor maintenance practices. In addition, night-shift operators frequently make mistakes during the installation process.

(a) Explain the meaning of SMED.

(5 marks)

(b) Describe FOUR (4) stages of SMED implementation.

(8 marks)

(c) Construct a 5 Why Analysis for the issue: "Night-shift staff frequently make mistakes during the installation process." together with final root cause.

(12 marks)

Question 4

A workshop has messy workstations, misplaced tools, poor housekeeping practices, and unused broken parts scattered around the work area. Workers spend excessive time searching for equipment and some employees are not competent in performing repair work efficiently. As a result, delays occur in the repairing process. Management proposes the implementation of the 5S system for improvement.

(a) Explain the purpose of the 5S system in addressing the issues stated above.

(5 marks)

(b) List and explain the FIVE (5) elements of 5S in relation to the workshop improvement process.

(10 marks)

(c) Draw a Cause and Effect Diagram using the 4M categories (Man, Machine, Method, Material) for the issue "Delay in Repairing Process".

(10 marks)

Question 5

APM Coil Springs Sdn Bhd plans to improve customer response time and increase production flexibility by implementing Agile Manufacturing and smart factory technologies.

(a) Explain the meaning of Agile Manufacturing.

(5 marks)

(b) List FOUR (4) advantages of Agile Manufacturing in today's manufacturing environment.

(8 marks)

(c) Suggest FIVE (5) tools or approaches for managing change that can help reduce "People-Related Failure" during the implementation of a Lean & Agile Manufacturing project. Explain briefly how each approach contributes to successful project implementation.

(12 marks)

END OF EXAMINATION PAPER