



MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

UNIVERSITY POSTGRADUATE EXAMINATION

2024/2025 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATION FOR MASTER

OF TECHNOLOGY IN MECHANICAL ENGINEERING

EMT 607- MANUFACTURING SYSTEMS AND ECONOMICS

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Answer any FOUR questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

QUESTION ONE (25 MARKS)

- a) Describe the classification of basic manufacturing processes. Discuss the capacity and limitations of at least two of these processes and provide example of how they are applied in industry. (10 marks)
- b) Explain the role of automation, robotics and CNC machines in modern Manufacturing. How do these technologies contribute to productivity and accuracy in production? Provide specific examples. (8 marks)
- c) Discuss how CAD/CAM applications are utilised in process planning and production. How do these tools enhance the efficiency and quality of manufacturing processes? (7 marks)

QUESTION TWO (25 MARKS)

- a) Discuss the importance of plant layout, group technology and flexible manufacturing systems in optimizing production operations. In your answer, explain how each concept contributes to efficiency and provide example of their application in modern manufacturing. (13 marks)
- b) Explain how lean manufacturing techniques such as KAIZEN, KANBAN, JIT, 5S and Seven Wastes contribute to quality and productivity improvements in manufacturing. Describe each technique briefly and discuss its impact on cost reduction and improving workflow efficiency. (12 marks)

QUESTION THREE (25 MARKS)

Discuss the significance of effective inventory control and quality management in manufacturing operations. Include a detailed explanation of various inventory control techniques such as material Requirements Planning and describe the key principle of quality control that ensure products meet specified standards. Illustrate how these concepts interrelate to enhance overall operational efficiency. (25 marks)

QUESTION FOUR (25 MARKS)

- a) Discuss the relationship between design features and manufacturing process capabilities. Explain how understanding of this relationship can lead to more efficient manufacturing processes and improved product quality. Provide example of design considerations that might influence the choice of manufacturing processes. (15 marks)

- b) Describe the factors that influence the selection of manufacturing systems for specific design requirements. Include a discussion on how technology advancements and production volume affect the choice of manufacturing systems. (10 marks)

QUESTION FIVE (25 MARKS)

Discuss the financial aspects of manufacturing, focusing on the following areas: Inventory costing, Economic Order Quantities, Machine Tool selection and cost of production strategy. In your answer, define each concept and explain its significance in economic decision making for manufacturers. Provide examples to illustrate how each component can impact overall production efficiency and profitability. (25 marks)