

Study Programme	: Bachelor of Science Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	DMX7402 – Analysis of Manufacturing systems & Processes
Academic Year	: 202/23
Date	: February 19, 2024
Time	: 09:30 hrs. – 12:30 hrs.
Duration	: 3 hours

General instructions

- 1) Read all instructions carefully before answering the questions
- 2) This question paper consists of 05 questions. All questions carry equal marks.
- 3) Answer all questions.

Question 01.

- a) Briefly discuss the factors which govern the classification of manufacturing systems.
- b) Explain the objectives of analyzing manufacturing systems.
- c) Briefly discuss the important performance measures you would consider dealing with manufacturing systems.

Question 02.

- a) Discuss the importance of capacity planning in manufacturing systems.
- b) Describe the role of modeling in manufacturing systems analysis and optimization.
- c) Discuss the different types of models used in manufacturing systems analysis.

Question 03.

- a) Define deterministic and stochastic models in the context of manufacturing systems analysis. Discuss the differences between the two types of models.
- b) Define production flow lines in manufacturing systems. Explain the key characteristics that distinguish them from other production system configurations.
- c) Provide examples of common sources of bottlenecks and delays in production processes. Explain how Production Flow Analysis (PFA) can help to identify and address these bottlenecks effectively.

Question 04.

- a) Define cellular manufacturing and explain its core principles. Provide examples of industries or products that can benefited from cellular manufacturing.
- b) What are the advantages and disadvantages of Flexible Manufacturing Systems (FMS) in adapting to changing production demands? Provide examples of industries or products that benefit the most from FMS.
- c) Explain the steps involved in developing a simulation model for a manufacturing system.

Question 05.

- a) Consider a three-workstation flowline. The workstations each have an infinite buffer and contain 1, 4, and 2 machines respectively. The process time of the machines in workstation 1, 2 and 3 is 0.15, 0.8, and 0.35 hours respectively.
 - (i) Calculate the maximum throughput of the line.
 - (ii) Determine the flow time of a lot for release rates under the maximum throughput.
 - (iii) Determine the mean WIP-level in the line for the maximum throughput.

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