

Study Programme	: Bachelor of Science Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	DMX5212 – Computer Aided Design and Manufacturing
Academic Year	: 2024/25
Date	: February 10, 2026
Time	: 13:30 hrs. – 16:30 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.
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Question 01.

- a) Explain the role of CAD/CAM integration in achieving Computer Integrated Manufacturing (CIM). (8 Marks)
- b) Identify and briefly explain four (04) key functions of manufacturing support systems in a modern production environment. (8 Marks)
- c) Explain how product quality and life expectancy influence manufacturing cost and customer satisfaction. (4 Marks)

Question 02.

- a) Differentiate between raster graphics and vector graphics with suitable examples from CAD applications. (6 Marks)
- b) Compare 2D modeling and 3D modeling in engineering design. Highlight their applications and limitations. (8 Marks)
- c) Distinguish between wireframe models, surface models, and solid models used in CAD systems. (6 Marks)

Question 03

- a) Explain any two (02) solid modeling techniques used in modern CAD software. Discuss the advantages and limitations of each. (8 Marks)
- b) Describe how Computer Aided Engineering (CAE) supports design verification and performance evaluation. Mention two analysis tools commonly available in CAD/CAE packages. (6 Marks)

- c) Define Computer Aided Process Planning (CAPP) and explain why it is considered a key link between CAD and CAM. (6 Marks)

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Question 04.

- a) Discuss design optimization techniques available in CAD systems for mechanical components, with emphasis on weight reduction and strength improvement. (8 Marks)
- b) Define Rapid Prototyping. Explain two (02) commonly used rapid prototyping techniques. (6 Marks)
- c) Identify the limitations and challenges associated with rapid prototyping in industrial applications. (6 Marks)

Question 05.

- a) List and explain the disadvantages of manual part programming when compared with computer-assisted CNC programming. (5 Marks)
- b) Define Computer Numerical Control (CNC) and discuss the reasons for its widespread adoption in modern manufacturing industries. (5 Marks)
- c) Figure 01 shows a rectangular mild steel plate of dimensions 80 mm × 40 mm and thickness 10 mm. A rectangular slot of size 20 mm × 10 mm is machined on the top face of the plate. The slot is centered at coordinates (40 mm, 25 mm) with respect to the origin. Two through holes of 8 mm diameter are located at (15 mm, 10 mm) and (65 mm, 10 mm). The origin (0,0) is located at the bottom-left corner of the component.

Write a manual CNC part program to machine the outer profile, the slot, and the holes shown in Figure 01 under the following conditions:

- Work material: Mild steel
- Plate thickness: 10 mm
- Spindle speed: 1000 rpm
- Feed rate: 300 mm/min

Clearly state any additional assumptions made.

(10 Marks)

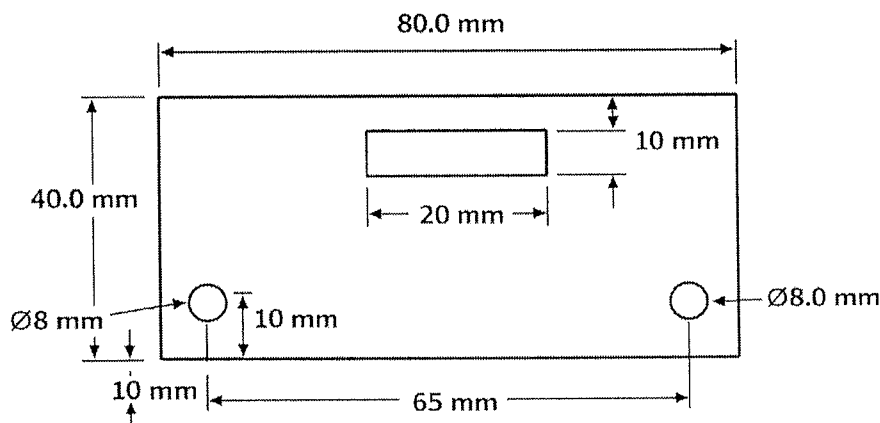


Figure 01

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