



MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS
ENGINEERING**

UNIVERSITY ORDINARY EXAMINATION

2020/2021 ACADEMIC YEAR

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR, BACHELOR OF
SCIENCE IN ELECTRICAL AND ELECTRONICS ENGINEERING**

EES 101– COMPUTER AIDED DRWAING

DURATION: 2 HOURS

Instructions to candidates:

1. Answer question One and Any Other Two questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

- a) Outline **SIX** benefits of implementing a computer aided design system. (6 marks)
- b) Discuss how multicoloured images are obtained in computer graphics. (4 marks)
- c) Outline **SIX** ground rules which should be considered when designing graphics software. (6 marks)
- d) State **FOUR** advantages of 3D solid modelling over other modelling techniques. (4 marks)
- e) State the function of the central processing unit in a CAD system. (2 marks)
- f) Briefly differentiate the following common synthetic curves used in CAD systems
 - i. Hermite cubic spline (2 marks)
 - ii. Bezier curves (2 marks)
- g) What is the purpose of secondary storage in a CAD system? (4 marks)

SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO (20 MARKS)

- a) Explain the importance of CAD data exchange and list **THREE** industry data exchange formats. (6 marks)
- b) By means of a diagram, show how CAD/CAM can be applied in different steps of a product cycle. (10 marks)
- c) Define a 3D geometric modelling kernel and give **TWO** examples. (4marks)

QUESTION THREE (20 MARKS)

- a) A company wants to start consultancy on computer aided design. The plan is to start up with two CAD professionals working with one 3D modelling software. The CAD software will soon run on personal computers. Advise on the hardware requirements considering the following: (12 marks)
 - i. Memory and central processing unit
 - ii. Output devices
 - iii. Display devices
 - iv. Secondary storage devices
- b) Sketch the typical configuration of the hardware components in a stand-alone CAD system. (5 marks)
- c) Briefly describe the principle of operation of an LCD display. (3marks)

QUESTION FOUR (20 MARKS)

- a) State 3×3 matrices representing the following three dimensional transformations. (4 marks)

- i. Scaling
 - ii. Rotation about the z -axis
 - iii. Rotation about the y -axis
 - iv. Rotation about the x -axis
- b) The line defined by end points $(3,1)$ and $(7,5)$ is scaled by a factor of 1.5 and then rotated by 45° . Determine the concentration matrix. What are the new co-ordinates of the new end points? (7 marks)
- c) Show the relationships between the modules of the graphics software and briefly describe their purpose. (5 marks)