**W1-2-60-1-6**

##  JOMO KENYATTA UNIVERSITY

 **OF**

 **AGRICULTURE AND TECHNOLOGY**

# University Examinations 2015/2016

**YEAR THREE SEMESTER ONE EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE INFORMATION TECHNOLOGY**

**BIT 2111: COMPUTER AIDED DESIGN**

**DATE: AUGUST 2016 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO FROM SECTION B**

**SECTION A**

**QUESTION ONE (30 MARKS)**

a) Define computer aided design, and explain any two application areas

 (5 marks)

b) The important reason for using a CAD system is that it offers the opportunity to develop the database needed to manufacture the product using a suitable illustration explain the relationship between CAD/CAM database (6 marks)

c) Define the following terms as used in CAD

 i) CRT (3 marks)

 ii) ICG (3 marks)

 iii) Numerical control (3 marks)

d) Discuss any FOUR benefits of computer aided design. (8 marks)

(e) What is geometric modeling? (2 marks)

**SECTION B**

**QUESTION TWO (20 MARKS)**

a) computer aided design consists of three components namely; Design analysis and visualization, explain these components citing examples

 (6 marks)

b) Differentiate between modeling transformation and visual transformation and show how each can be achieved using a CAD software such as sketch-up (6 marks)

c) How does computer aided design differs from conventional design

 (3 marks)

d) Explain how the following technique works in CAD (5 marks)

 i) Bezier curves

 ii) B-spline curve

**QUESTION THREE (20 MARKS)**

a) i) There are three basic 2D modeling transformations, most of which are based on matrix operation which can be expressed as;

 (P\*)=(P)(T)

 Explain this expression (3 marks)

 ii) Discuss the three basic 2D modeling transformations in detail

 (9 marks)

b) List and explain any four characteristics of a good geometric modeling representation (8 marks)

**QUESTION FOUR (20 MARKS)**

 Design process is the pattern of activities that is followed by a designer in arriving at the solution of a technological problem. Discuss these process in details according to the following models;

 i) Shigley model (5 marks)

 ii) Pahl and Beitz model (5 marks)

 iii) Ohsuga model (5 marks)

 iv) Earle model (5 marks)

**QUESTION FIVE (20 MARKS)**

a) Differentiate between geometry and topology (4 marks)

b) Solid model is a digital representation of the geometry of an existing or envision physical object. Briefly explain the following solid modeling techniques;

 i) Constructive solid geometry (CSG) (3 marks)

 ii) Boundary representation (B-Rep) (3 marks)

 iii) Sweeping (3 marks)

c) List and explain three characteristics of a good CAD software (3 marks)

d) Discuss how DDA algorithm works in line generation in computer graphics (4 marks)