



MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR DEGREE IN
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

EMM 200: COMPUTER AIDED ENGINEERING DRAWING

DATE: 13/6/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

- I. This paper contains **FIVE (5)** questions. Question (1) in **section 1** is compulsory and carries 30 marks. All the other questions carry 20 marks each.
- II. Attempt **Question one** and any other two: one from **Section B** and another one from **Section C**
- III. You need a computer installed with AutoCAD 2013.
- IV. Create a folder on the desktop and rename it your Registration Number. Save your work progressively in the renamed folder.
- V. All dimensions are in millimeters unless otherwise stated.
- VI. Unspecified dimensions are to be taken as per choice

SECTION A: COMPULSORY

QUESTION ONE (30 MARKS)

Fig. Q1 shows an isometric view of a sliding shaft, the arrow indicates the direction to obtain the front view. Using AutoCAD 2013;

- a) Redraw the solid and generate **full sectional front view, a plan, end elevation** (in 3rd Angle Orthographic projection) and **the isometric view** in paper space. (16 marks)
- b) Indicate 8 main dimensions. (4 marks)
- c) Use layers to group the lines according to their functions. (4 marks)
- d) Include centerlines and hidden details on the plan and end elevation. (4 marks)
- e) Suitable Title block (2 marks)

SECTION B:

QUESTION TWO (20 MARKS)

Fig. Q3 shows orthographic views of a solid object. Study the views and AutoCAD 2013 in 2D drafting environment.

- a) Draw the isometric projection in paper space (11 marks)
- b) Use layers to group lines according to function, (5 marks)
- c) Include a suitable title block (2 marks)
- d) Include 4 main dimensions (2 marks)

QUESTION THREE (20 MARKS)

Fig. Q3 shows an isometric view of a solid object, the **arrow** indicates the direction to obtain the front view. Using AutoCAD 2013 and in **Third Angle Orthographic Projection** draw the following views and present them in paper space;

- a) The front view (6 marks)
- b) Plan (5 marks)
- c) Use layers to group lines according to function, (4 marks)
- d) Include **6** major dimensions in paper space. (3 marks)
- e) Suitable title block. (2 marks)

SECTION C

QUESTION FOUR (20 MARKS)

- a) State and explain the TWO co-ordinate systems used in computer graphics. (4 marks)
- b) Consider a line represented as $\bar{L} = \begin{pmatrix} 1 & 2 \\ 2 & 3 \end{pmatrix}$, which is scaled about the origin by $T_1 = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$ then translated by $T_2 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ and finally rotated about the origin by 60° in the clockwise direction. What will be the final coordinates of line $\bar{L}$, show your working. (6 marks)
- c) State and briefly explain FOUR secondary data storage devices. (8 marks)
- d) State 4 computer input devices. (2 marks)

QUESTION FIVE (20 MARKS)

- a) With the aid of sketches, describe the following geometric modelling systems: (4 marks)
- Wireframe modeling
 - Surface modeling
- b) State FOUR reasons why solid modeling is considered superior to the other 3-dimensional modeling techniques. (4 marks)
- c) With the aid of diagrams briefly explain the following types of solid internal representation schemes and state an advantage of each. (6 marks)
- Primitive instancing
 - Sweeping
- d) With aid of diagrams explain the THREE Boolean operators used in constructive solid Geometry. (6 marks)

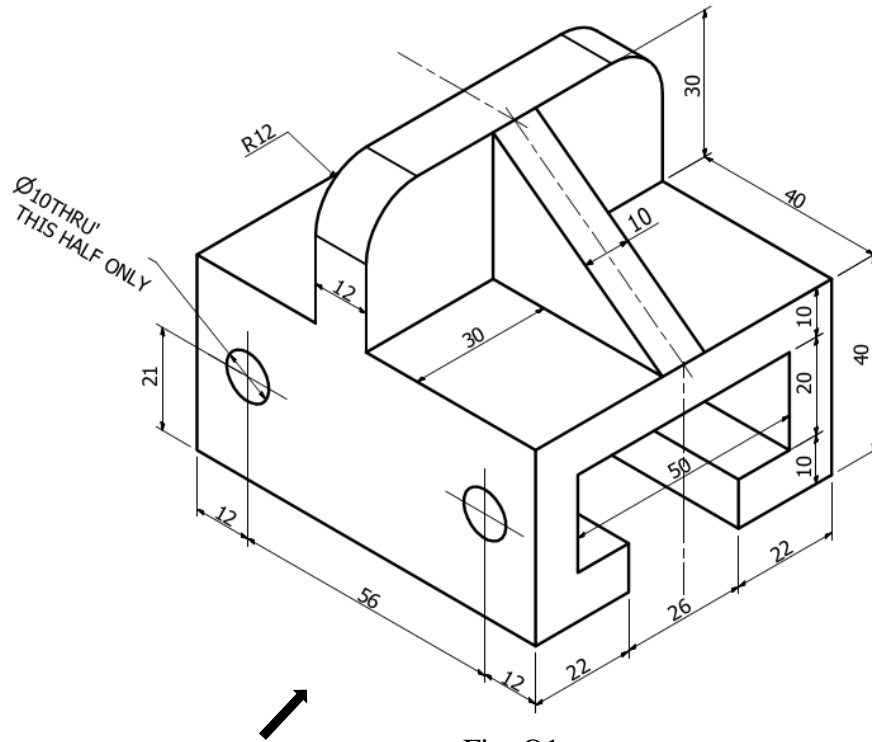


Fig. Q1

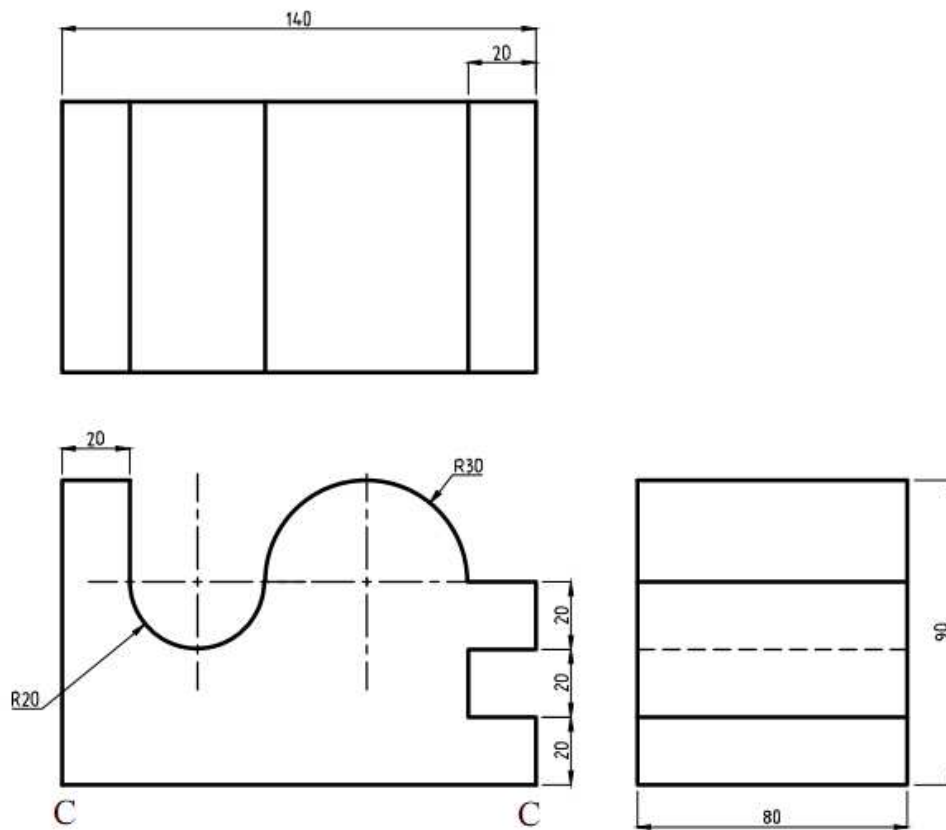


Fig. Q2

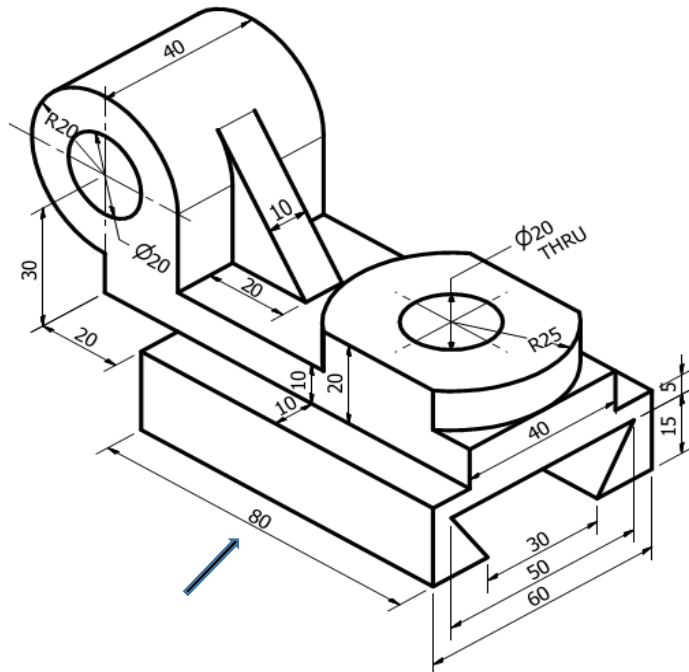


Fig. Q3