



MACHAKOS UNIVERSITY

University Examinations 2023/2024 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

THIRD YEAR SECOND SEMESTER EXAMINATIONS FOR

BACHELOR OF SCIENCE MECHANICAL ENGINEERING

EMM 311: COMPUTER-AIDED ENGINEERING DRAWING

DATE: _____

TIME: _____

INSTRUCTION TO CANDIDATES

- You should have the following for this exam
 - a) Answer Booklet
 - b) Calculator
- A computer installed with Autodesk Inventor 2013 and above.
- The examination consists of FIVE Questions. Answer One (**COMPULSORY**) and attempt any other two questions.
- Maximum marks for each part of a question are as indicated.
- Use of mobile phones in the exam room is strictly prohibited.
- **The Paper consists of 6 printed pages**
- **For the questions done in Autodesk AutoCAD save your work in a folder on the desktop. The name of the folder should be your registration number. You are advised to save your work consistently to avoid loss of your work in case of any eventuality**
- All dimensions are in millimetres unless otherwise stated.
- **Missing and mismatching dimensions, if any, may be suitably assumed**

QUESTION ONE (COMPULSORY) 30 MARKS

Fig. Q1 shows a 2-dimensional orthographic view of a bracket. In Autodesk inventor, draw the 3-D bracket in the dimensions shown and place an isometric view of the bracket in a drawing layout. Dimension the 3-D object appropriately

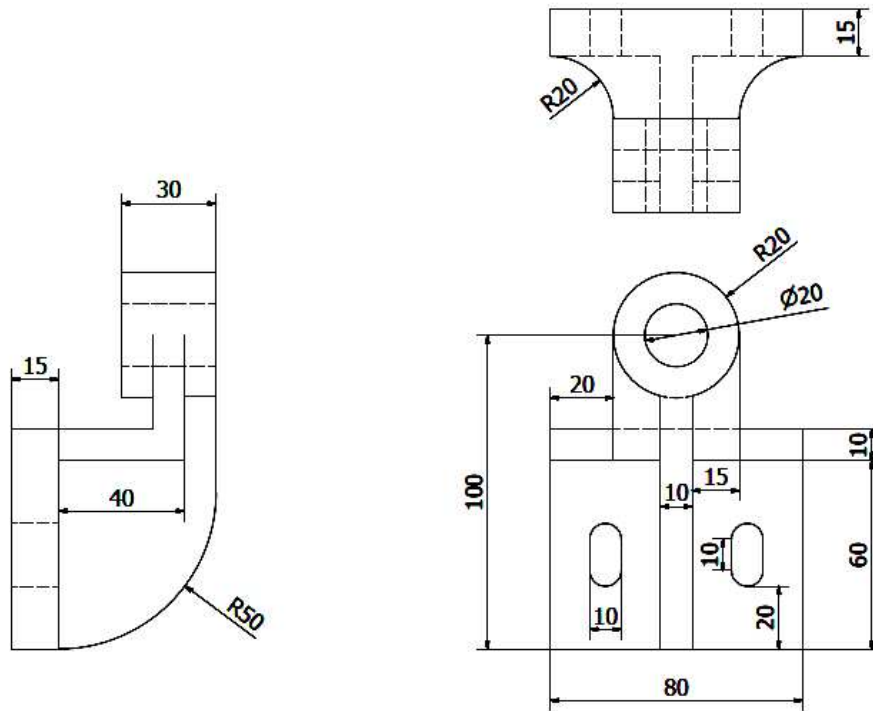


Fig. Q1

QUESTION TWO (20 MARKS)

Draw in First Angle projection, the orthographic views of **Fig. Q2** in AutoCAD. Use layers for different types of lines and for placing dimensions

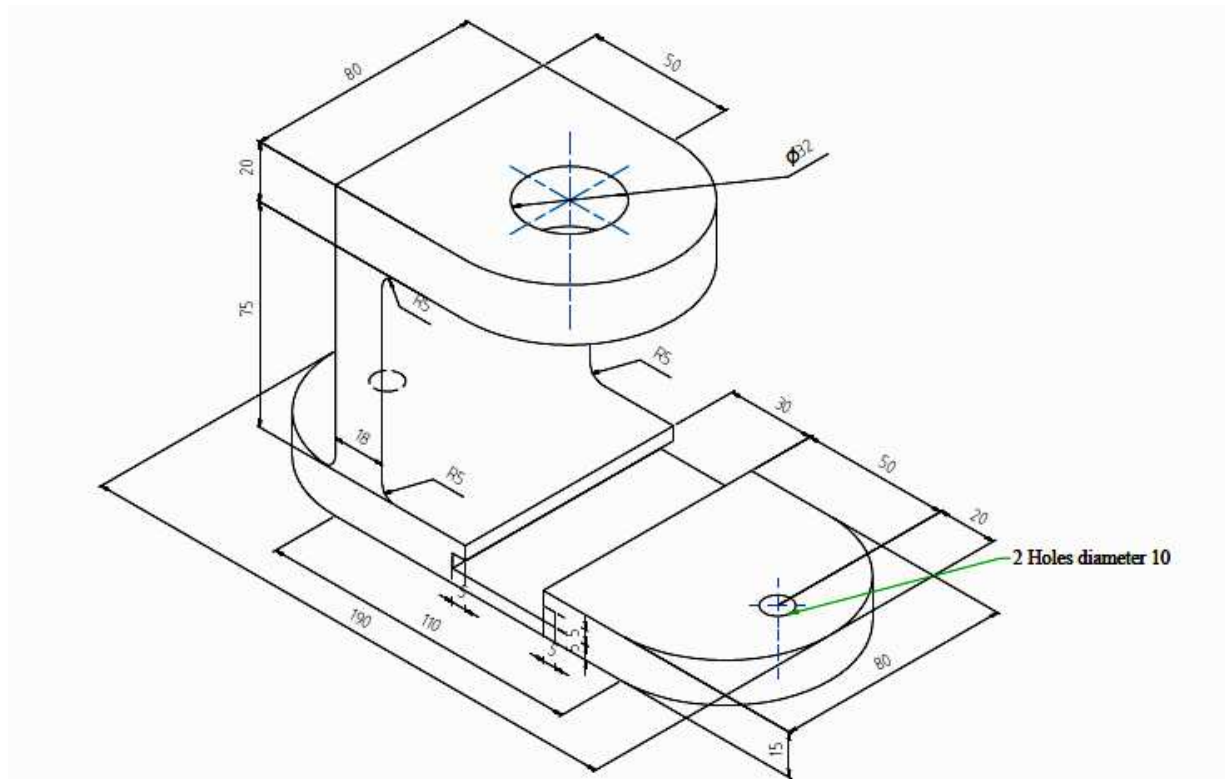


Fig. Q4

QUESTION THREE (20 MARKS)

- a) Discuss the applications of computer-aided drawing and design in mechanical engineering. (4 Marks)
- b) Using neat sketches explain the concept of constructive solid geometry. (3 Marks)
- c) Discuss the THREE main components of a CAD package. (3 Marks)
- d) Explain FOUR characteristics of good CAD software. (2 Marks)
- e) Describe FOUR disadvantages of CAD. (2 Marks)
- f) Explain THREE engineering analyses that can be conducted in a CAD environment. (3 Marks)
- g) Using a well-labelled diagram, explain the CAD Design Process. (3 Marks)

QUESTION FOUR (20 MARKS)

Create the drawing as shown in **Fig Q4** using Autodesk AutoCAD and then answer the following Questions. Calculate the Lengths of dimensions A1, A2 and A3.

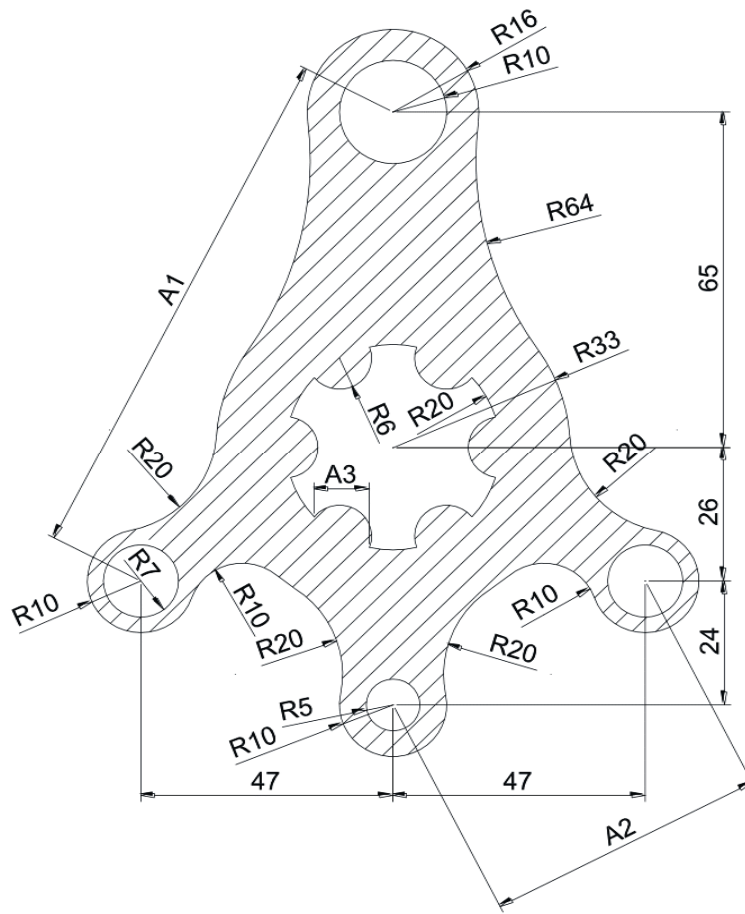


Fig Q4

QUESTION FIVE (20 MARKS)

Study the 2-D structure shown in **Fig Q5** carefully and develop a 3-D object that it represents in the real world using the Autodesk Inventor.

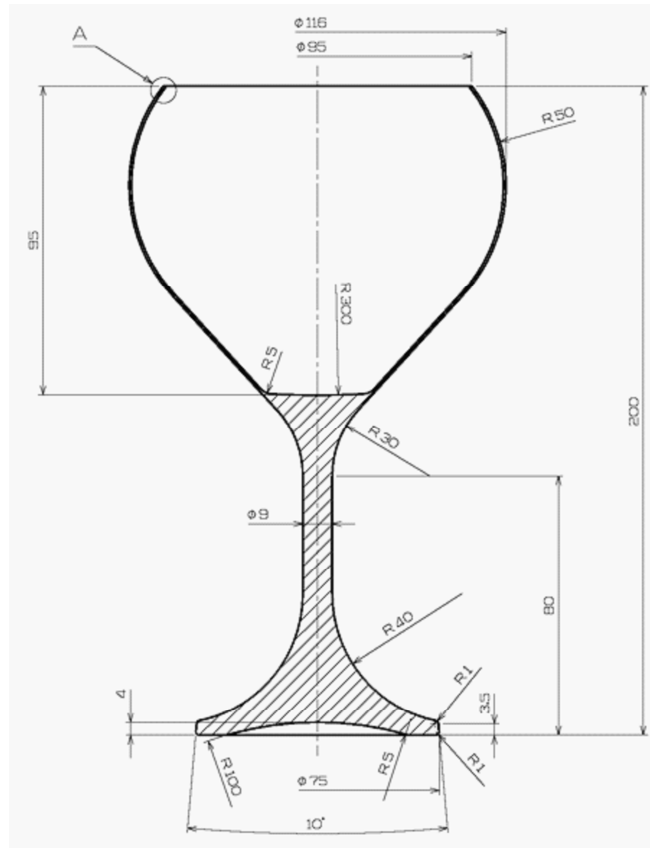


Fig Q5