MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (ELECTRICAL ENGINEERING)

EEE210: COMPUTER-AIDED DRAWING

DATE: 20/4/2023 **TIME: 8:30 – 10:30 AM**

INSTRUCTIONS

1. This paper contains **FIVE (5)** questions.
2. You are required to answer **THREE (3)** questions only.
3. Question **one** is compulsory and carry **30 marks**
4. Attempt ONE question in **SECTION A** and ONE question in **SECTION B**.
5. Question one carries 30 marks and the others carry 20 marks each.

All dimensions are in millimetres (mm) unless otherwise stated

QUESTION ONE (30 MARKS)

a) List four needs for computer aided design in the Engineering sector. (4 marks)

b) Distinguish between the following terms used in CAD

I. a **fillet** and a **chamfer** in computer aided design (2 marks)

II. **shell** and **emboss** (2 marks)

c) Outline the four ways of converting 2D to 3D using Autodesk in CAD software. (4 marks)

d) Figure 1 (e) is a CAD design of a connector.

i. Create the main part of the model. (5 marks)

ii. Include a 10-degree face draft on the 20 curved surface. (2 marks)

iii. Add the 15mm ‘extension’ part and the two thread features. (4 marks)

iv. Added a Suitable embossed text is to be onto a selected face. (2 marks)

v. Export a drawing (PDF) of the connector on an A4 paper including at least 10 dimensions. (5 marks)

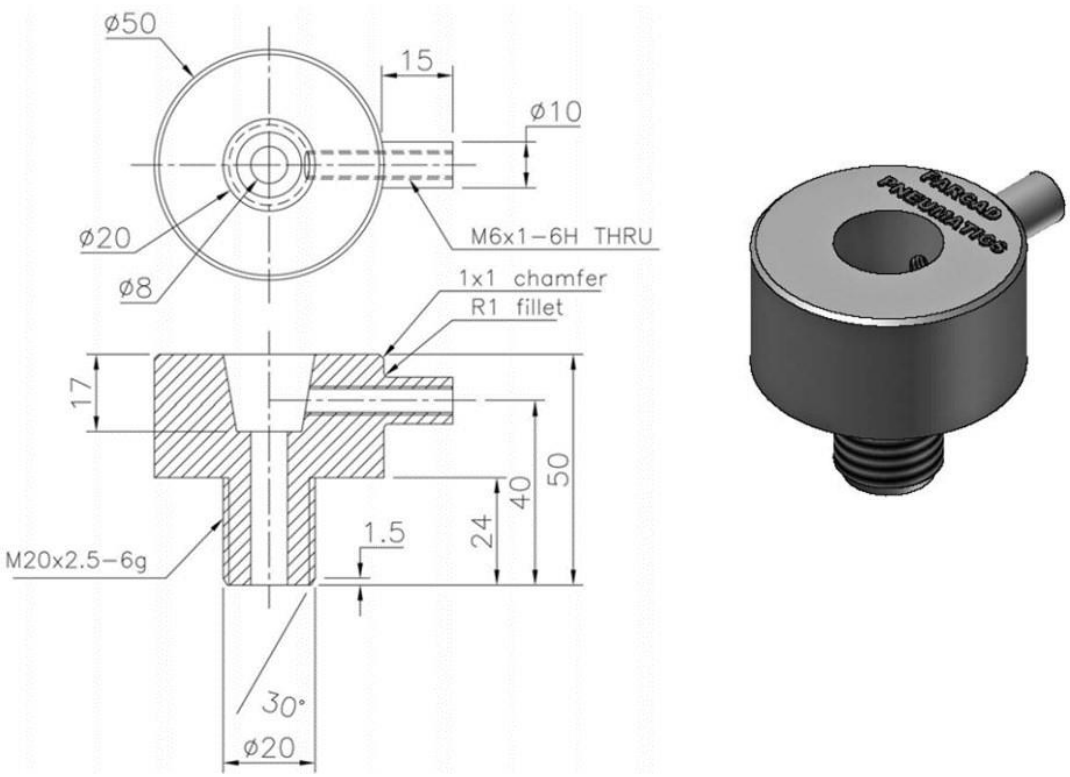

Figure 1 (e): Connector

QUESTION TWO (20 MARKS)

a) ***Figure 2 (a)*** shows a fully dimensioned model of an **I beam** (dimensions in millimeters). Using 3-Dimensional Modeling Capability of AutoCAD reproduce a drawing of the Top View, Sectional Front View, Side View and a shaded Isometric view. Include at least 6 dimensions and export a pdf of your drawing on A4 paper. (14 marks)

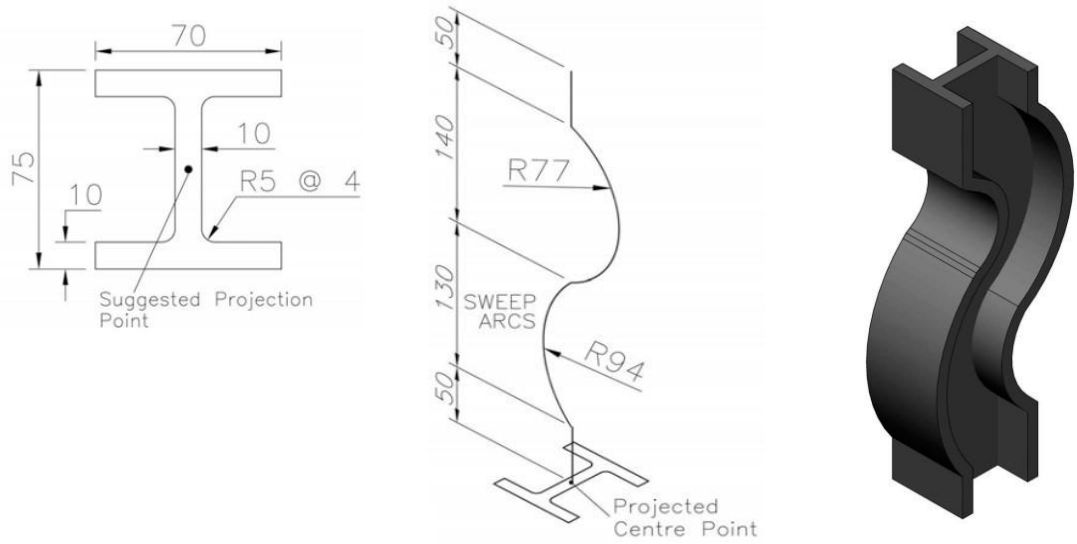

Figure 2 (a): I beam

b) Figure 2 (b) shows a fully dimensioned model of a **trophy** (dimensions in millimeters).

Using 3-Dimensional Modeling Capability of AutoCAD: (6 marks) i. Use the information given to design a 'lofted trophy'. The circle centers are all on the 'same vertical center line' and are 30mm 'offset' from each other.

ii. Add any refinements and save a fully dimensioned model.

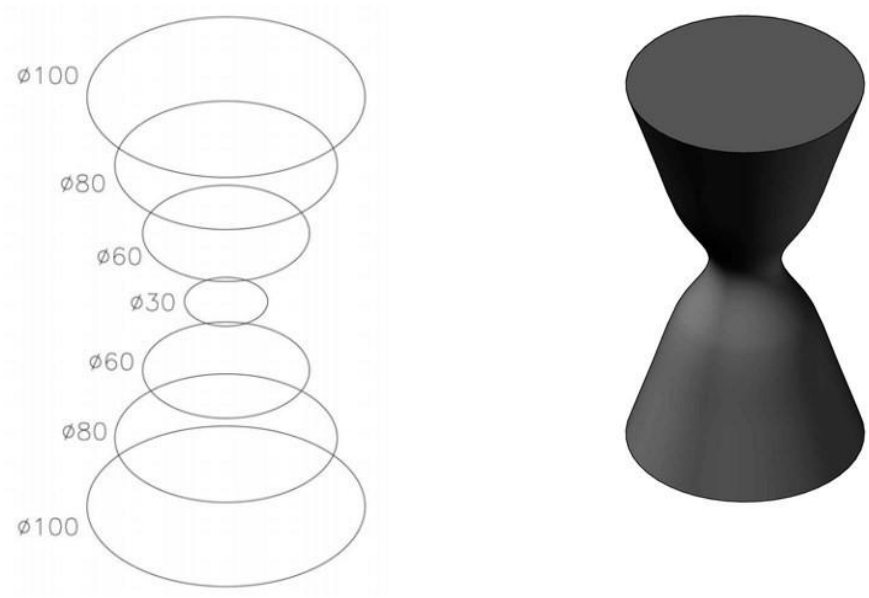

Figure 2 (b): Trophy

QUESTION THREE (20 MARKS)

a) **Figure 3 (a)** shows a model of a spout. Create a part model of the component using the two First Angle projection views given. (7 marks)

Figure 3 (a): Spout

b) **Figure 3 (b) (i & ii)** shows the 3D design of a fan motor housing. Using the two First Angle projection views given, create a part model of the fan housing, which is an interesting model to complete. (13 marks)

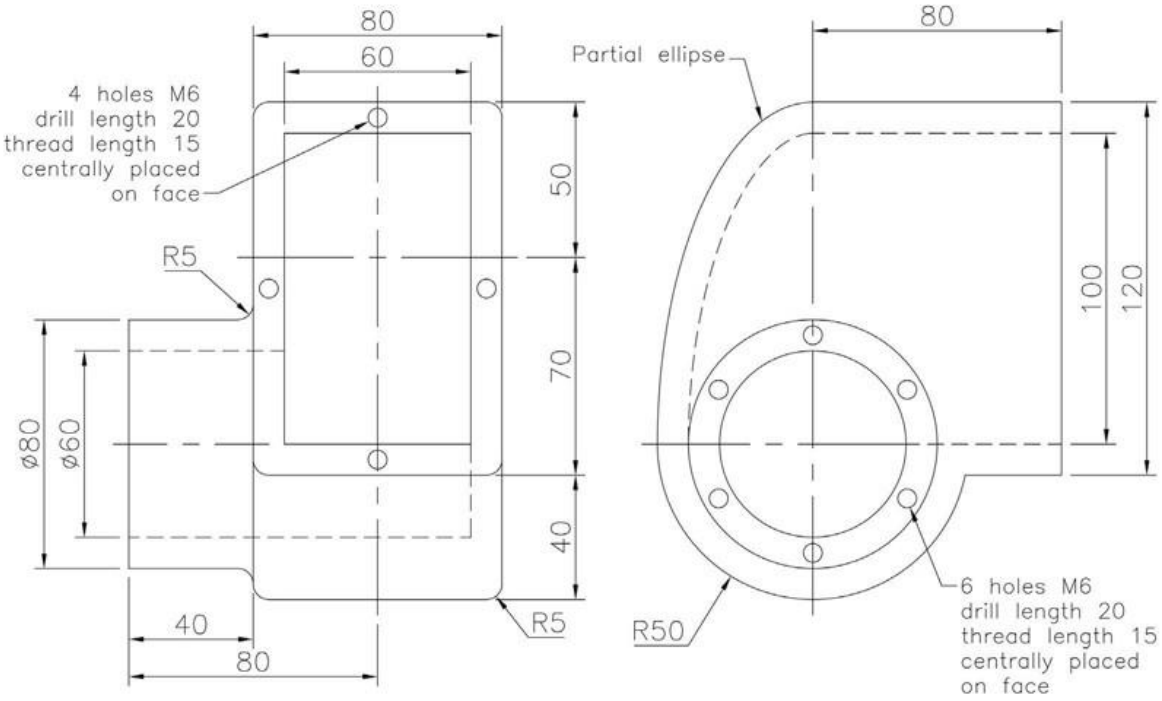

Figure 3 (b) (i) a fan motor housing

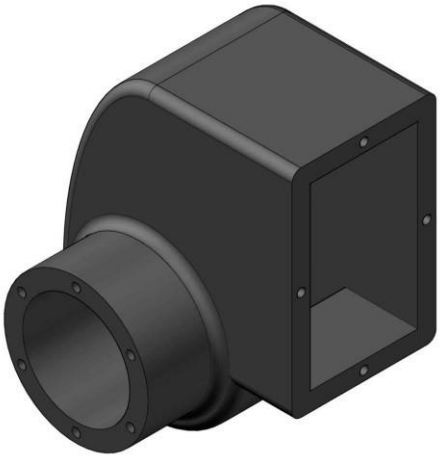

Figure 3 (b) (ii) Isometric view of a fan motor housing

QUESTION FOUR (20 MARKS)

The **Figure Qs 4** shows a wheel and handle design and a retaining screw.

a) **Produce the drawing of the individual parts:**

i. Part 1: Wheel (1 of).
ii. Part 2: Handle (1 of).
iii. Part 3: Retaining Screw (1 of).

b) Produce an assembly drawing from the parts and hence an exploded view in an A4 paper showing ballooned individual parts and an updated part list

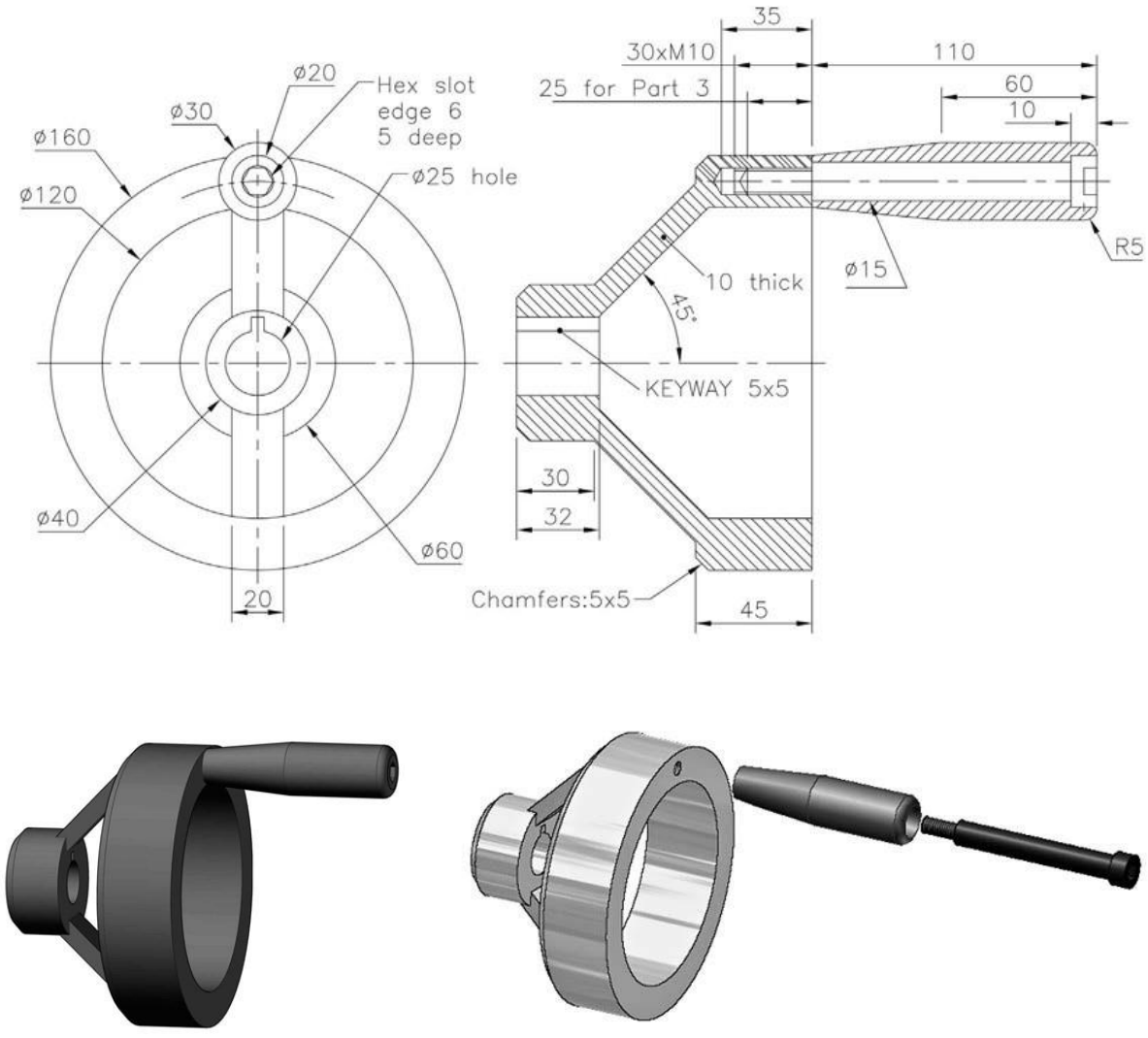

Figure 4: Holder Base

QUESTION FIVE (20 MARKS)

Figure 5 is a lathe milling wheel holder assembly with the parts:

i. Part 1: T Bar (1).
ii. Part 2: Arms (2).
iii. Part 3: Washer (2).
iv. Part 4: Screw (1).
v. Part 5: Nut (2).
vi. Part 6: Pin (2)

Use the drawing information to create an assembly and drawing layout of the holder

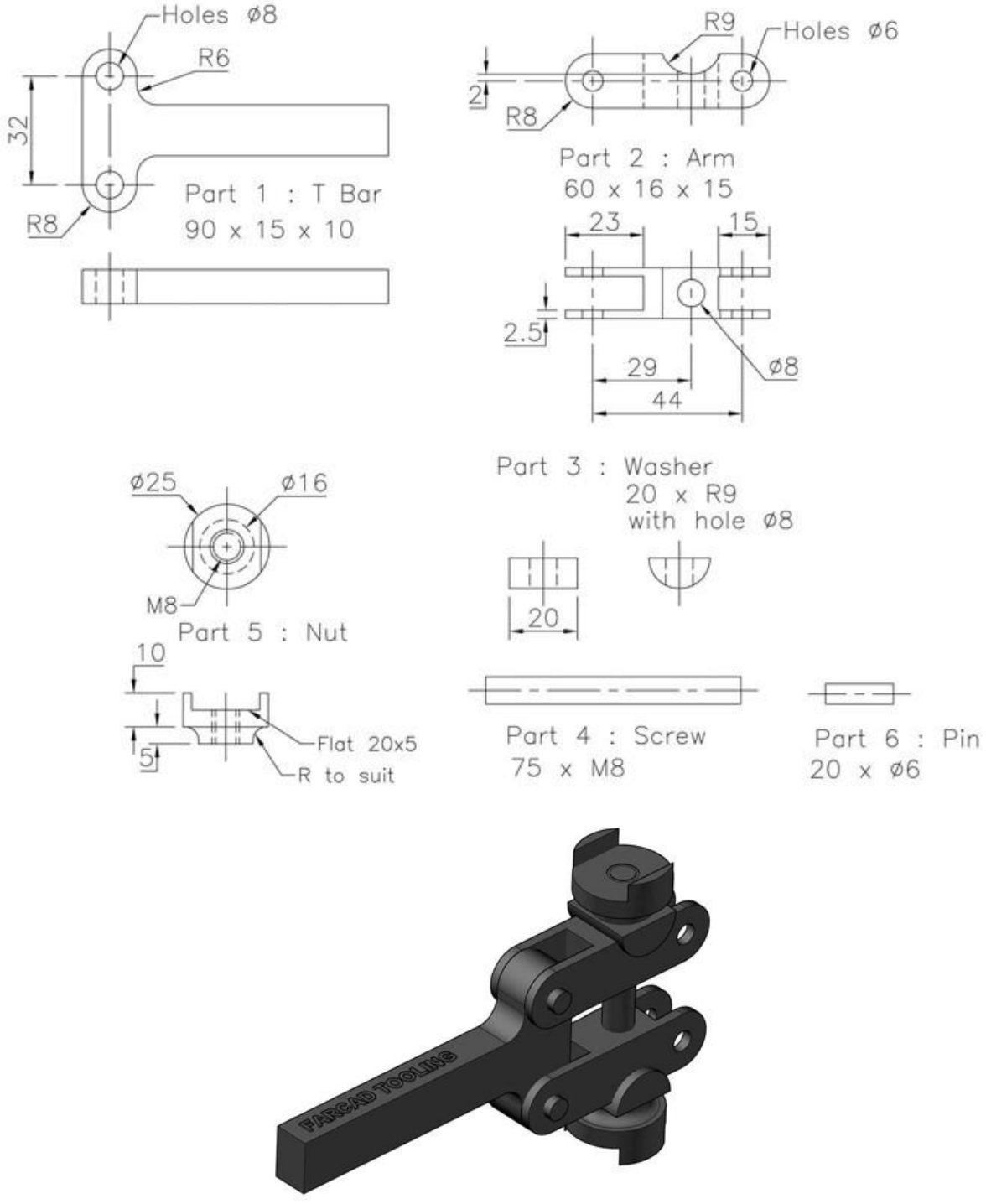

Figure 5: A lathe milling wheel holder assembly