MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING
FIRST YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MECHANICAL ENGINEERING)

EMM 111: ENGINEERING DRAWING & DESIGN I

DATE: **TIME:**

INSTRUCTIONS:

I)   This paper contains **FIVE (5)** questions.

II) Question **ONE** is **COMPULSORY** and carries 30 marks

III) Answer any other **TWO (2)** questions.

QUESTION ONE (COMPULSORY) (30 MARKS)

Figure Q1 shows a machined engineering block. Draw in full size, the following views in **FIRST ANGLE** orthographic projection:

    i.   A front elevation obtained by viewing the bracket in the direction of arrow A;   (8 marks)

    ii.   An end view obtained by viewing the bracket in the direction of arrow B;   (8 marks)

    iii.   A plan view projected from the front   (6 marks)

    iv.   Projection Symbol   (2 marks)

    v.   Title Block   (3 marks)

    vi.   Indicate the leading dimensions   (3 marks)

QUESTION TWO (20 MARKS)

a)   Figure **Q2 (a)** shows orthographic views of a locating bracket. Draw an isometric view of the bracket with a corner A as the lowest point on the drawing.   (10 marks)

b)   Figure **Q2 (b)** shows the orthographic views of a milling machine spindle bracket. Draw an oblique view of the object in cavalier projection using a receding angle of 30^0.

     (10 marks)

QUESTION THREE (20 MARKS)

a)   Figure **Q3 (a)** shows an elbow joint made from sheet metal. Draw the development of both parts considering the seam positions given.   (12 marks)

b)   Figure **Q3 (b)** shows a plan and end elevation of two intersecting branch cylinders.

     i.   Redraw the given views,

     ii.   Draw the missing front view showing the line of interpenetration of the two cylinders.   (8 marks)

QUESTION FOUR (20 MARKS)

a)   Figure **Q4 (a)** shows a circle rolling clockwise along a straight line. Plot the locus of point p for one complete revolution of the circle, with the initial position as shown. In block, write the name of the curve obtained and give one application of this curve.

     (8 marks)

b)   In the mechanism given in figure **Q4 (b)**, crank OA and BQ revolve in opposite directions at the same speed and are joined by the rods AC and BCD. Crank OA revolves in the clockwise direction. Plot the locus of D for one revolution of the cranks.

(12 marks)

QUESTION FIVE (20 MARKS)

a)   Figure **Q5 (a)** shows two FIRST ANGLE orthographic views of two engineering components. Sketch the given views including the missing view indicated and make freehand oblique sketches of the components.   (10 marks)

b)   Figure **Q5 (b)** shows pictorial views of 3 engineering components. Sketch in free hand and in good proportions, suitable Front, End and Plan views of each component using FIRST ANGLE Orthographic projection. Include all the hidden details   (10 marks)
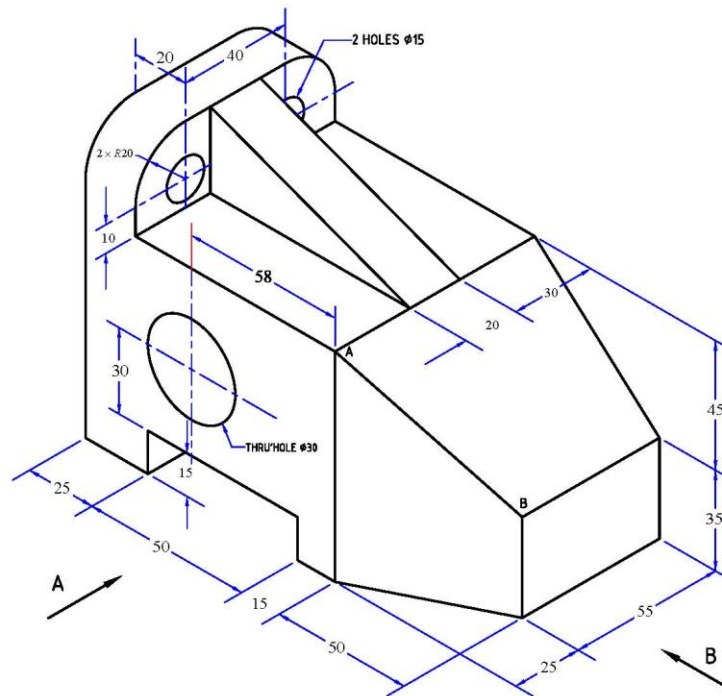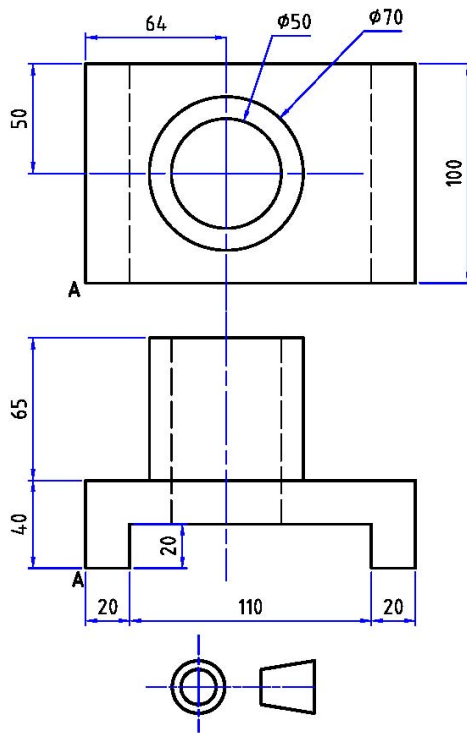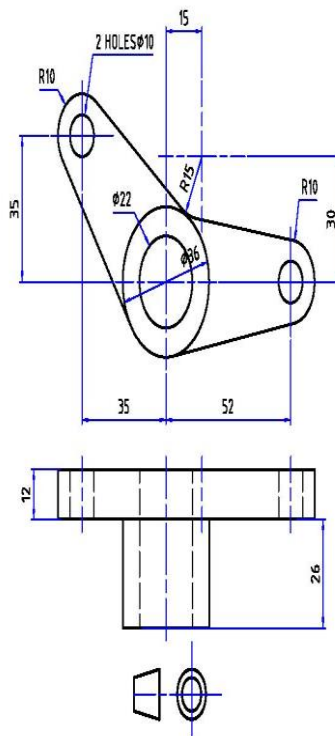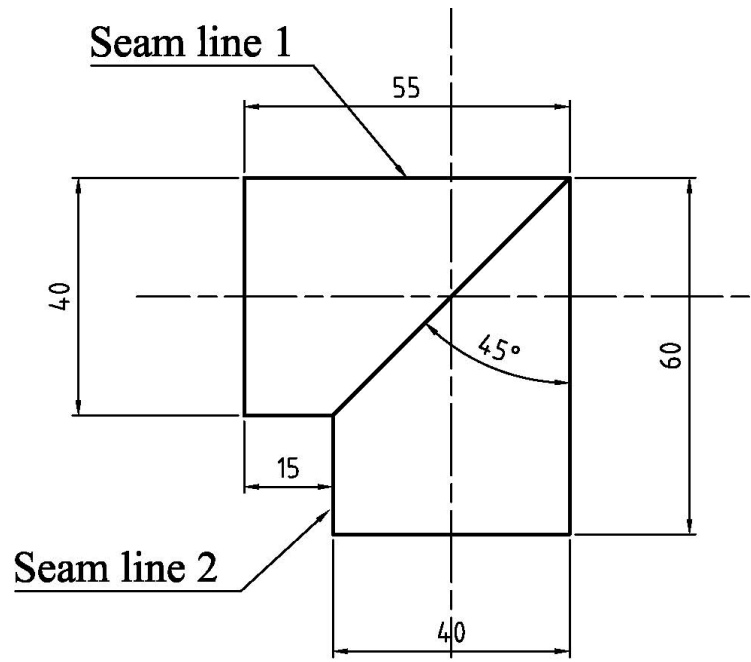

Figure Q1

Figure Q2 (a)

Figure Q2 (b)

Seam line 1

55

40

45°

60

15

Seam line 2

40

Dimensions in mm

Figure Q3 (a)

35

80

Ø60

End

Ø60

35

72

Plan

Figure Q3 (b)

Rolling circle ⌀56

20

point p

fixed line

Figure Q4 (a)
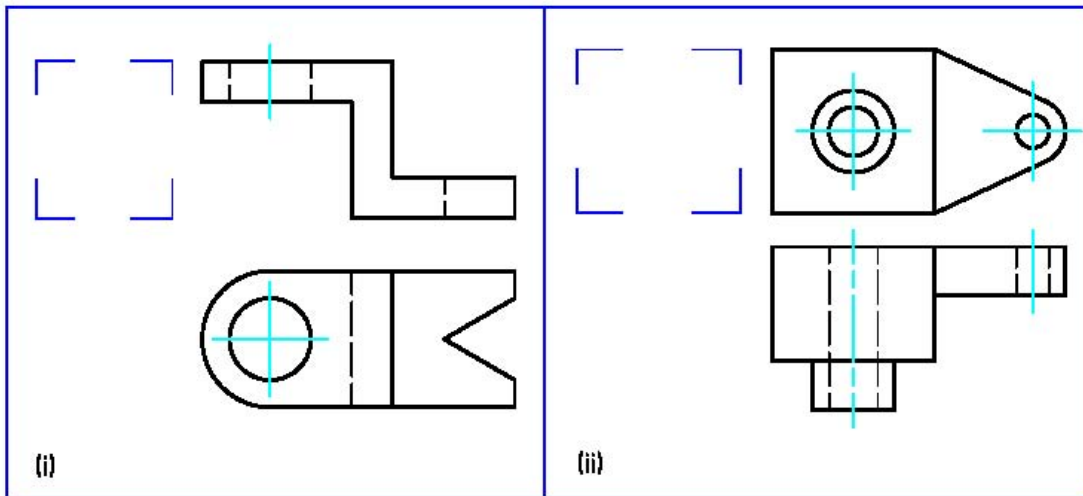
75

B

A

O

Q

OA = 25
QB = 25
AC = 125
BC = 150
CD = 20

C

D
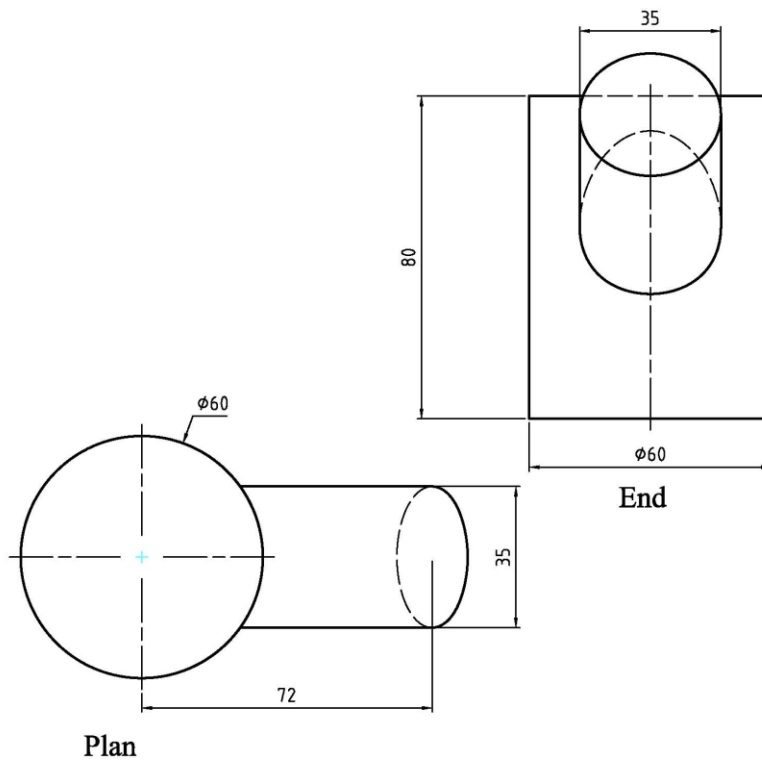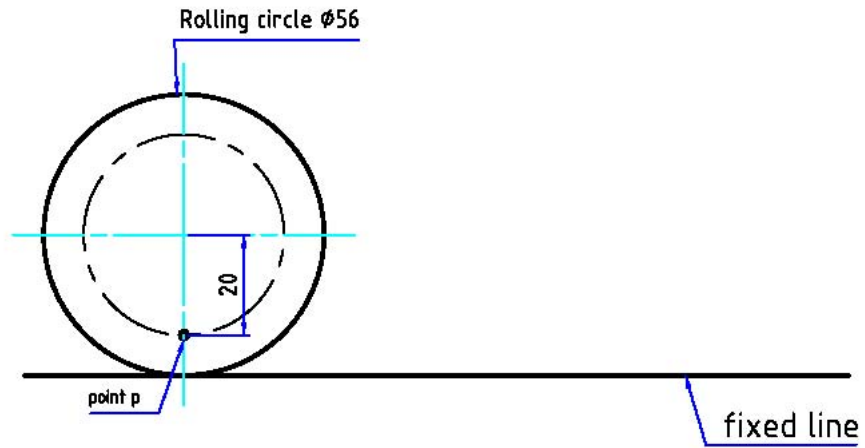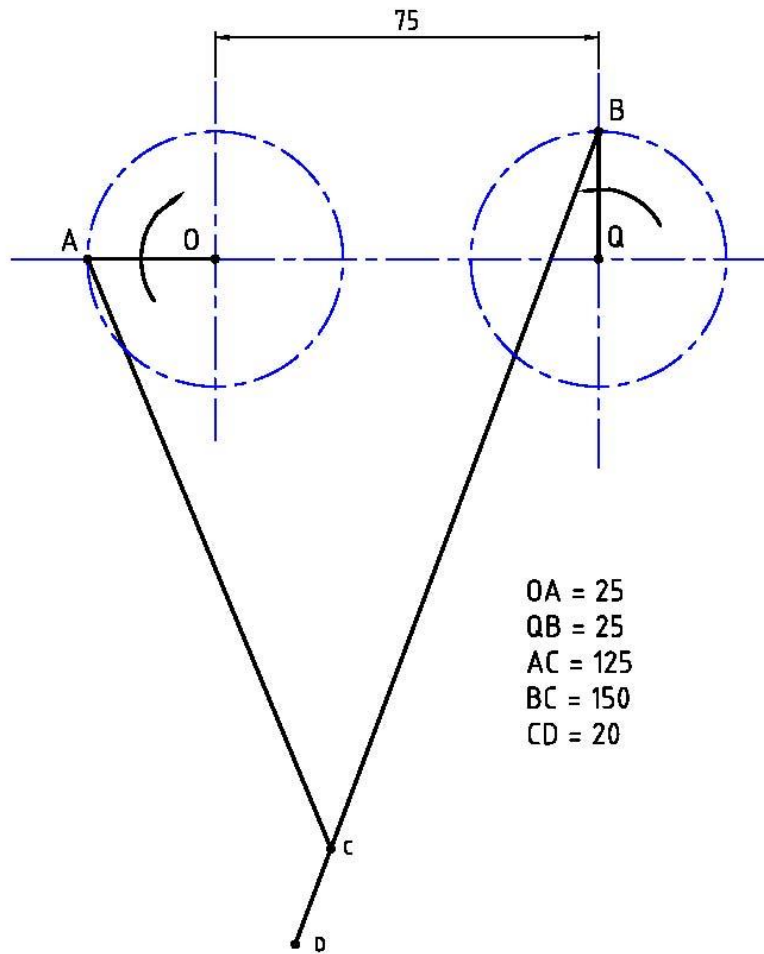
Figure Q4 (b)

Figure Q5 (a)

Figure Q5 (b)