ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Advanced Level

TECHNICAL GRAPHICS AND DESIGN 6047/1

PAPER 1 Applied Geometry

SPECIMEN PAPER 3 hours

Additional materials: **A2** Drawing paper (4 sheets)
Standard Drawing Equipment

TIME **3 hours**

INSTRUCTIONS TO CANDIDATES

Print your name, centre number and candidate number at the bottom right-hand corner of every sheet of paper you use.

Answer **all** questions in **Section A** and any **three** questions in **Section B**.
Write or draw your answers on the separate drawing paper provided.
Work out **all** your answers in **SI** units. Use both sides of the drawing paper.

All solutions are to be drawn **full size** unless a contrary instruction is given. Construction lines must be shown clearly.
Measurements **not** given are left to your own discretion.
If you use more than one sheet of paper, fasten the sheets together.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
The diagrams are **not** necessarily drawn to scale.
All dimensions are in **millimetres** unless otherwise stated.
You are reminded of the need for clear presentation in your answers.

This question paper consists of 10 printed pages and 2 blank pages.

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SECTION A [40 Marks]

Answer **all** questions.

1. **Fig 1**, shows the drawing of the plan of a recently acquired piece of land near a city. The owner plans to use area '**A**' for horticultural activities whilst area **B** will be reserved for the construction of farm buildings.

(a) Draw the given plan to a scale of 1:100. [3]

(b) Using graphical construction, determine the area in hectares to be used for the purpose of horticultural activities (Area **A**). Consider 1 hectare to be 10 000m^2. [8]

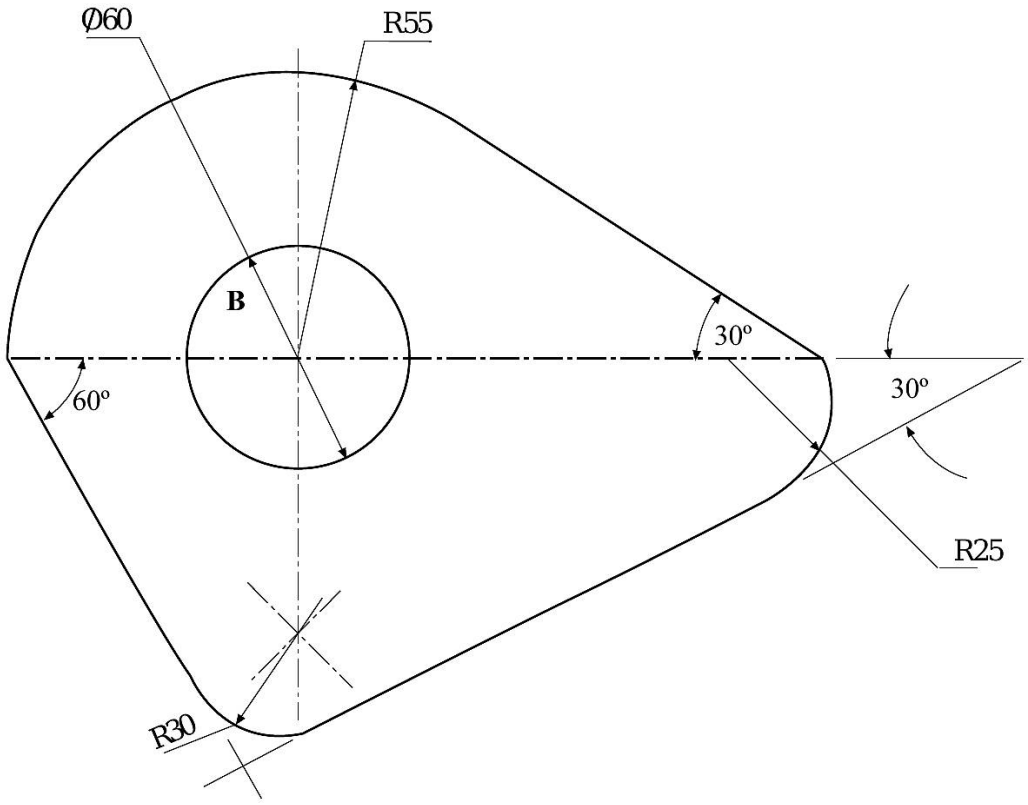


Figure 1

2 **Fig 2** shows a free body diagram for a system of concurrent co-planar forces which are in equilibrium. Determine graphically the magnitude and direction of the unknown forces marked **x** and **y**. [9]

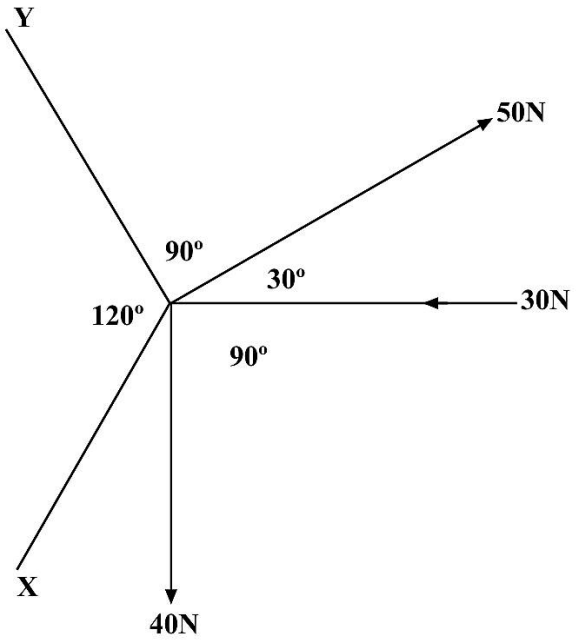


Figure 2

3 **Figure 3**, shows an anchor ring.

(a) Draw the given view full size. [2]

(b) Draw a sectional plan taken from cutting plane **Q-Q**. [8]

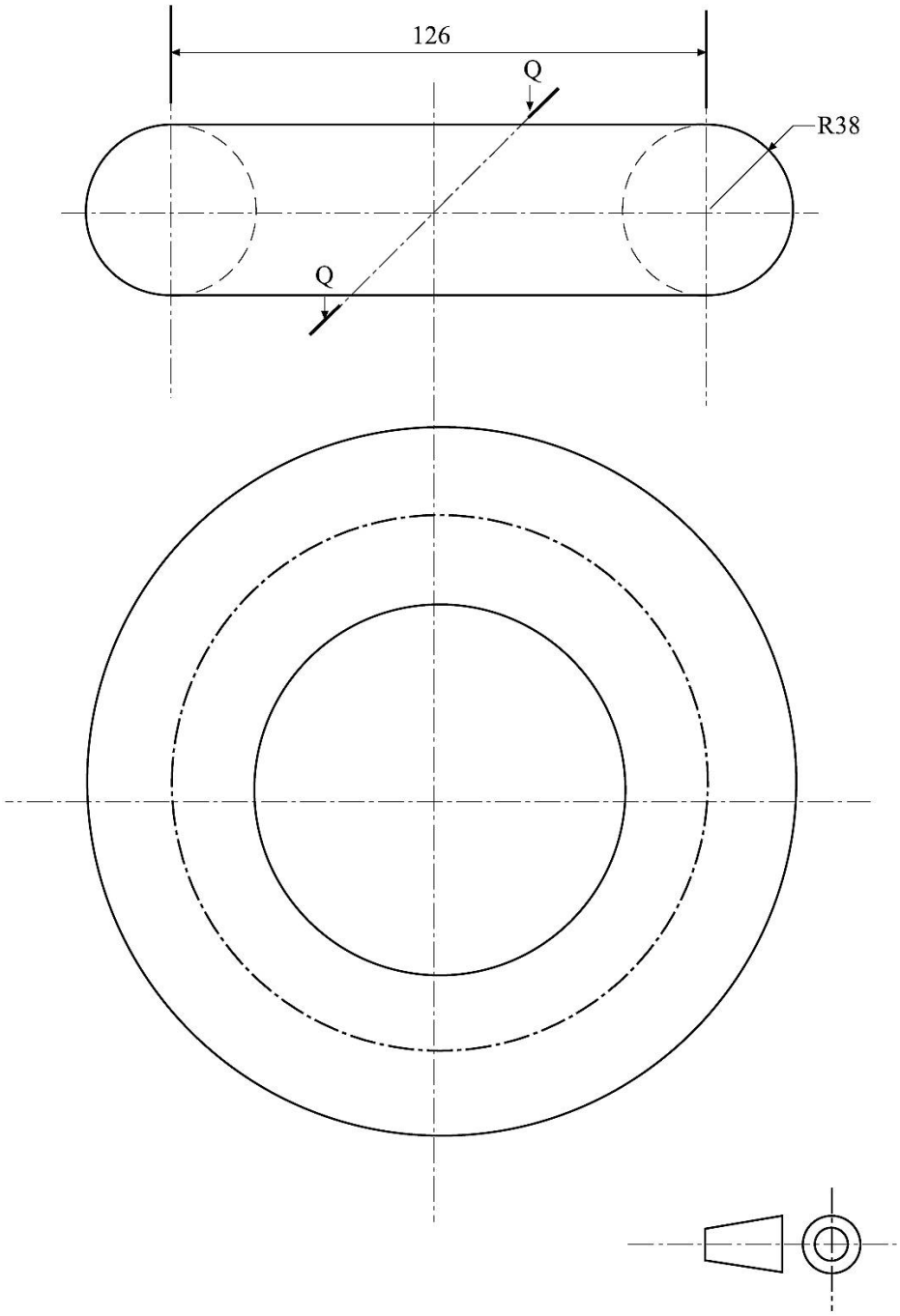


Figure 3

4 **Figure 4**, shows an incomplete elevation of the handle and plastic body of a hairdryer.

(a) Draw the given views full size. [2]

(b) Complete the front view by constructing the line of intersection. [8]

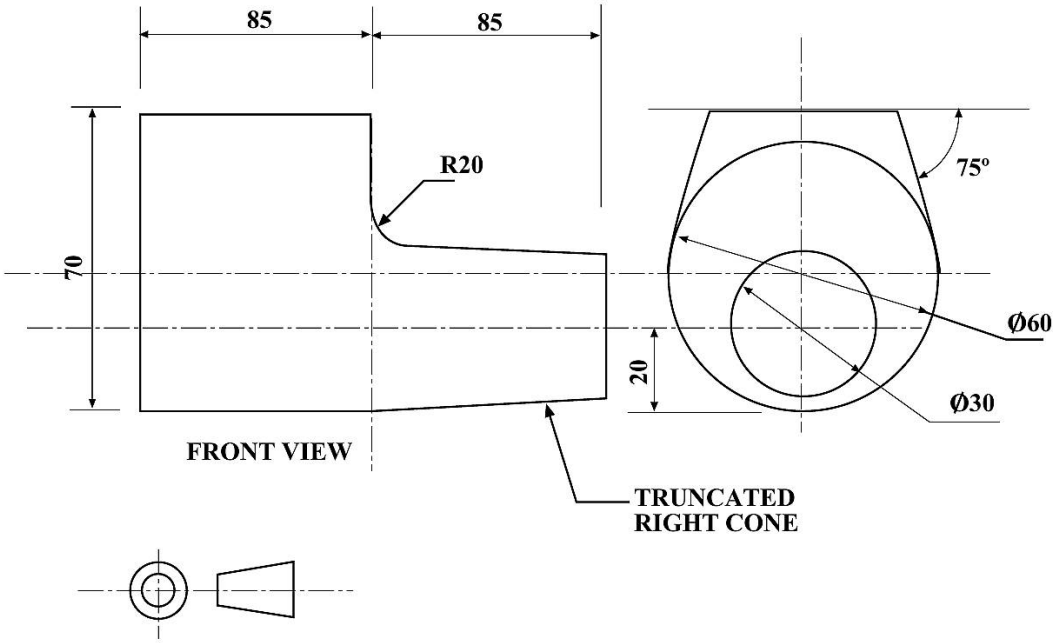


Figure 4

SECTION B [60 Marks]

Answer any **three** questions.

5. **Figure 5**, shows part of the mechanisms of a wrapping machine. The flanged wheel centre **O** rolls clockwise without slipping along the arc **AB**. The arm **CD** is pin jointed at **C** and **E**. The position at **E** is constrained to a reciprocating movement along the line.

(a) Draw a full size diagram of the mechanism [2]

(b) Construct the locus for **C** for one revolution of the wheel as it rolls from **A** towards **B** [10]

(c) Plot the locus of **D**. [8]

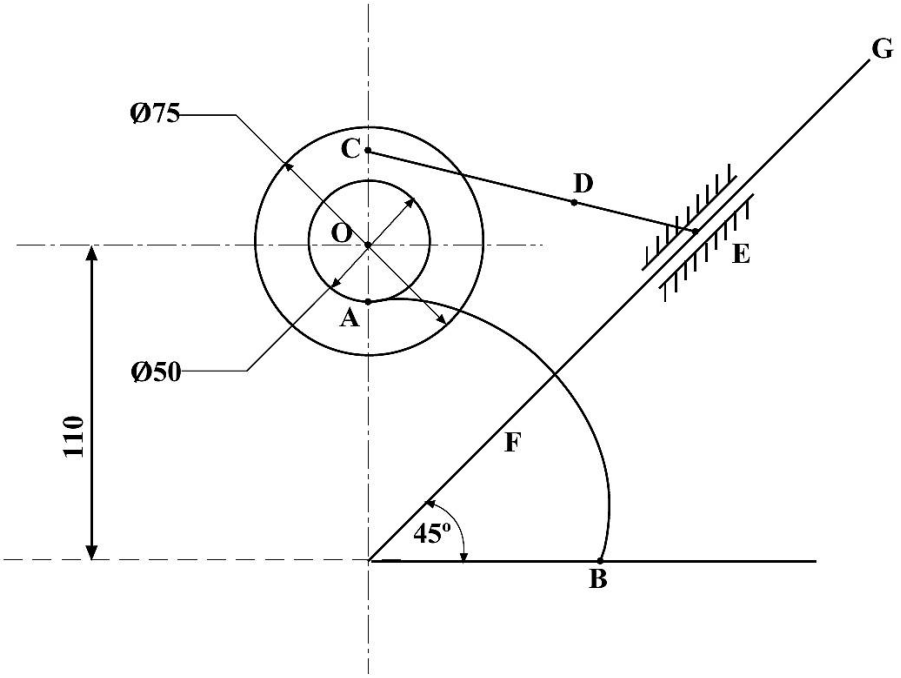


Figure 5

6. **Figure 6**, shows three views of a bracket in first angle projection. Draw an isometric projection of the bracket with **Z** as the lowest point on the drawing. Use an isometric scale. [20]

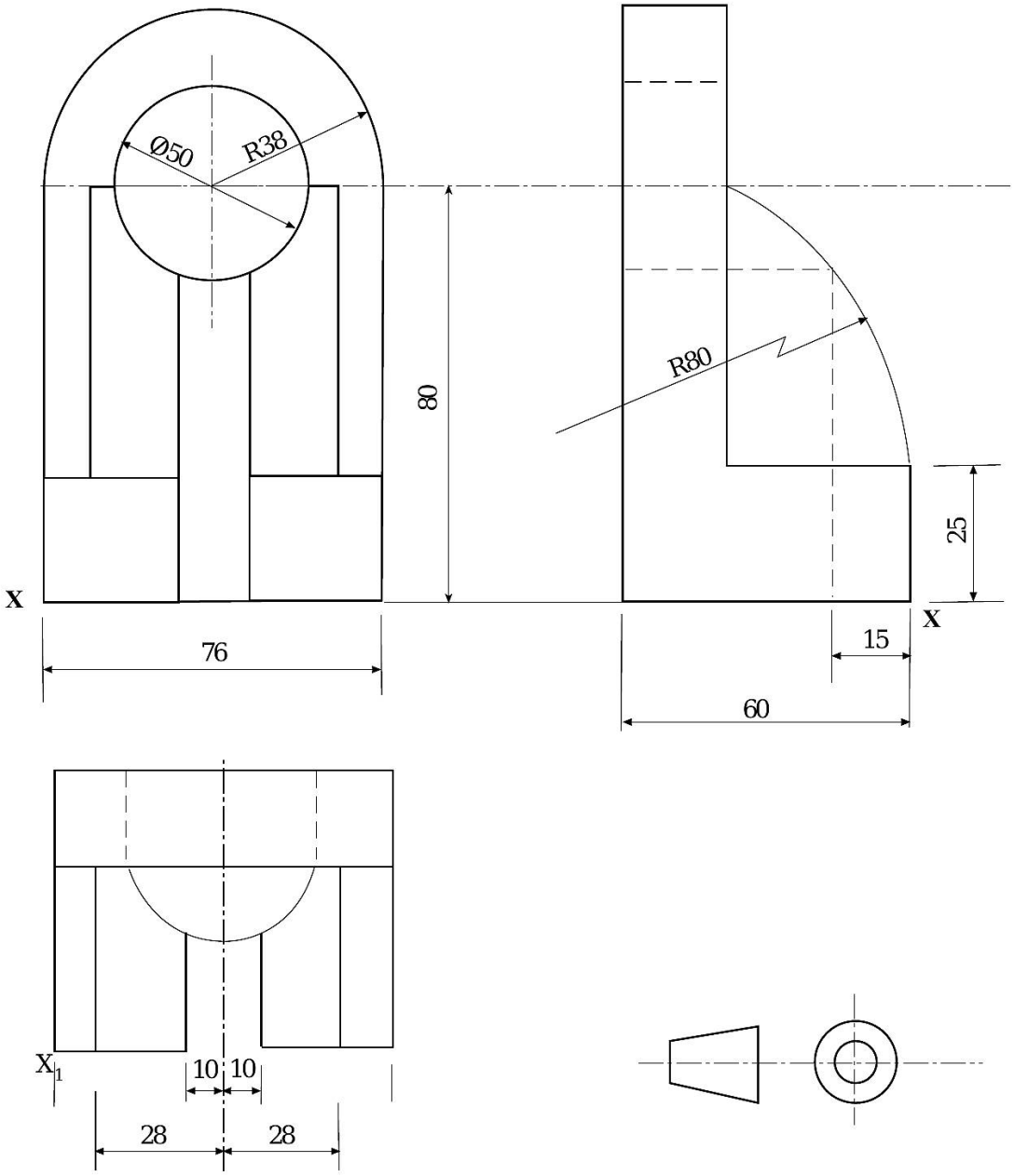


Figure 6

7 The plan of a square based pyramid height **95**mm tilted at **30º** to the vertical plane about edge **AB** is shown in **Figure 7**.

Draw:

(a) the given plan and the VTH [2]

(b) the plan of the cut pyramid [6]

(c) the elevation of the cut pyramid [4]

(d) the true shape of the surface cut by the oblique plane [8]

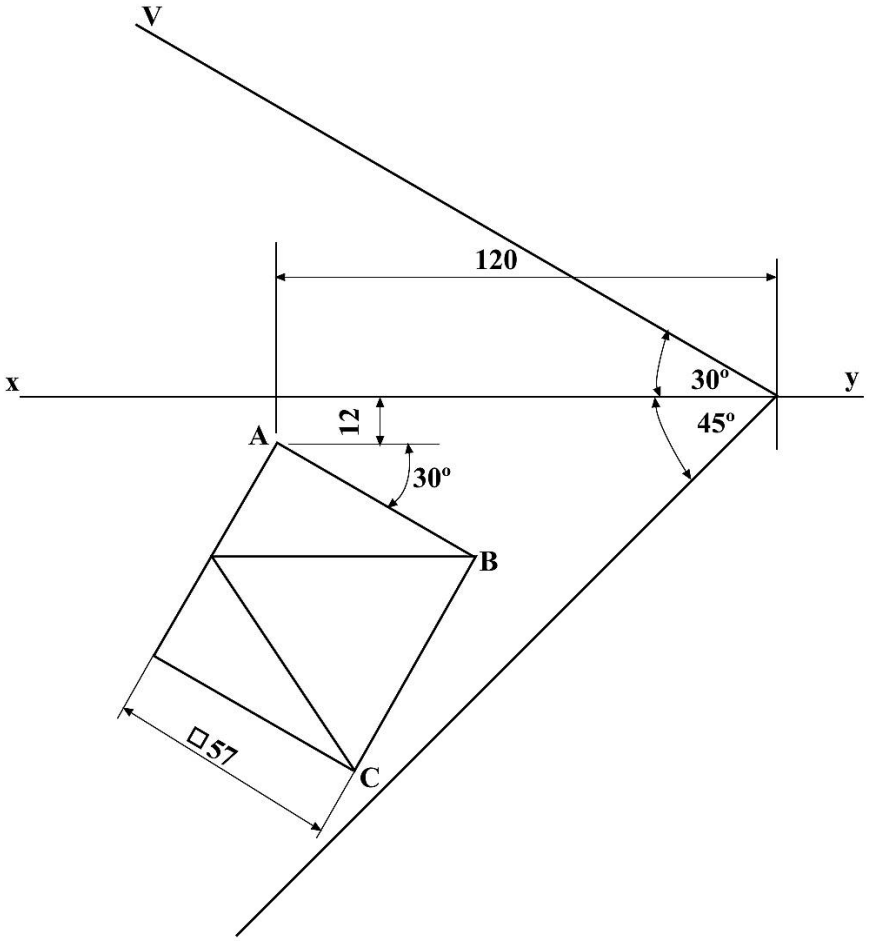


Figure 7

8 **Figure 8**, shows two views in first angle projection of a portion of a thin duct. The shape of the duct changes from a square of **300mm** side to a circle of **Ø 1000mm**.

(a) Draw the given views to a scale of 1:10 [2]

(b) Complete the plan. [4]

(c) Develop the outer surface of the transition piece full size using **J-J** as joint line. [14]

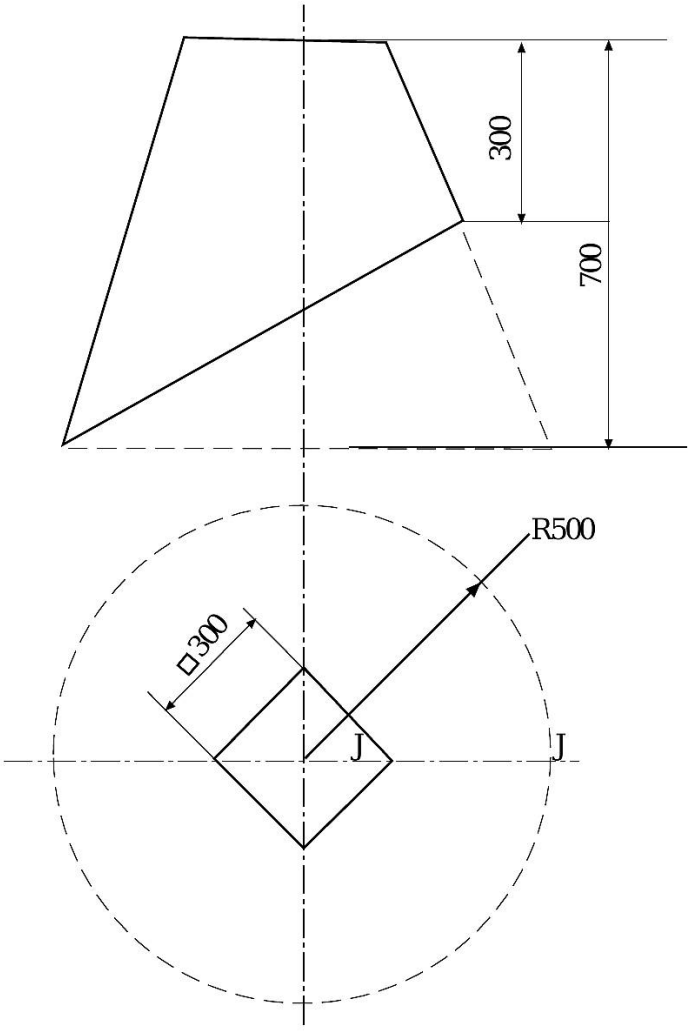


Figure 8

9. **Fig 9**, shows a pin jointed roof truss carrying dead and wind loads hinged on the right hand and supported at the left had end by frictionless rollers.

(a) Draw a space diagram for the roof truss to a scale of **1:100**. [2]

(b) Determine by construction the magnitude of the reactions at the roller and the hinge. [6]

(c) Construct a force diagram for the roof truss. [8]

(d) Use the force diagram to determine the magnitude and sense of the forces in the members indicated by * and tabulate your answers. [4]

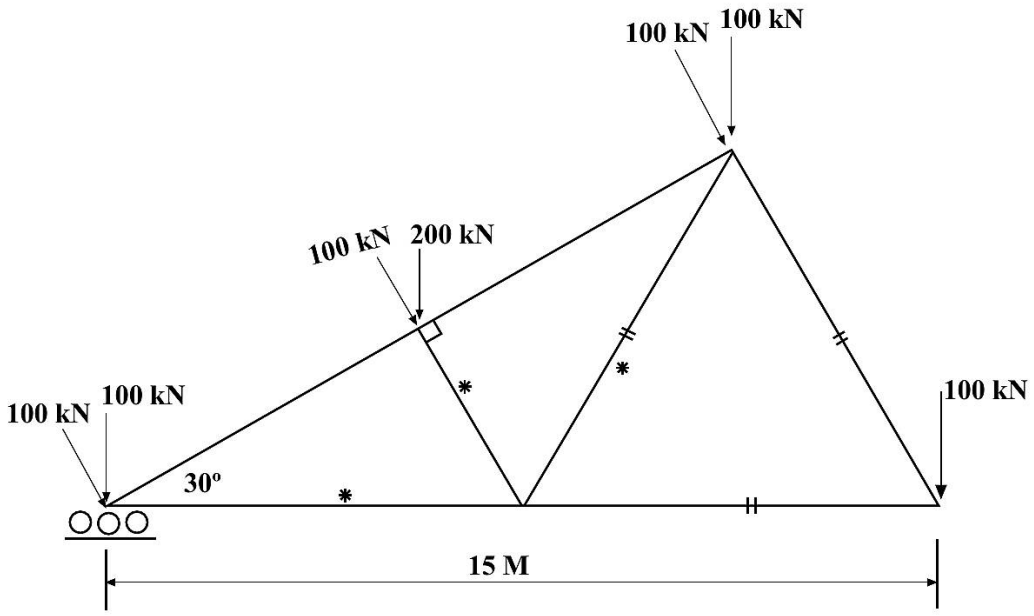


Figure 9

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