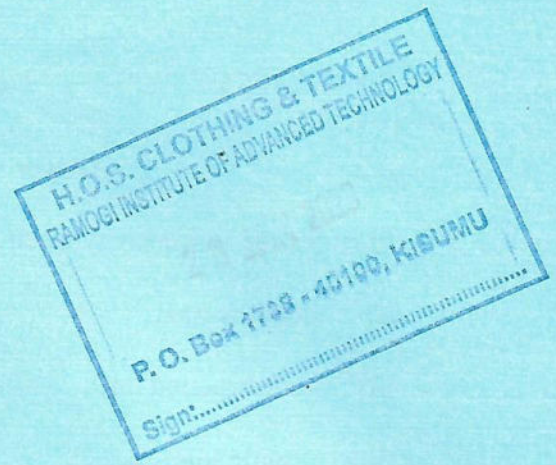


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0202/214    0404/214  
0301/214    0405/214

**APPLIED GEOMETRY**  
Oct./Nov. 2022  
Time: 3 hours



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**ARTISAN CERTIFICATE**

**GENERAL FITTER  
MOTOR VEHICLE MECHANICS  
AGRICULTURAL MECHANICS  
WELDING AND FABRICATION  
ELECTRICAL INSTALLATION  
CARPENTRY AND JOINERY**

**PAINTING AND DECORATING  
MASONRY  
PLUMBING  
GARMENT MAKING  
LEATHERWORK TECHNOLOGY  
GENERAL AGRICULTURE**

**APPLIED GEOMETRY**

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Drawing papers size A2;*

*Drawing instruments;*

*Scientific calculator;*

*This paper consists of SIXTEEN (16) questions in THREE sections; A, B and C.*

*Answer ALL questions in section A, ONE question from section B and TWO questions from section C.*

*Answers to the questions MUST be done on the drawing papers provided.*

*All questions carry equal marks.*

*Maximum marks for each part of a question are indicated.*

*Candidates should answer the questions in English.*

**This question paper consists of 10 printed pages.**

**Candidates must check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**



SECTION A (40 marks)

Answer ALL the questions in this section.

1. Illustrate the following types of lines used in drawing:

(i) outline line;

(ii) construction line;

(iii) centre line;

(iv) hidden details line.

(4 marks)

2. Figure 1 shows an outline of a decoration pattern. Draw the pattern using appropriate set square.

(3 marks)

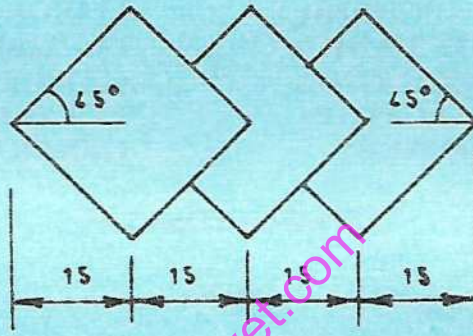


Fig 1

3. Draw a line  $XY = 120$  mm and divide it in the ratio 3:4:5.

(3 marks)

4. An equilateral triangle has a base length of 70 mm. Using a compass and a ruler only, construct the triangle and inscribe a circle in it.

(5 marks)

5. Construct a regular octagon in a square of sides 60 mm.

(4 marks)

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6. Figure 2 shows a view of two unequal circles. Draw common internal tangent to the circles. (5 marks)

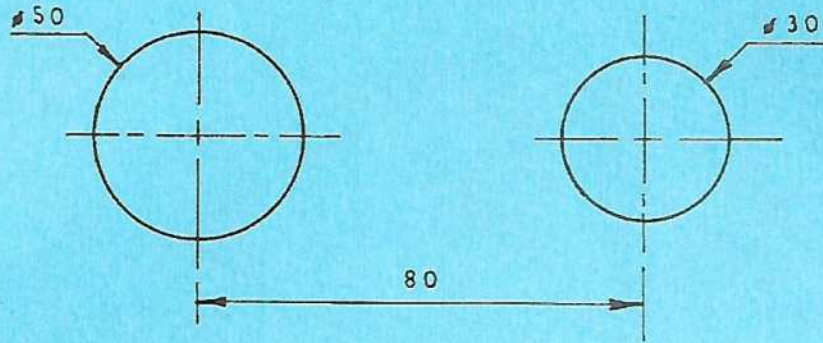


Fig.2

7. Make a free hand sketch of a Tee square. (2 marks)
8. Construct an involute of a square of side length 12 mm. (4 marks)
9. Figure 3 shows a front elevation and a plan of a shaped block in first angle projection. Copy the given views and draw the end elevation. (5 marks)

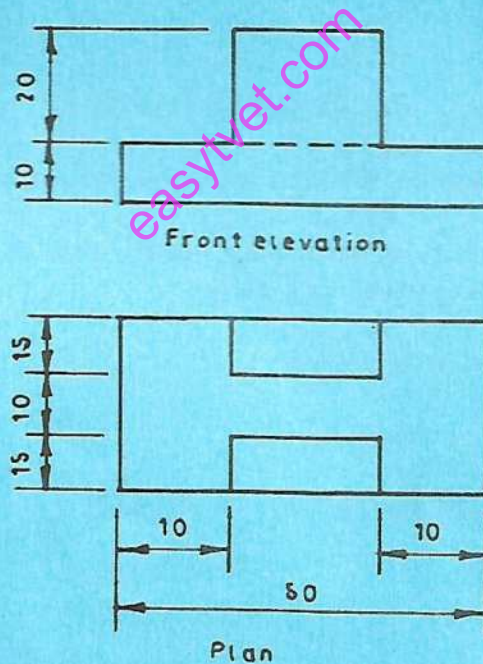


Fig. 3

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10. Figure 4 shows an outline of an isometric square. Copy the given view and draw an isometric circle in it. (5 marks)

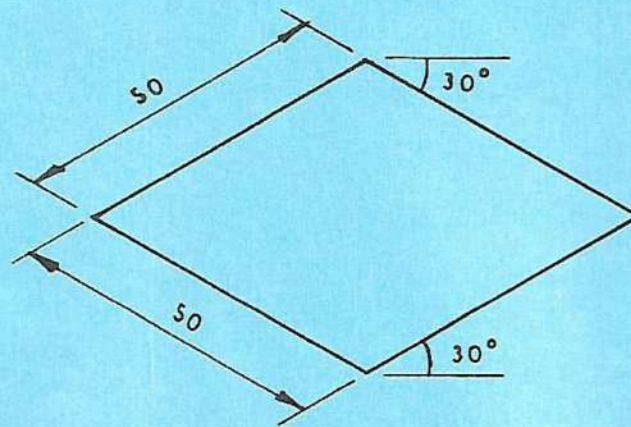


Fig. 4

**SECTION B (30 marks)**

Answer any ONE question from this section.

11. (a) Figure 5 shows a pictorial drawing of a machine part. Draw the following views of the part in first angle projection to a scale of 1:1:
- front elevation viewed from **F**;
  - end elevation viewed from **E**;
  - plan as viewed from **P**.

(30 marks)

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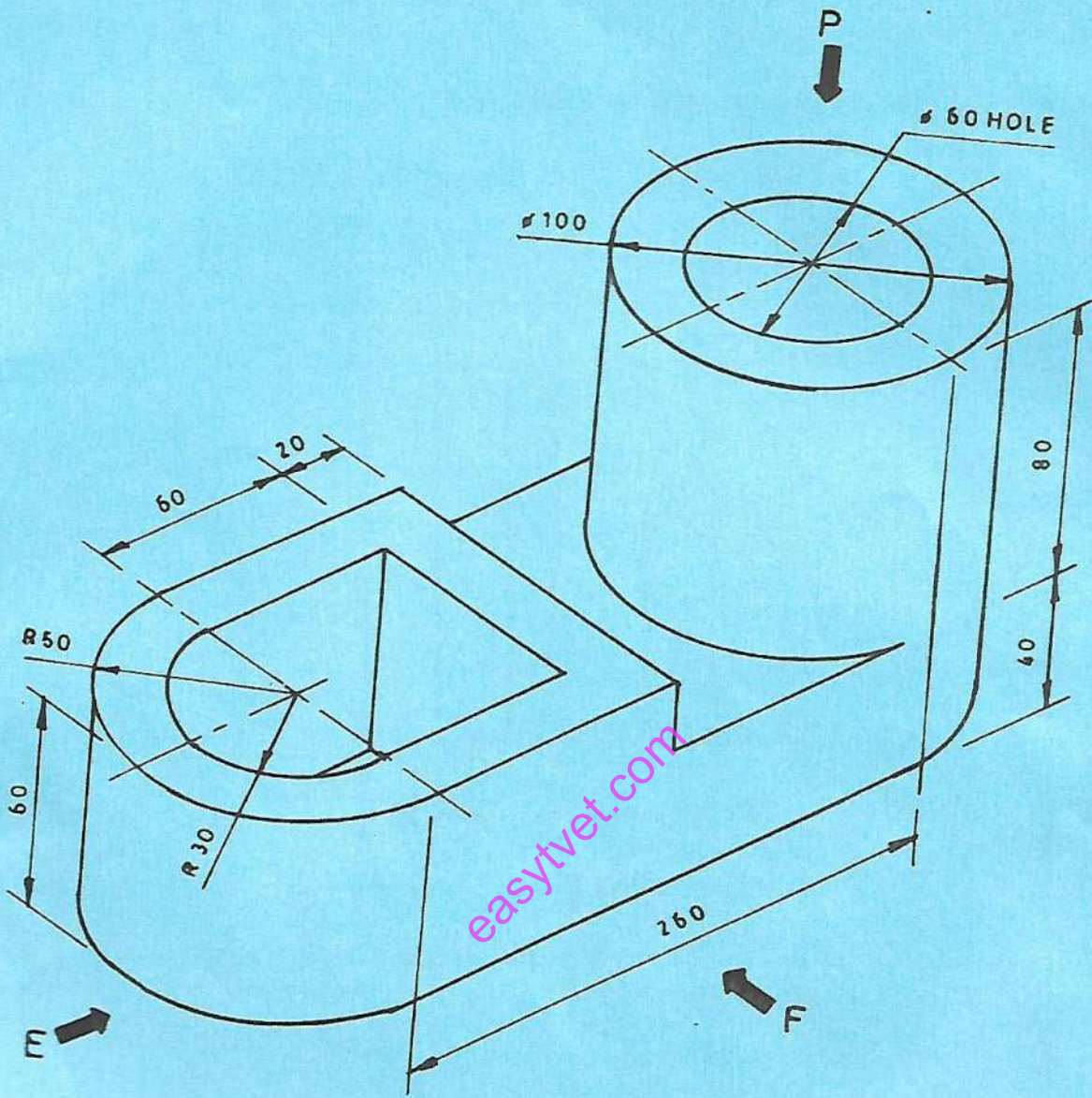


Fig.5

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12./ Figure 6 shows the front elevation of a truncated hexagonal prism. Copy the given view and draw the following:

- (i) end elevation in the direction of arrow **EE**;
- (ii) plan;
- (iii) surface development.

(30 marks)

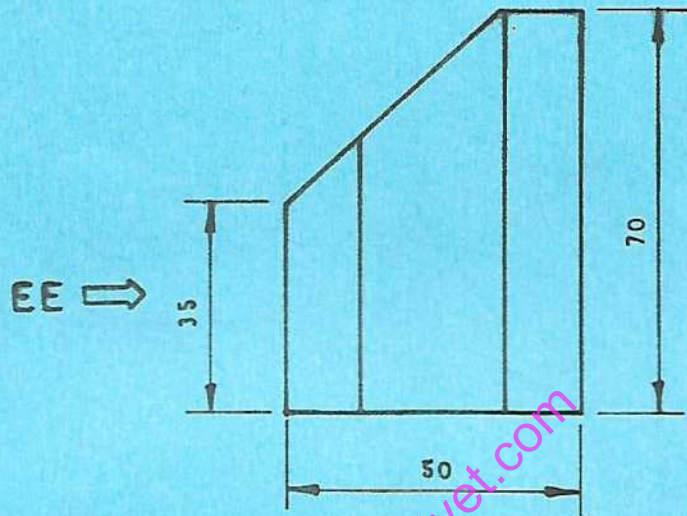


Fig. 6

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13. Figure 7 shows orthographic views of a machine housing drawn in third angle projection. Draw an isometric view of the housing taking corner A as the lowest point.

(30 marks)

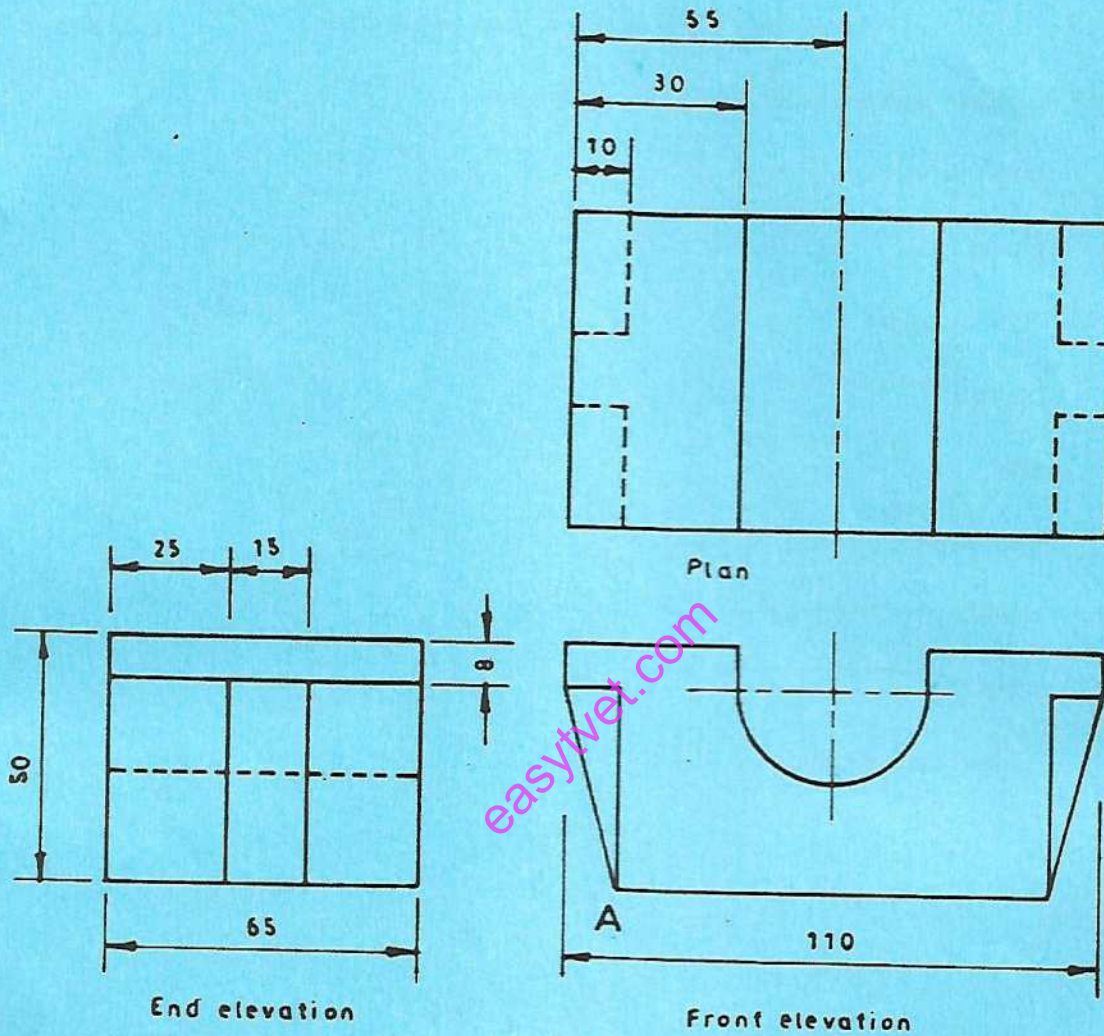


Fig.7

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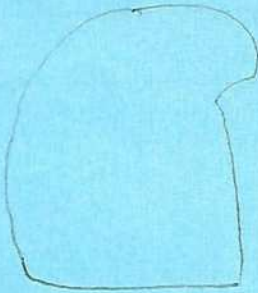
**SECTION C (30 marks)**

*Answer any TWO questions from this section.*

14. Make free hand sketches of any five of the following:

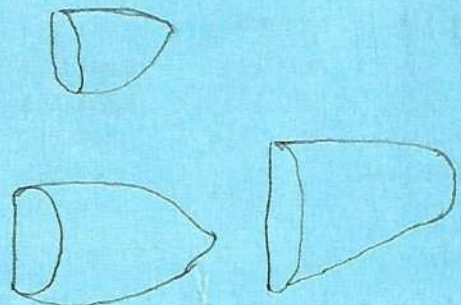
- (a) screw driver;
- (b) glove;
- (c) claw hammer;
- (d) helmet;
- (e) rake;
- (f) hack saw.;
- (g) thimble;
- (h) mallet;
- (i) open-ended spanner;

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(j) trowel.

(15 marks)

15. Figure 8 shows orthographic views of an object drawn in first angle projection. Draw a full size oblique view of the object. (15 marks)

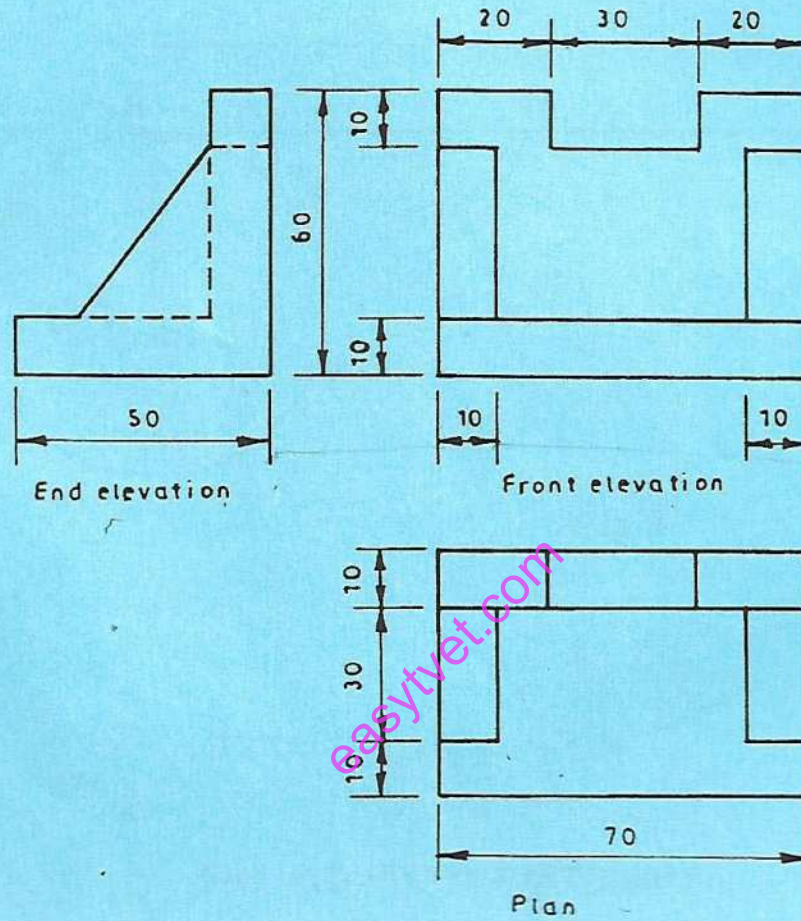


Fig.8

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16. Figure 9 shows the layout of a link mechanism in which **A** moves along a straight line as the crank **OB** rotates about point **O**. Draw the locus of point **P** for one revolution of crank **OB** in clockwise direction. (15 marks)

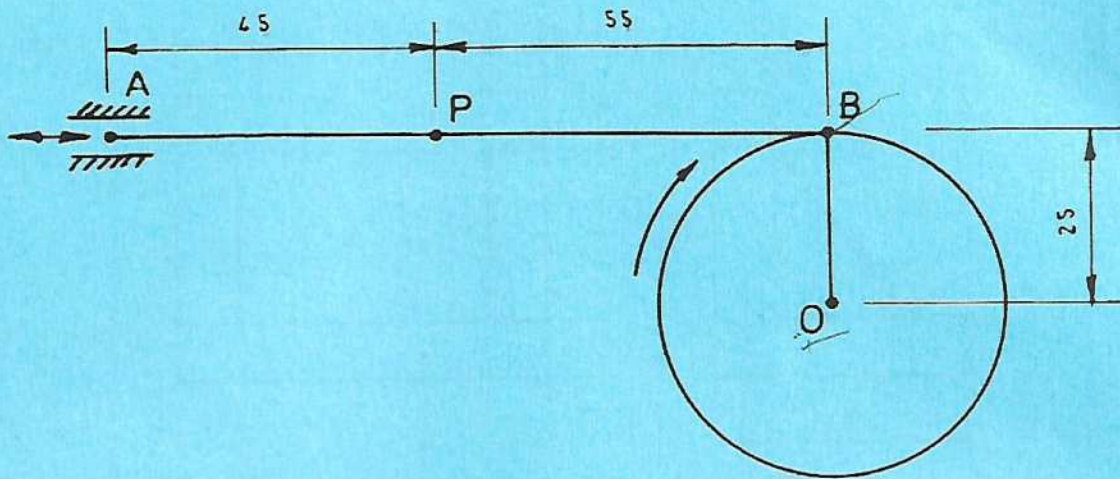


Fig. 9

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