

0101/214 0302/214
0103/214 0304/214
0105/214 0305/214
0106/214 0401/214
0202/214 0404/214
0301/214 0405/214
APPLIED GEOMETRY
June/July 2023
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.

Maximum marks for each part of a question are indicated.

Candidates should answer the questions in English.

This question paper consists of 13 printed pages.

Candidates should 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. Figure 1 shows a right angle (90°) XYZ.

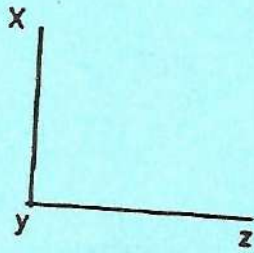


Fig. 1

Divide the angle into three equal parts.

(2 marks)

2. Figure 2 shows a partitioned metal window frame.

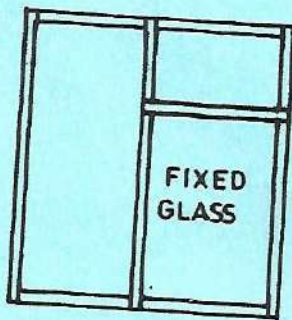


Fig 2

Redraw the figure and use symbols to show the parts which can be opened.

(2 marks)

| | | |
|----------|----------|----------|
| 0101/214 | 0202/214 | 0305/214 |
| 0103/214 | 0301/214 | 0401/214 |
| 0105/214 | 0302/214 | 0404/214 |
| 0106/214 | 0304/214 | 0405/214 |

June/July 2023

3. Figure 3 shows a line AB inclined to BQ at 45° .

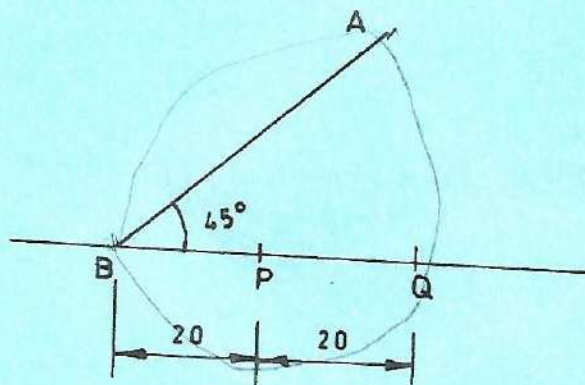
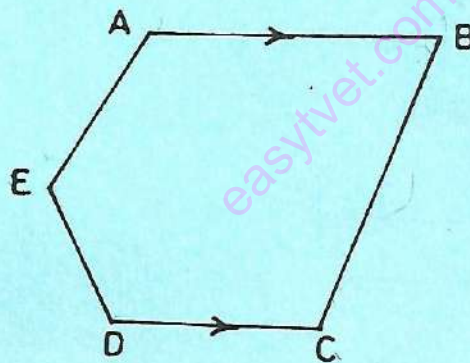


Fig. 3

Copy the figure and construct a circle tangential to AB and passing through P and Q.

(4 marks)

4. Figure 4 shows an irregular pentagon ABCDE.



| | | | |
|-----------------|---|---|-------------|
| AB | / | = | 40 |
| AE | / | = | 25 |
| ED | / | = | 20 |
| DC | | = | 30 |
| \widehat{CDE} | | = | 120° |
| \widehat{DEA} | | = | 120° |

Fig 4

Construct a quadrilateral of equal area to the pentagon.

(5 marks)

5. Construct a regular heptagon in a circle of diameter 60 mm.

(5 marks)

6. Draw a plain scale of 10 mm representing 30 mm to read upto 180 mm.

(4 marks)

0101/214 0202/214 0305/214
 0103/214 0301/214 0401/214
 0105/214 0302/214 0404/214
 0106/214 0304/214 0405/214

7. Figure 5 shows an outline for drawing a parabola using the directrix method.

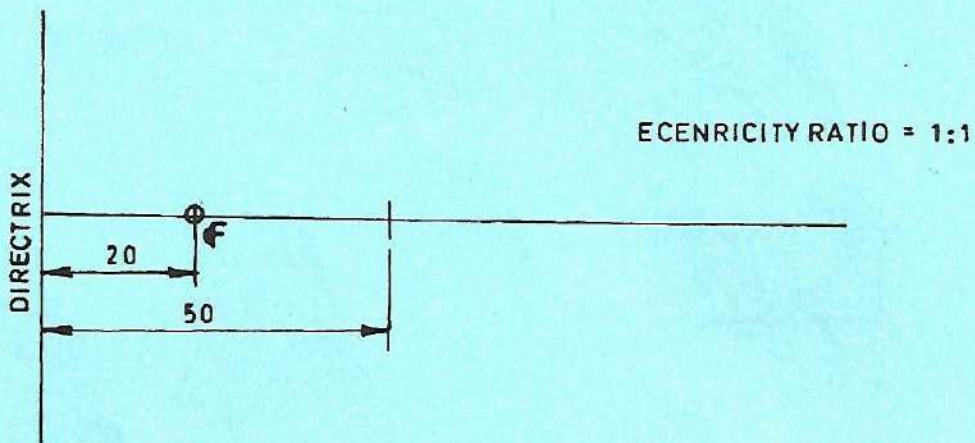


Fig. 5

Construct the parabola using eccentricity ratio of 1:1.

(5 marks)

8. Figure 6 shows two views of an object.

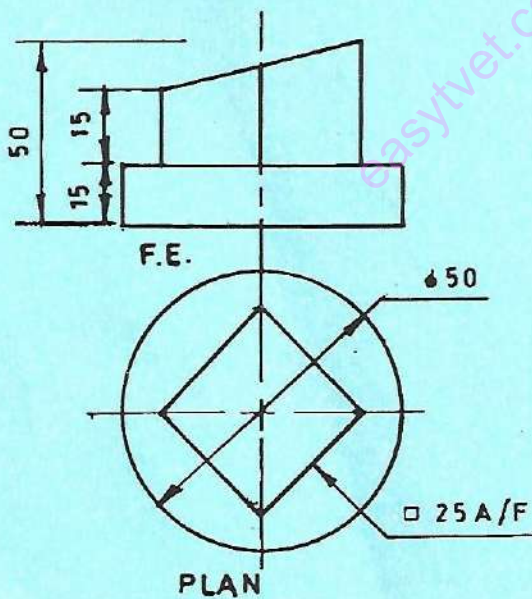


Fig. 6

Make a free hand pictorial sketch of the object showing the slant surface.

(5 marks)

| | | | |
|----------|----------|----------|---|
| 0101/214 | 0202/214 | 0305/214 | 4 |
| 0103/214 | 0301/214 | 0401/214 | |
| 0105/214 | 0302/214 | 0404/214 | |
| 0106/214 | 0304/214 | 0405/214 | |

9. Figure 7 shows two views of an L-shaped object drawn in 3rd angle orthographic projection.

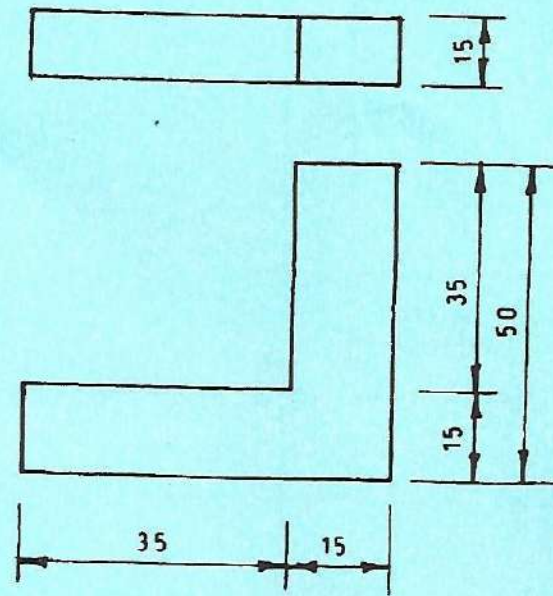


Fig. 7

Copy the given views and project an end elevation.

(4 marks)

0101/214 0202/214 0305/214
0103/214 0301/214 0401/214
0105/214 0302/214 0404/214
0106/214 0304/214 0405/214

June/July 2023

10. Figure 8 shows three views of letter F drawn in third angle orthographic projection.

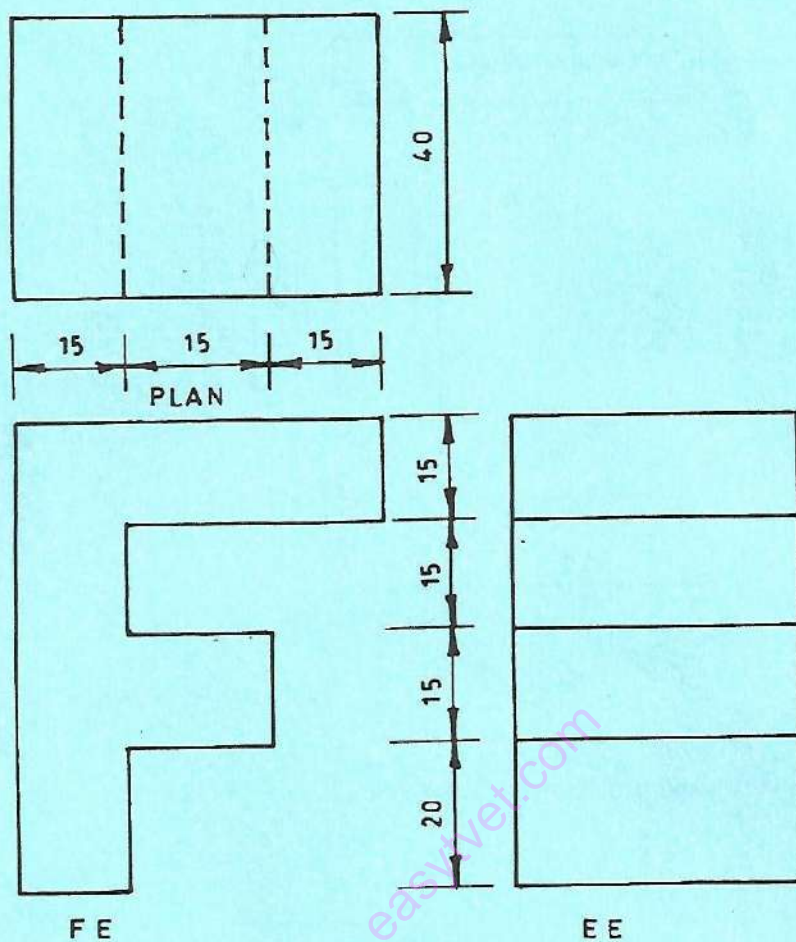


Fig.8

Draw an oblique cabinet projection of the letter.

(4 marks)

| | | |
|----------|----------|----------|
| 0101/214 | 0202/214 | 0305/214 |
| 0103/214 | 0301/214 | 0401/214 |
| 0105/214 | 0302/214 | 0404/214 |
| 0106/214 | 0304/214 | 0405/214 |

6

June/July 2023

SECTION B (30 marks)

Answer any ONE question from this section.

11. Figure 9 shows a pictorial view of an object.

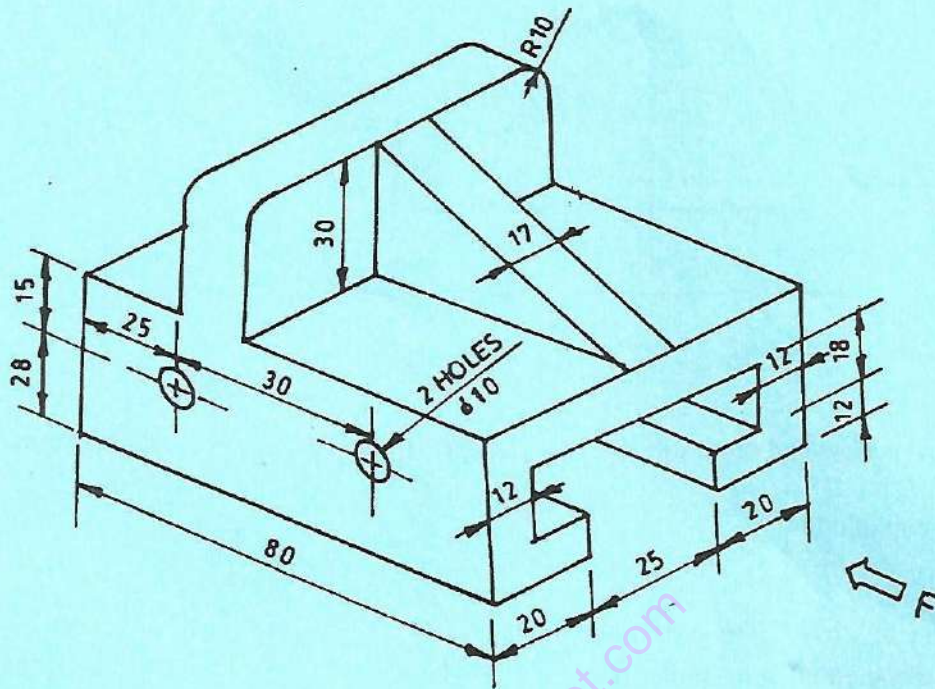


Fig.9

Draw in 1st angle orthographic projection, the following views:

- (a) front elevation viewed from F;
- (b) end elevation;
- (c) plan.

(30 marks)

| | | |
|----------|----------|----------|
| 0101/214 | 0202/214 | 0305/214 |
| 0103/214 | 0301/214 | 0401/214 |
| 0105/214 | 0302/214 | 0404/214 |
| 0106/214 | 0304/214 | 0405/214 |

12. Figure 10 shows the front elevation of a truncated cone.

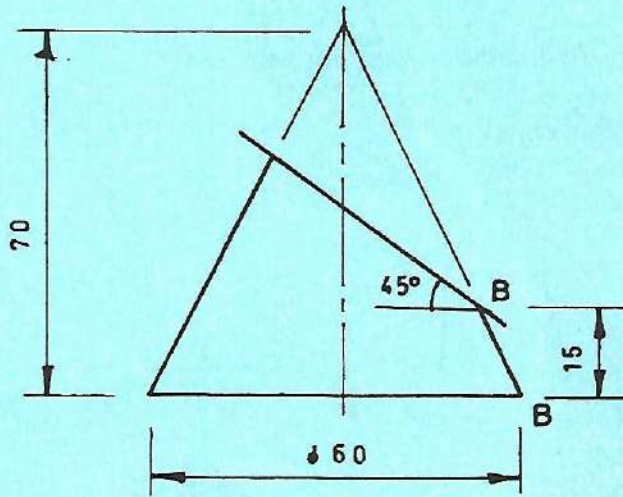


Fig. 10

Copy the given view and draw full size, in 3rd angle orthographic projection, the following:

- (a) end elevation;
- (b) plan;
- (c) development, opened at B - B. (30 marks)

13. (a) Make freehand sketches of each of the following tools:

- (i) try square;
- (ii) pair of pincers;
- (iii) awl;
- (iv) hack saw. (20 marks)

| | | |
|----------|----------|----------|
| 0101/214 | 0202/214 | 0305/214 |
| 0103/214 | 0301/214 | 0401/214 |
| 0105/214 | 0302/214 | 0404/214 |
| 0106/214 | 0304/214 | 0405/214 |

8

(b) Figure 11 shows a shaped object.

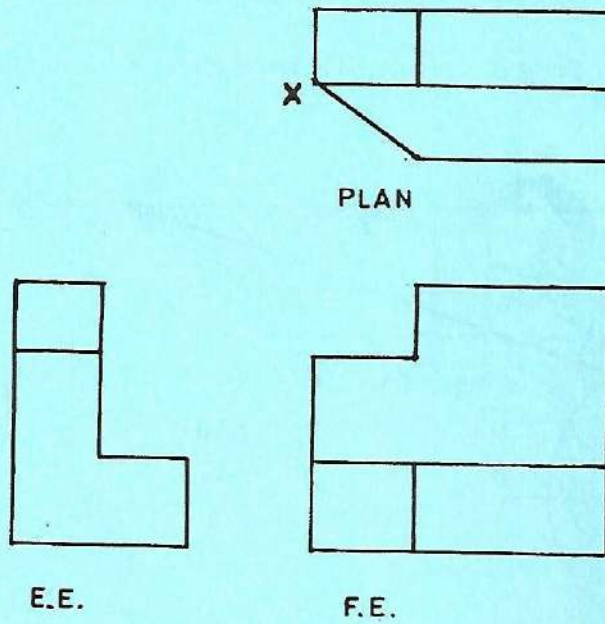


Fig. 11

Make an isometric sketch of the block taking X as the lowest corner.

(10 marks)

0101/214 0202/214 0305/214
0103/214 0301/214 0401/214
0105/214 0302/214 0404/214
0106/214 0304/214 0405/214

June/July 2023

SECTION C (30 marks)

Answer any TWO questions from this section.

14. Figure 12 shows a link mechanism. Point B is restricted to move along X - X as OA rotates.

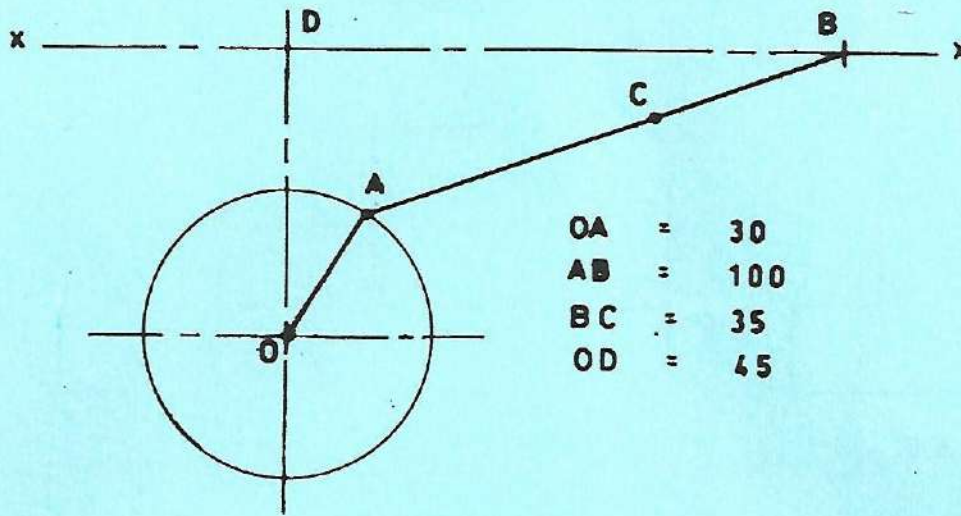


Fig. 12

Plot the locus of point C for a complete rotation of OA.

(15 marks)

| | | | |
|----------|----------|----------|----|
| 0101/214 | 0202/214 | 0305/214 | 10 |
| 0103/214 | 0301/214 | 0401/214 | |
| 0105/214 | 0302/214 | 0404/214 | |
| 0106/214 | 0304/214 | 0405/214 | |

15. (a) Figure 13 shows the front elevation of a house.

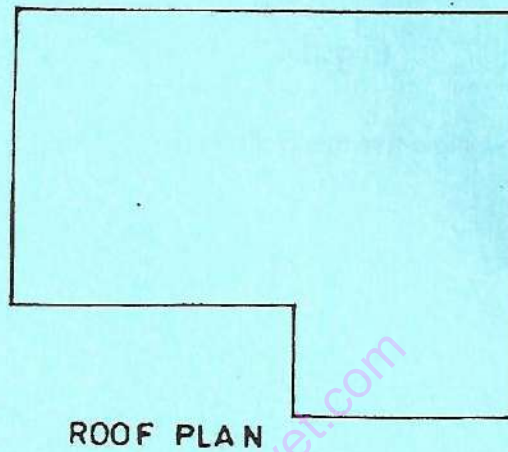
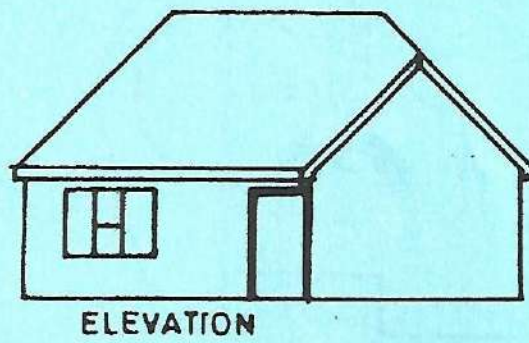


Fig.13

Copy the views and project the roof outline on the plan.

(10 marks)

C S

| | | |
|----------|----------|----------|
| 0101/214 | 0202/214 | 0305/214 |
| 0103/214 | 0301/214 | 0401/214 |
| 0105/214 | 0302/214 | 0404/214 |
| 0106/214 | 0304/214 | 0405/214 |

11

Turn over

(b) Figure 14 shows a view of a shaped object.

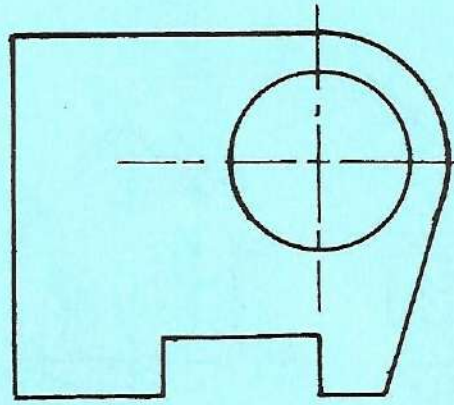


Fig.14

Copy the figure and show **five** major dimensions.

(5 marks)

easyvet.com

16. Figure 15 shows a square prism intersecting with a cylinder.

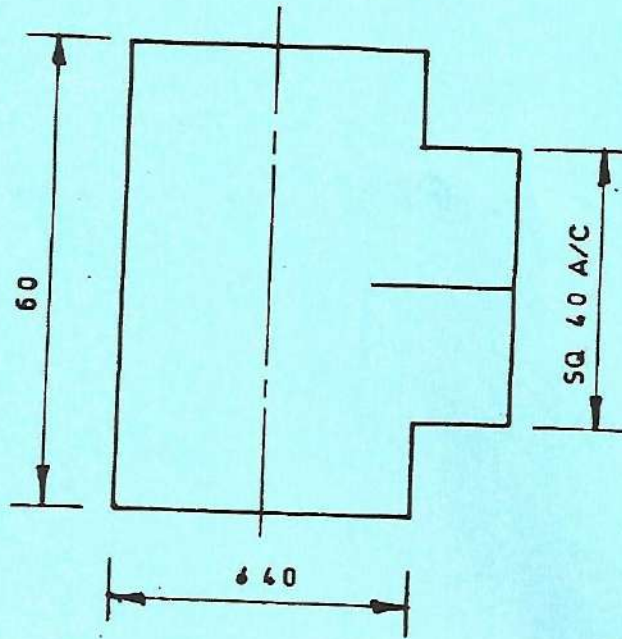


Fig.15

Draw, full scale, the following views in 1st angle orthographic projection:

- (a) complete front elevation;
- (b) end elevation;
- (c) plan.

(15 marks)

THIS IS THE LAST PRINTED PAGE.

| | | |
|----------|----------|----------|
| 0101/214 | 0202/214 | 0305/214 |
| 0103/214 | 0301/214 | 0401/214 |
| 0105/214 | 0302/214 | 0404/214 |
| 0106/214 | 0304/214 | 0405/214 |