0101/214 0302/214
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0106/214 0401/214
0202/214 0404/214
0301/214 0405/214
APPLIED GEOMETRY
June/July 2021
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

ARTISAN CERTIFICATE IN

GENERAL FITTER
MOTOR VEHICLE MECHANICS
AGRICULTURAL MECHANICS
WELDING AND FABRICATION
ELECTRICAL INSTALLATION
CARPENTRY AND JOINERY
PAINTING AND DECORATING
MASONRY
PLUMBING
GARMENT MAKING
LEATHER WORK TECHNOLOGY
GENERAL AGRICULTURE

APPLIED GEOMETRY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
- *Drawing paper size A3;*
- *Drawing instruments;*
- *Scientific calculator.*

*This paper consists of **THREE** sections; **A, B and C.***
- *Section **A**: Answer **ALL** questions.*
- *Section **B**: Answer any **ONE** question.*
- *Section **C**: Answer any **TWO** questions.*

All answers must be done on the drawing papers provided.
Do not erase construction lines.
Candidates should answer the questions in English.

This paper consists of 8 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 an elevation and a plan of a rectangular block measuring 40 x 30 x 60 mm placed on a horizontal plane with one base side of 40 mm inclined at 30° to the horizontal.

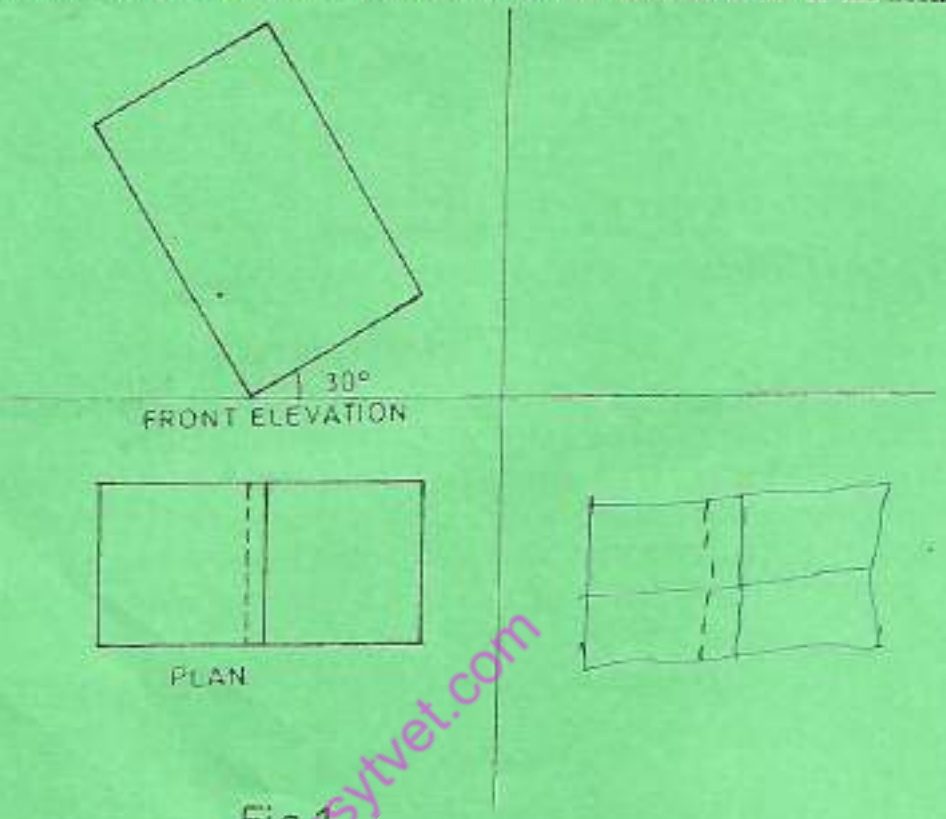


Fig. 1

Copy the given views and draw the end elevation in 1st angle projection. (5 marks)

2. **Figure 2** shows a decorative pattern.

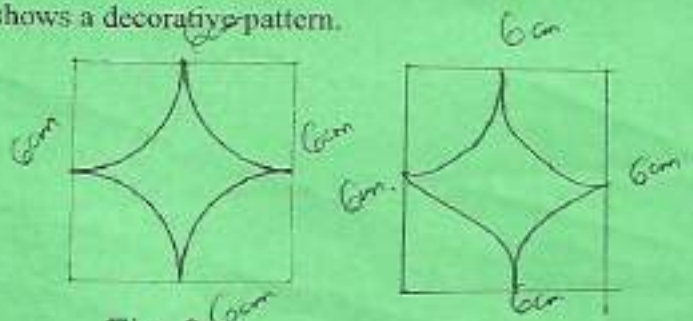


Fig. 2

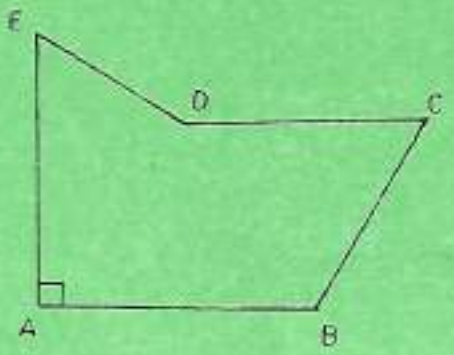
Construct the pattern in a square of side 60 mm. (5 marks)

3. Print the following letters and numbers between 5 mm guidelines.

(i) a b c d
(ii) 0 1 2 3

(4 marks)

4. **Figure 3** shows an irregular polygon ABCDE



AB = 70
BC = 60
∠BAE = 90°
AED = 60°
AE = 70
ED = 50
∠ABC = 120°

Fig. 3

Draw a reduced shape of the polygon to a scale of 2:3. (4 marks)

5. **Figure 4** shows frontal elevation of a truncated square block of base 30 x 30 mm.

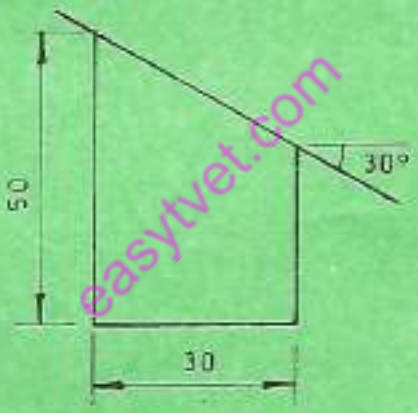


Fig. 4

Draw the true shape of the cut surface. (4 marks)

6. **Figure 5** shows orthographic views of a shaped object dawn in 1st angle projection.

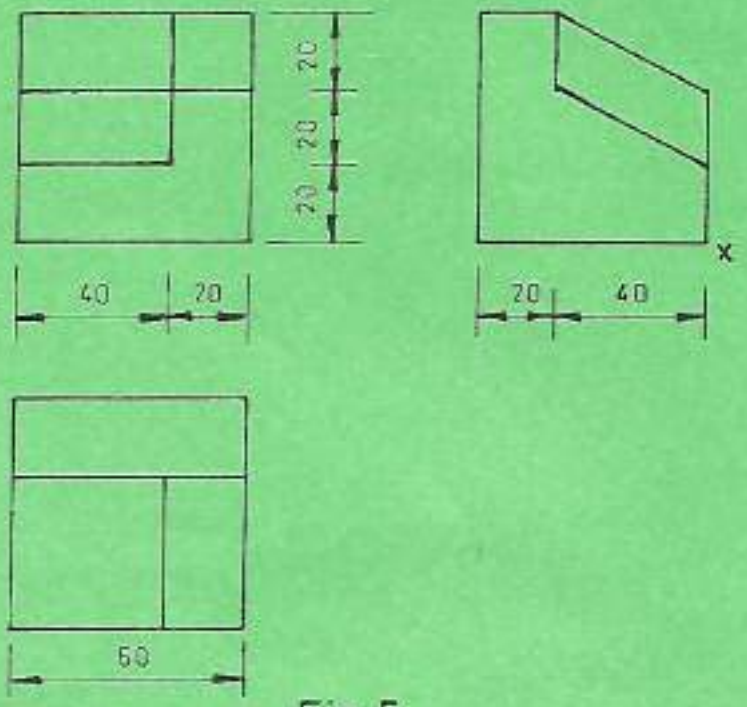


Fig. 5

Draw an isometric view of the object with corner X as the lowest point. (5 marks)

7. **Figure 6** shows a shaped regular hexagonal solid of base sides 25 mm.

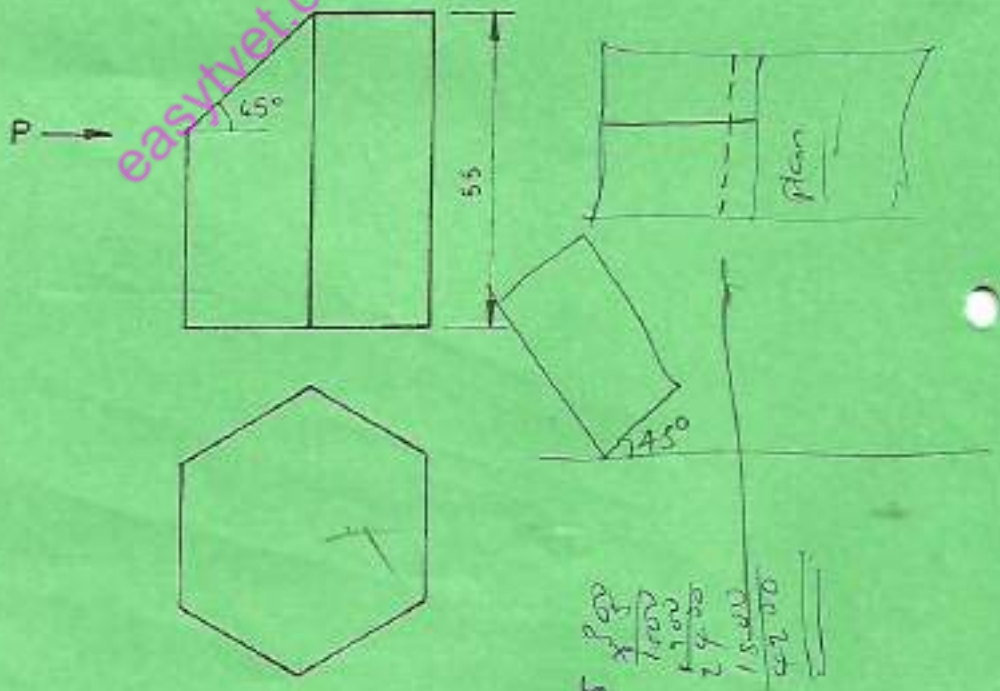


Fig. 6

Copy the front elevation and draw the following views:

(i) full plan;
(ii) end elevation viewed from the direction of arrow P. (5 marks)

8. Construct an isosceles triangle of base length AB = 50 mm and a vertical height of 650 mm. (2 marks)

9. Circumscribe a circle on a triangle ABC of sides AB = 30 mm, AC = 35 mm and angle BAC = 90°. (3 marks)

10. Sketch a flat tipped screw driver. (3 marks)

SECTION B (30 marks)

*Answer any **ONE** question from this section.*

11. **Figure 7** shows a truncated cone.

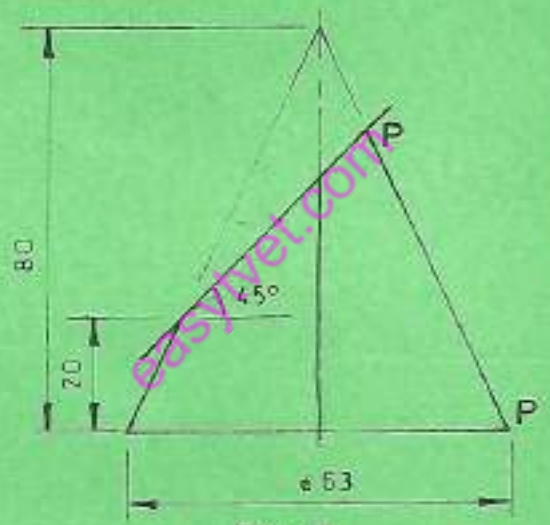
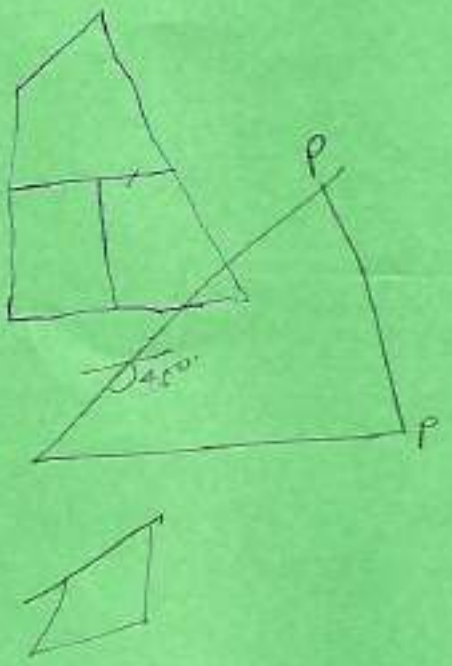


Fig. 7



Draw the following views in 1st angle projection:

(i) end elevation;
(ii) plan;
(iii) development of the truncated cone with P P as the cutting line. (30 marks)

12. (a) Construct an ellipse in a rectangle measuring 100 x 60 mm. (12 marks)

(b) **Figure 8** shows a shaped block of wood.

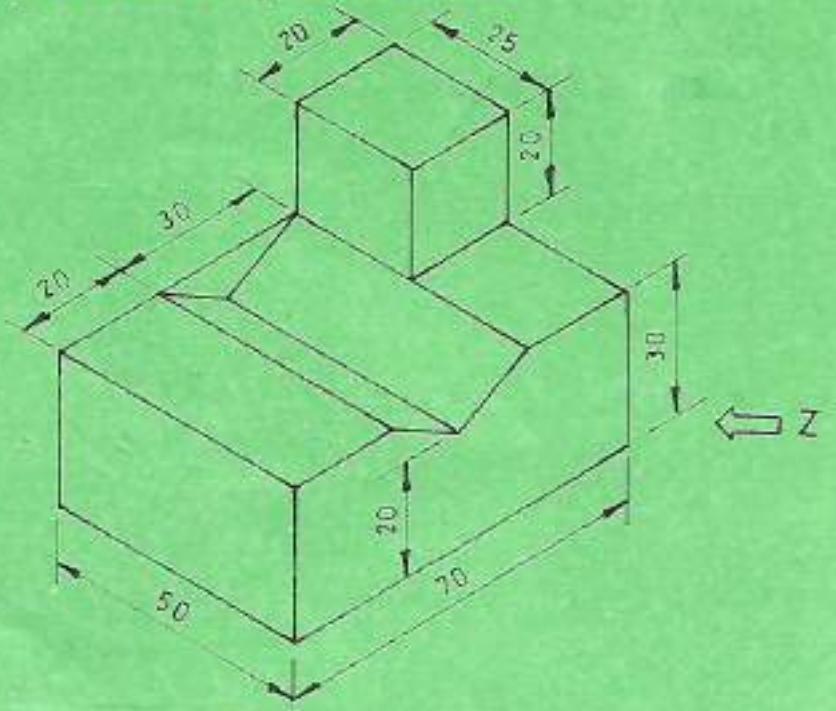


Fig. 8

Draw the following views, full size, in 3rd angle projection:

(i) front elevation viewed from the direction of arrow Z;
(ii) end elevation;
(iii) plan. (18 marks)

13. **Figure 9** shows an incomplete front elevation of two cylinders of unequal diameters intersecting at 45°.

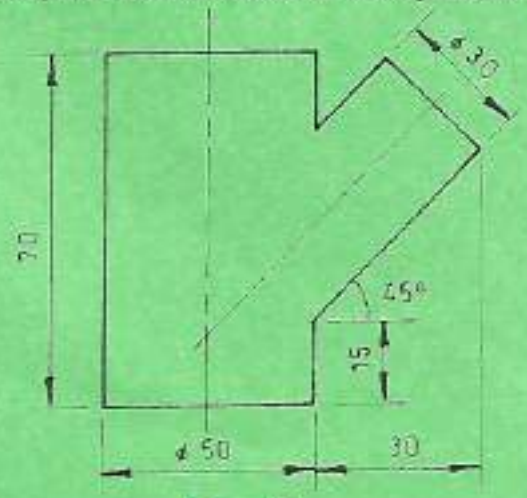


Fig. 9

Draw the following views in 3rd angle projection:

(i) complete front elevation;
(ii) end elevation;
(iii) plan. (30 marks)

SECTION C (30 marks)

*Answer any **TWO** questions from this section.*

14. **Figure 10** shows a pictorial view of a metal block:

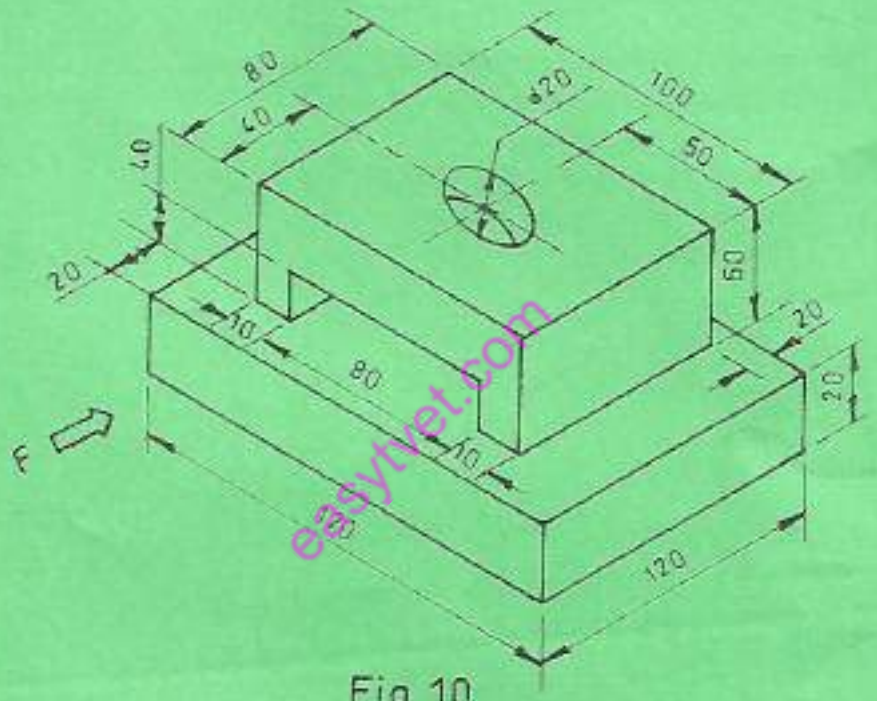
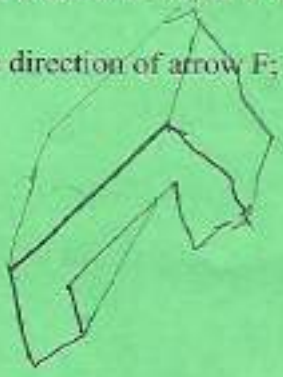


Fig 10

Draw the following views, to a scale of 1:2, in 1st angle projection:

(i) front elevation in the direction of arrow F;
(ii) end elevation;
(iii) plan. (15 marks)



15. **Figure 11** shows a door opening with a hinged door shutter.

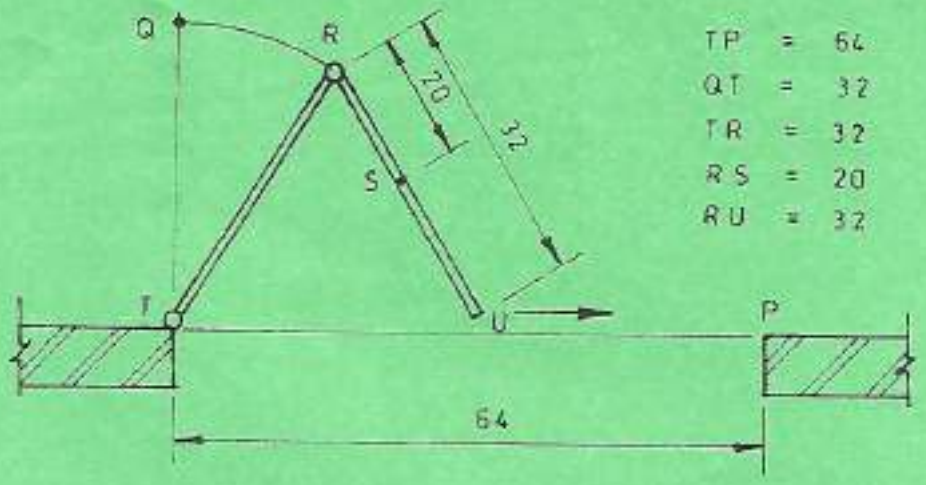


Fig. 11

Plot the locus of point S on the shutter from when the door is fully open at Q at 90° to the wall upto when the door is closed at P.

(15 marks)

16. **Figure 12** shows a pictorial view of an object.

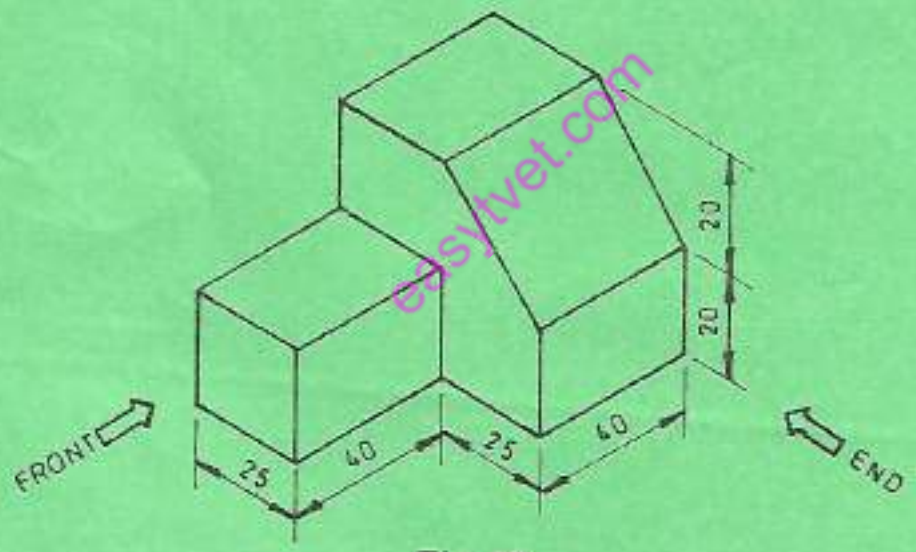


Fig. 12

Draw an oblique cabinet projection of the object.

(15 marks)

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