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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.

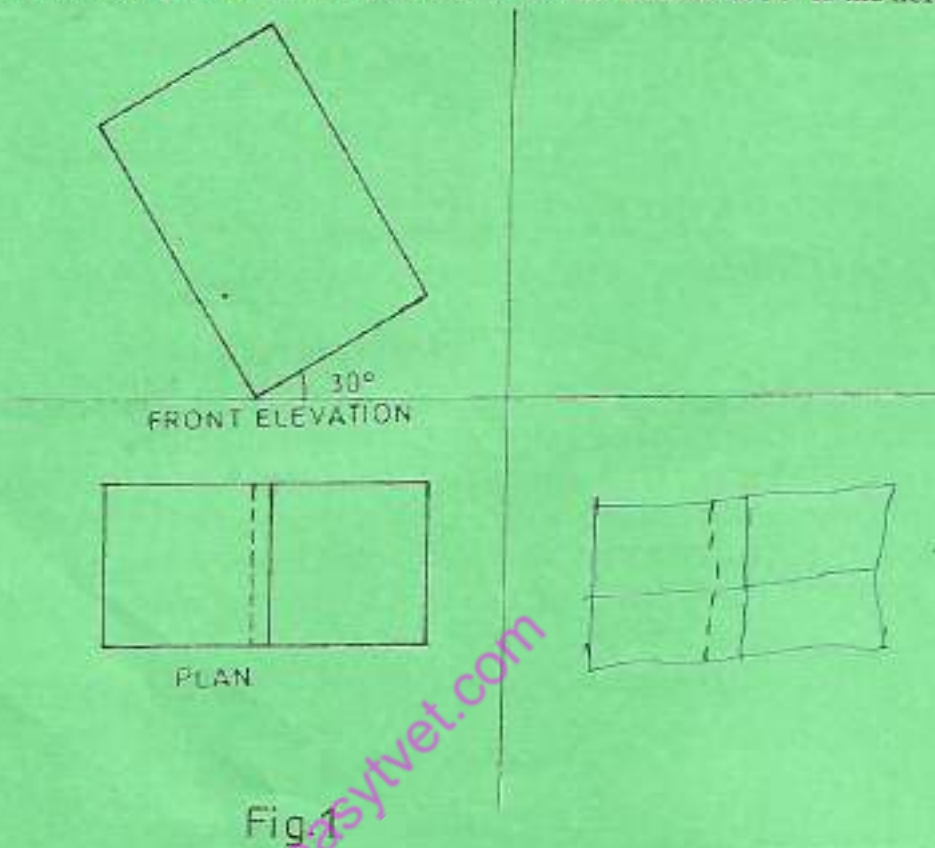
This paper consists of 8 printed pages.

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)

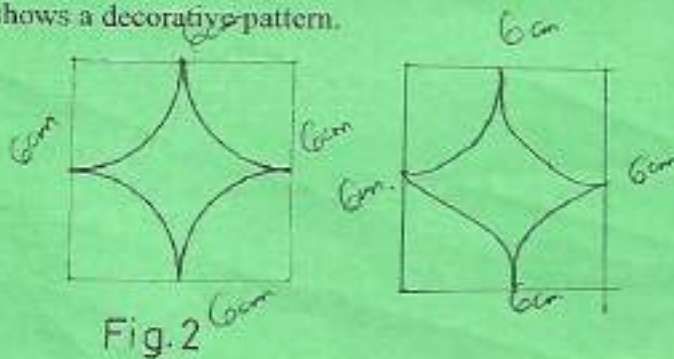
Answer ALL the questions in this section.

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.



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

2. Figure 2 shows a decorative pattern.



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

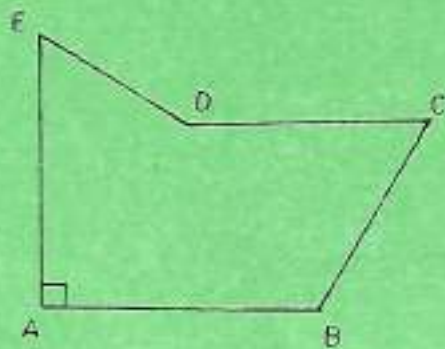
3. Print the following letters and numbers between 5 mm guidelines:

(i) a b c d

(ii) 0 1 2 3

(4 marks)

4. Figure 3 shows an irregular polygon ABCDE



$AB = 70$
 $BC = 60$
 $\angle BAE = 90^\circ$
 $\angle AED = 60^\circ$
 $AE = 70$
 $ED = 50$
 $\angle ABC = 120^\circ$

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.

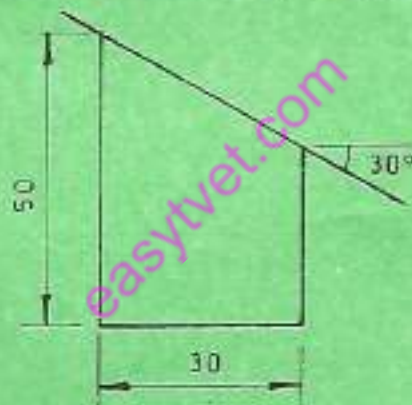


Fig. 4

Draw the true shape of the cut surface.

(4 marks)

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

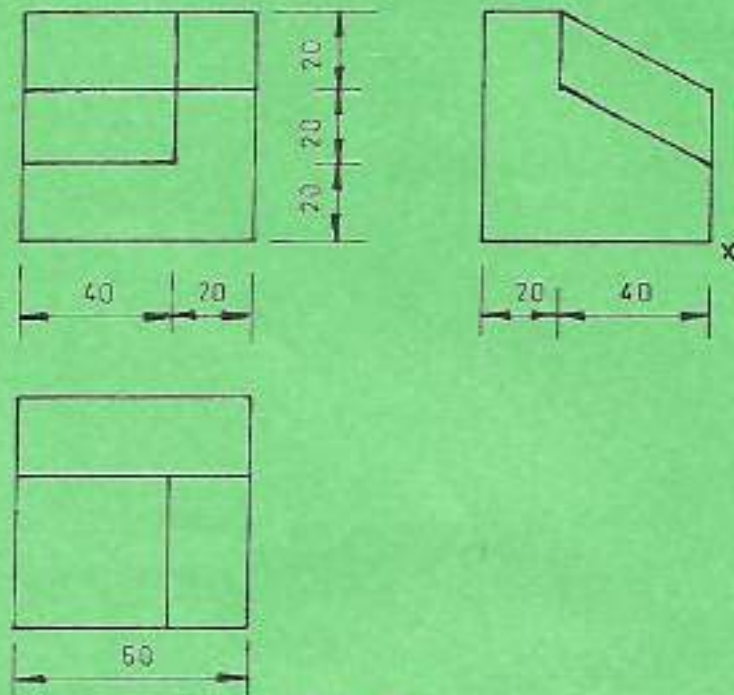


Fig. 5

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.

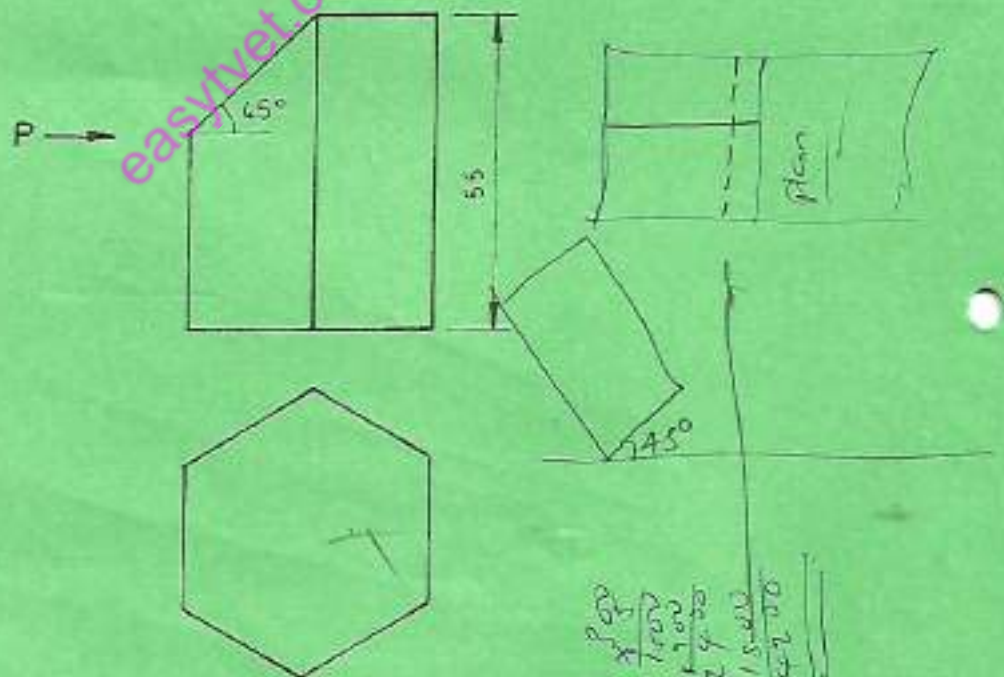


Fig. 6

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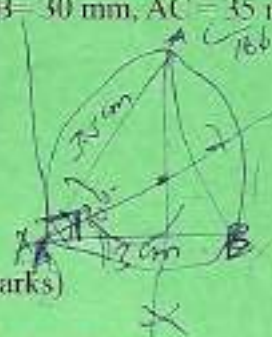
Copy the front elevation and draw the following views:

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

8. Construct an isoscelles triangle of base length $AB = 50 \text{ mm}$ and a vertical height of 65 mm . (2 marks)

9. Circumscribe a circle on a triangle ABC of sides $AB = 30 \text{ mm}$, $AC = 35 \text{ mm}$ and angle $BAC = 90^\circ$. (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.

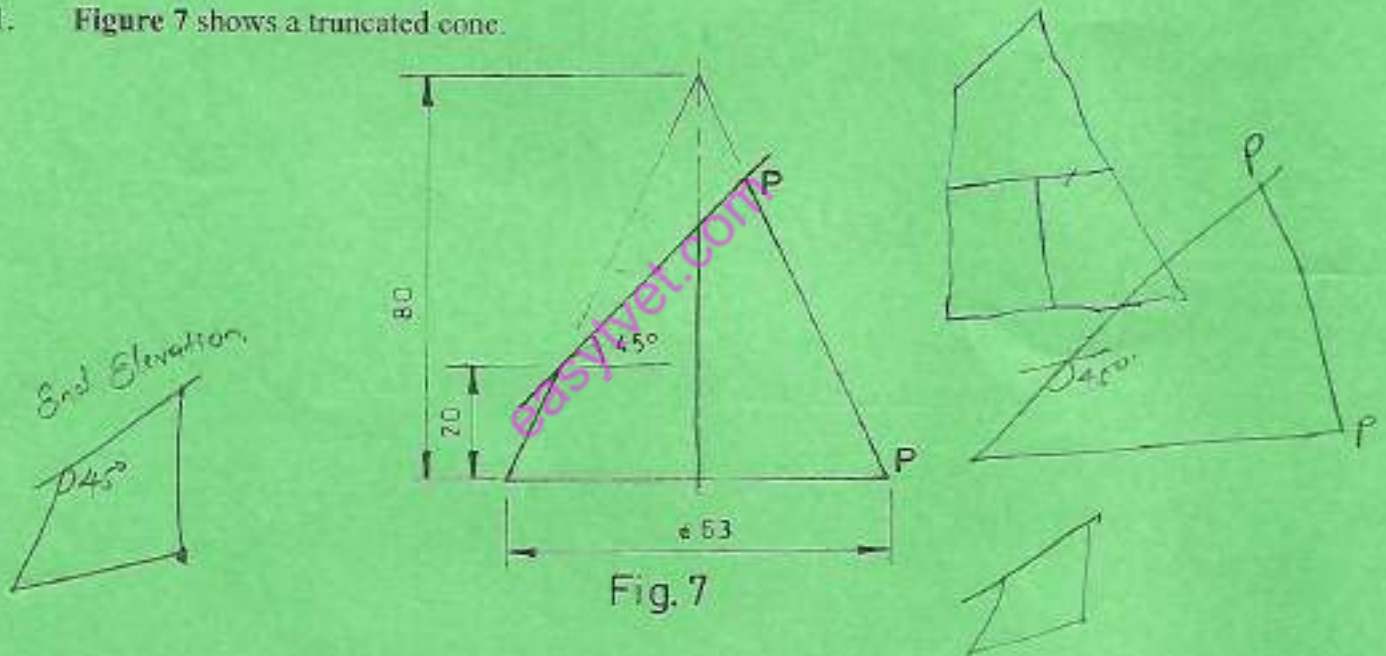


Fig. 7

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.

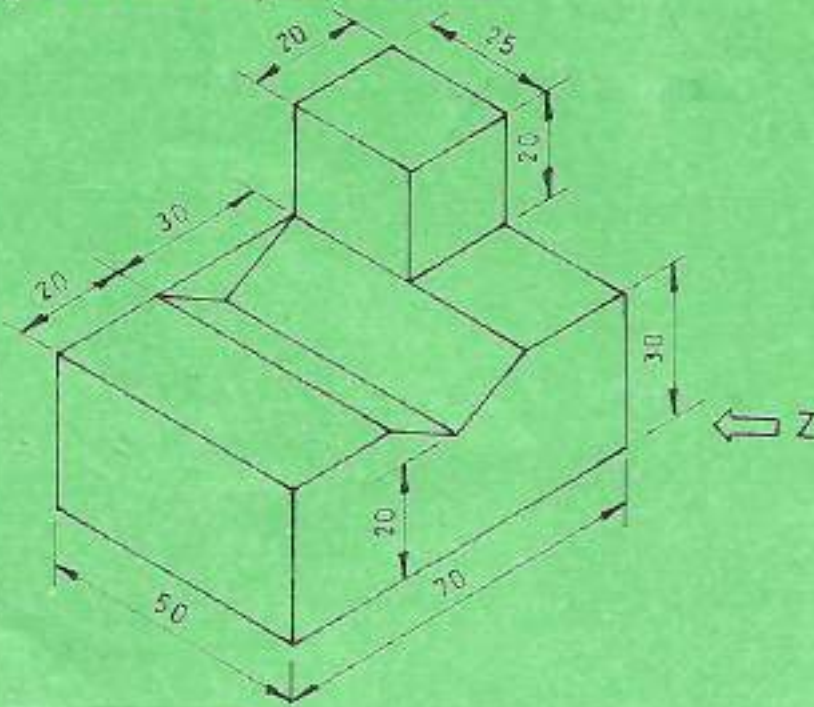


Fig. 8

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°.

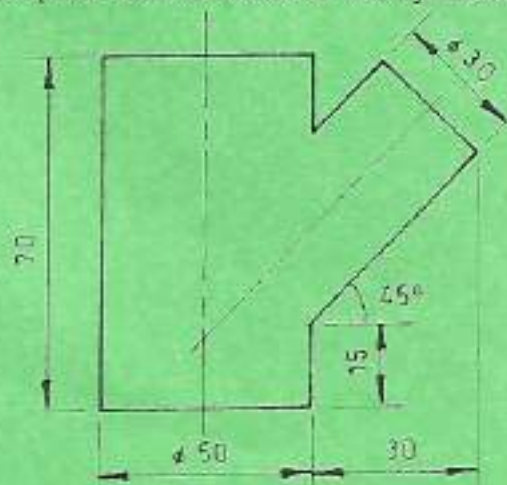


Fig. 9

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:

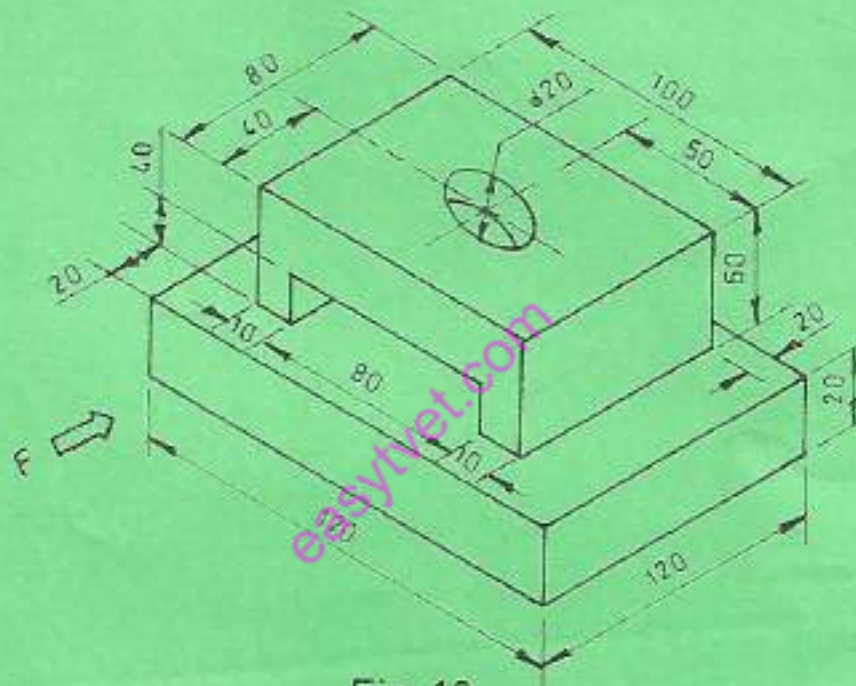
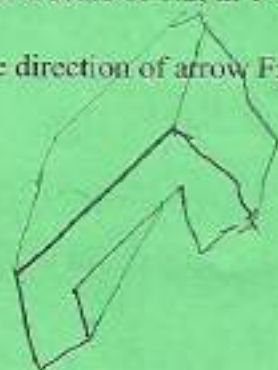


Fig 10

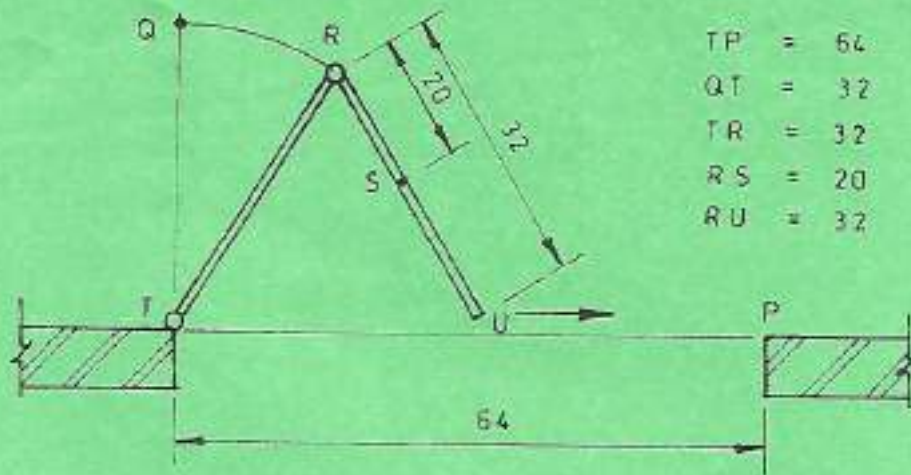
Draw the following views, to a scale of 1:2, in 1st angle projection:

- (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.



$TP = 64$
 $QT = 32$
 $TR = 32$
 $RS = 20$
 $RU = 32$

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.

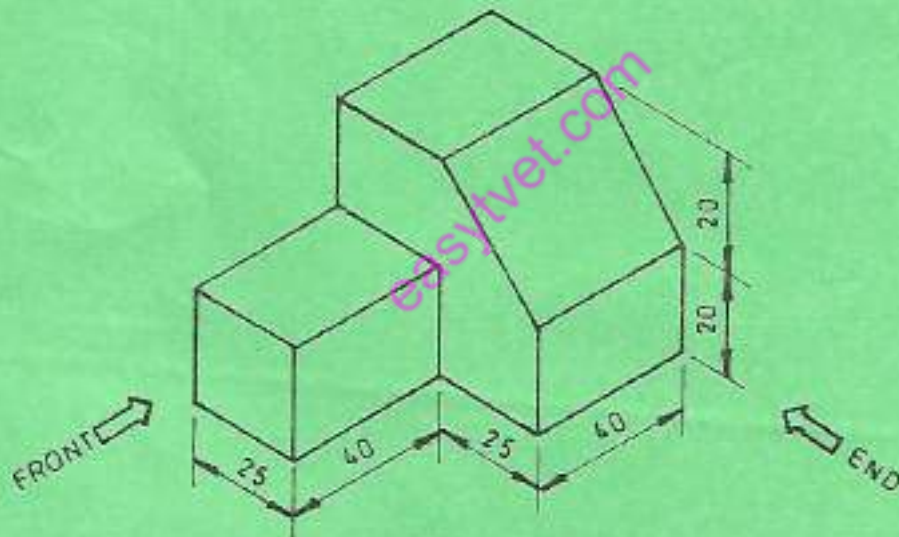


Fig.12

Draw an oblique cabinet projection of the object.

(15 marks)

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