



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

Qualification Code : 071606T4MCT
Qualification : Mechatronics Technician Level 6
Unit Code : ENG/OS/MC/CC/01/6
Unit of Competency : Prepare and Interpret Technical Drawing

WRITTEN ASSESSMENT ASSESSOR'S GUIDE

INSTRUCTIONS TO ASSESSOR:

1. The candidate has **THREE HOURS** to attempt all the questions.
2. Marks for each section are indicated in the brackets
3. The paper consists of **TWO** sections: **A** and **B**.
4. The candidate is required to attempt **ALL** questions from section **A** and **ANY THREE** questions from section **B**.
5. The candidate is provided with answer booklet for their responses.

SECTION A: (40 MARKS)

1. Outline the procedure for drawing an isosceles triangle given the perimeter and the altitude (4 marks)
 - i. Draw line AB equal to half the perimeter.*
 - ii. From B erect a perpendicular and make BC equal to the altitude.*
 - iii. Join AC and bisect it to cut AB in D.*
 - iv. Produce DB so that BE=BD. CDE is the required triangle.*

(Award 1 mark for each step, correct order of steps is key)

2. What is the procedure for constructing a parallelogram given two sides and an angle? (4 marks)
 - i. Draw AD equal to the length of one of the sides.*
 - ii. From A construct the known angle and mark off AB equal in length to the other known side.*
 - iii. With compass point at B, draw an arc equal in radius to AD.*
 - iv. With compass point at D, draw an arc equal in radius to AB*

(Award 1 mark for each step, correct order of steps is key)

3. State three different sizes of drawing papers used in technical drawing (3 marks)
 - i. A0*
 - ii. A1*
 - iii. A2*
 - iv. A3*

(Award 1 mark for each correct response, any 3)

4. List two differences between oblique and isometric drawing (4 marks)

Oblique	Isometric
Sloping lines are drawn to half their true size	Sloping lines are drawn to full their true size
The drawing does not look natural	The drawing does look natural
Sloping lines are drawn at 45°	Sloping lines are drawn at 30°

(Award 1 mark for each correct response, any 2)

5. Identify **four** features which are not sectioned in an object when cut longitudinally during sectioning (4 marks)
 - i. Ribs and webs*

- ii. *Shafts, rods and spindles*
- iii. *Spokes of wheels and similar parts*
- iv. *Bolts, nuts and thin washers*
- v. *Rivets, dowels and pins*

(Award 1 mark for each correct response, any 4)

6. Outline any four information that is contained in the title block (4 marks)
- i. *Title of the drawing*
 - ii. *Drawing number*
 - iii. *Scale*
 - iv. *Symbol denoting the method of projection*
 - v. *Date*
 - vi. *Author*

(Award 1 mark for each correct response, any 4)

7. Name two types of pencils used in drawing and their purpose (4 marks)
- i. *H- it is used for drawing construction lines*
 - ii. *HB- it is used for constructing outlines.*

(Award 1 mark for identification and 1 mark for stating the use)

8. Identify and describe two methods of dimensioning in technical drawing (4 marks)
- i. *Aligned system- Dimensional values are placed parallel to and above the dimension lines.*
 - ii. *Unidirectional system- Dimensions are placed in such a way that they can be read from the bottom. Dimensional values are placed at the middle of horizontal dimension line.*

(Award 1 mark for identification and 1 mark for description)

9. List any four tools used to manipulate a drawing in CAD (4 marks)
- i. *Chamfer*
 - ii. *Fillet*
 - iii. *Extrude*
 - iv. *Revolve*
 - v. *Thread*

(Award 1 mark for each correct response, any 4)

10. Define the following terms (3 marks)

- i. A circle- *it is the locus of a point which moves so that it is always a fixed distance from another stationary point.*
- ii. Concentric circles- *these are circles that have the same centre.*
- iii. Eccentric circles- *these are circles that neither share the same center nor intersect each other.*

(Award 1 mark for each correct definition)

11. State any two scales used in technical drawing (2 marks)

- i. *Plain scale*
- ii. *Representative fraction*
- iii. *Vernier scale*
- iv. *Diagonal scale*

(Award 1 mark for each correct response, any 2)

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SECTION B: (60 MARKS)

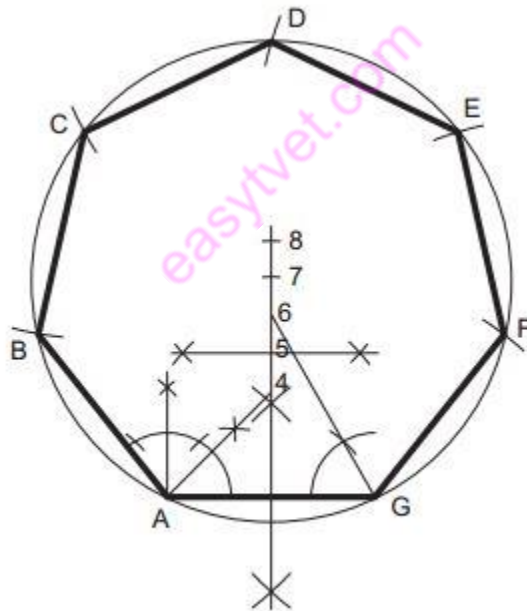
12.

a. Describe the procedure and construct a heptagon (12 marks)

- i. Draw a line GA equal in length to one of the sides and bisect GA.
- ii. From A construct an angle of 45° to intersect the bisector at point 4 and from G construct an angle of 60° to intersect the bisector at point 6.
- iii. Bisect between points 4 and 6 to give point 5.

Point 4 is the centre of a circle containing a square. Point 5 is the centre of a circle containing a pentagon. Point 6 is the centre of a circle containing a hexagon. By marking off points at similar distances the centers of circles containing any regular polygon can be obtained.

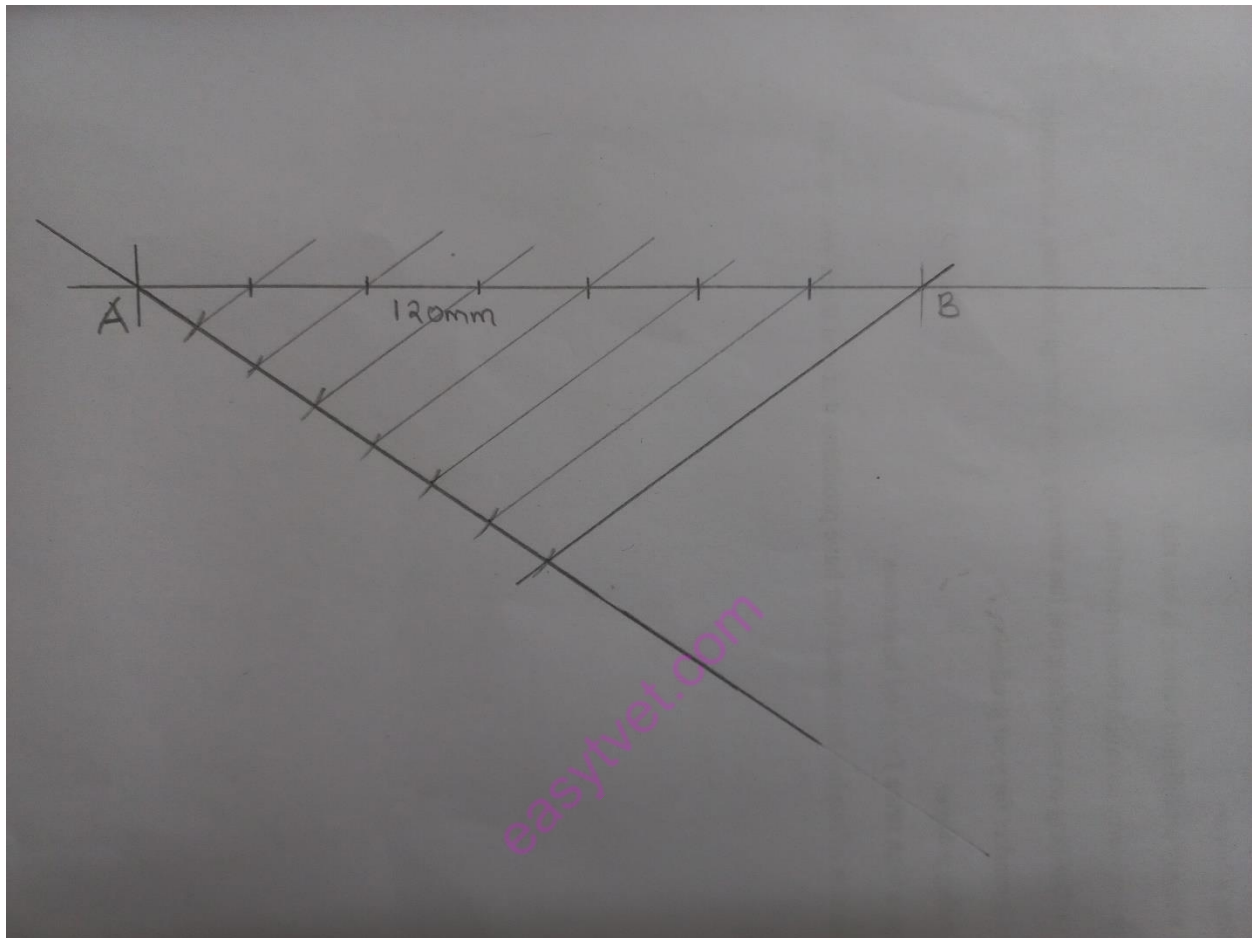
- iv. Mark off point 7 so that $6 \text{ to } 7 = 5 \text{ to } 6 (=4 \text{ to } 5)$ and with centre at point 7 draw a circle, radius 7 to A (=7 to G).
- v. Step off the sides of the figure from A to B, B to C, etc.



(Award 5 marks for the correct steps listed (correct order is key), 5 marks for the well-drawn heptagon and 2 marks for neatness)

- b. Divide a line AB 120 mm long into seven equal parts. (8 marks)
 - i. Draw a line at any angle from point A or B (it doesn't matter which one you choose) any length.
 - ii. Mark off the required amount of steps using your compass, using the same radius.

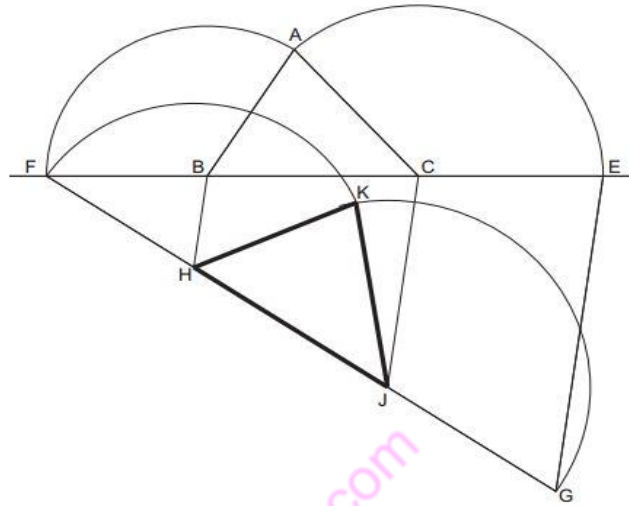
- iii. *Join the seventh arc back to point B. this creates a triangle.*
- iv. *Finally bring lines from the remaining 6 arcs parallel to line. Where these lines meet line AB divide into 7 equal parts.*



(Award 2 marks for the correct steps listed (correct order is key), 4 marks for the drawing and 2 marks for neatness)

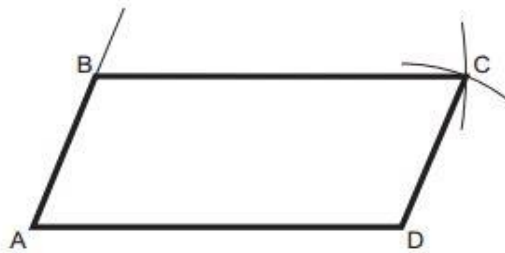
- 13.
- a. Describe the procedure and construct a triangle similar to another triangle but with a different perimeter (15 marks)
 - i. *Draw the given triangle ABC.*
 - ii. *Produce BC in both directions.*
 - iii. *With compass point on B and radius BA, draw an arc to cut CB produced in F.*
 - iv. *With compass point on C and radius CA, draw an arc to cut BC produced in E.*

- v. *Draw a line FG equal in length to the required perimeter.*
 - vi. *Join EG and draw CJ and BH parallel to it.*
 - vii. *With centre H and radius HF , draw an arc.*
 - viii. *With centre J and radius JG , draw another arc to intersect the first arc in K .*
- HKJ is the required triangle.*



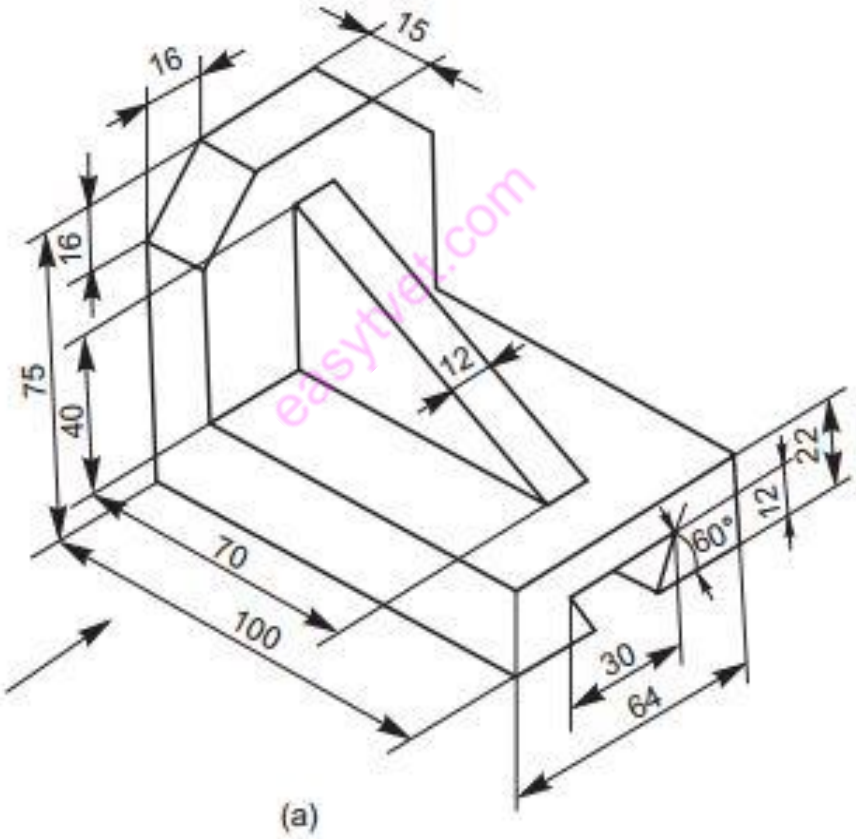
(Award 7 marks for the correct steps listed (correct order is key), 6 marks for the well-drawn triangle and 2 marks for neatness and correct use of pencils)

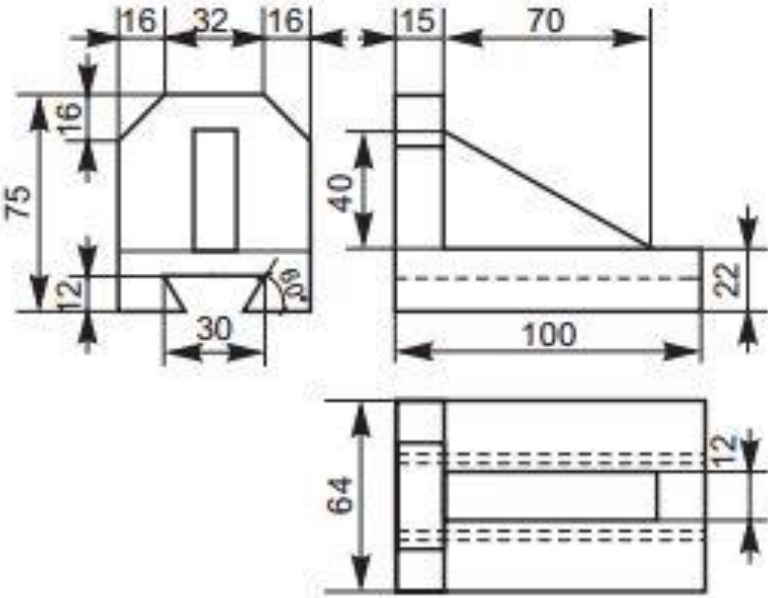
- b. Outline the procedure and construct a parallelogram given two sides and an angle (5 marks)
- i. *Draw AD equal to the length of one of the sides.*
 - ii. *From A construct the known angle.*
 - iii. *Mark off AB equal in length to the other known side.*
 - iv. *With compass point at B , draw an arc equal in radius to AD .*
 - v. *With compass point at D , draw an arc equal in radius to AB .*



(Award 2 marks for the correct steps listed (correct order is key), 2 marks for the well-drawn triangle and 1 marks for neatness and correct use of pencils)

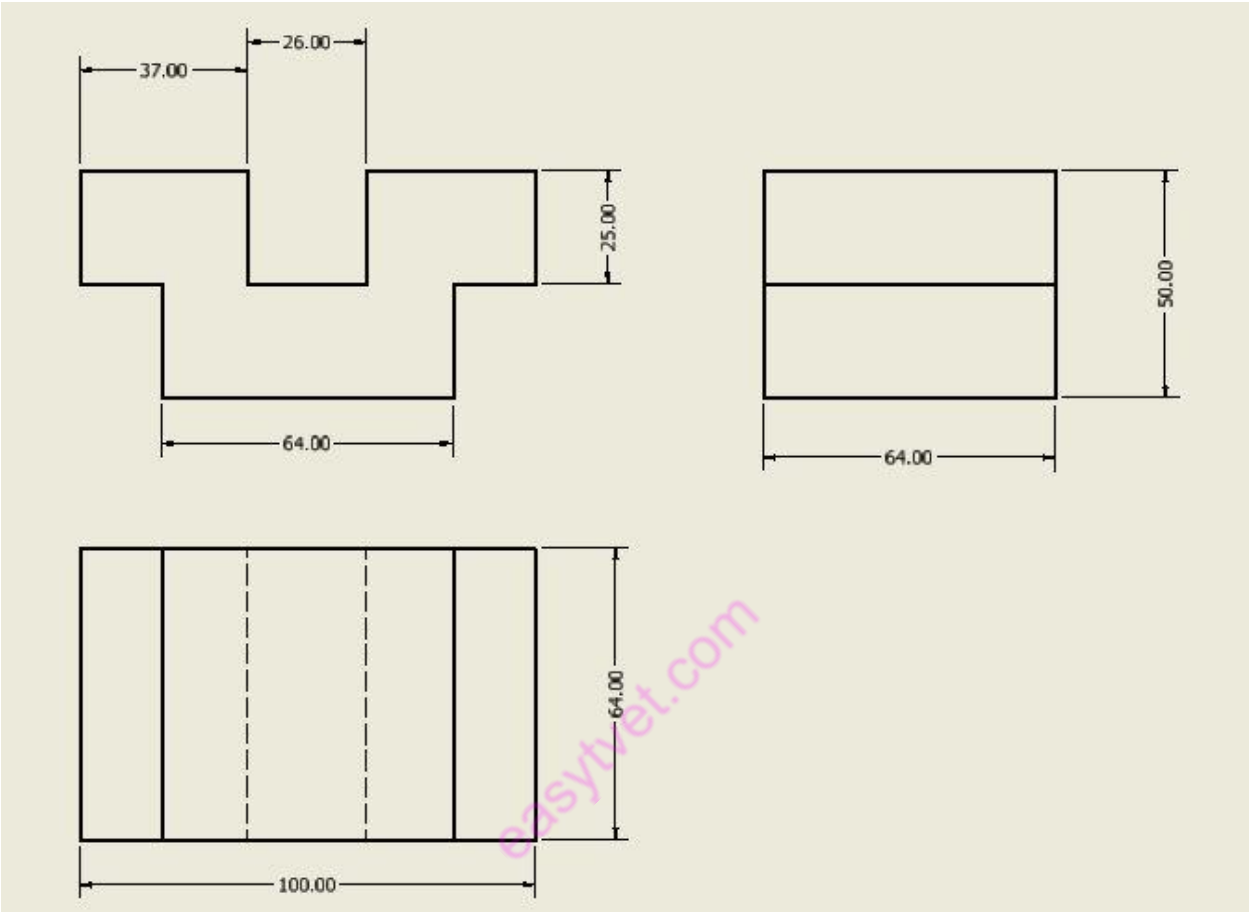
14. On A3 size drawing paper, using drawing instruments draw in first angle projection the views of the block given in figure below as follows:(20 marks)
- a) Front elevation in the direction of arrow E;
 - b) End elevation in the direction of arrow H;
 - c) Plan.

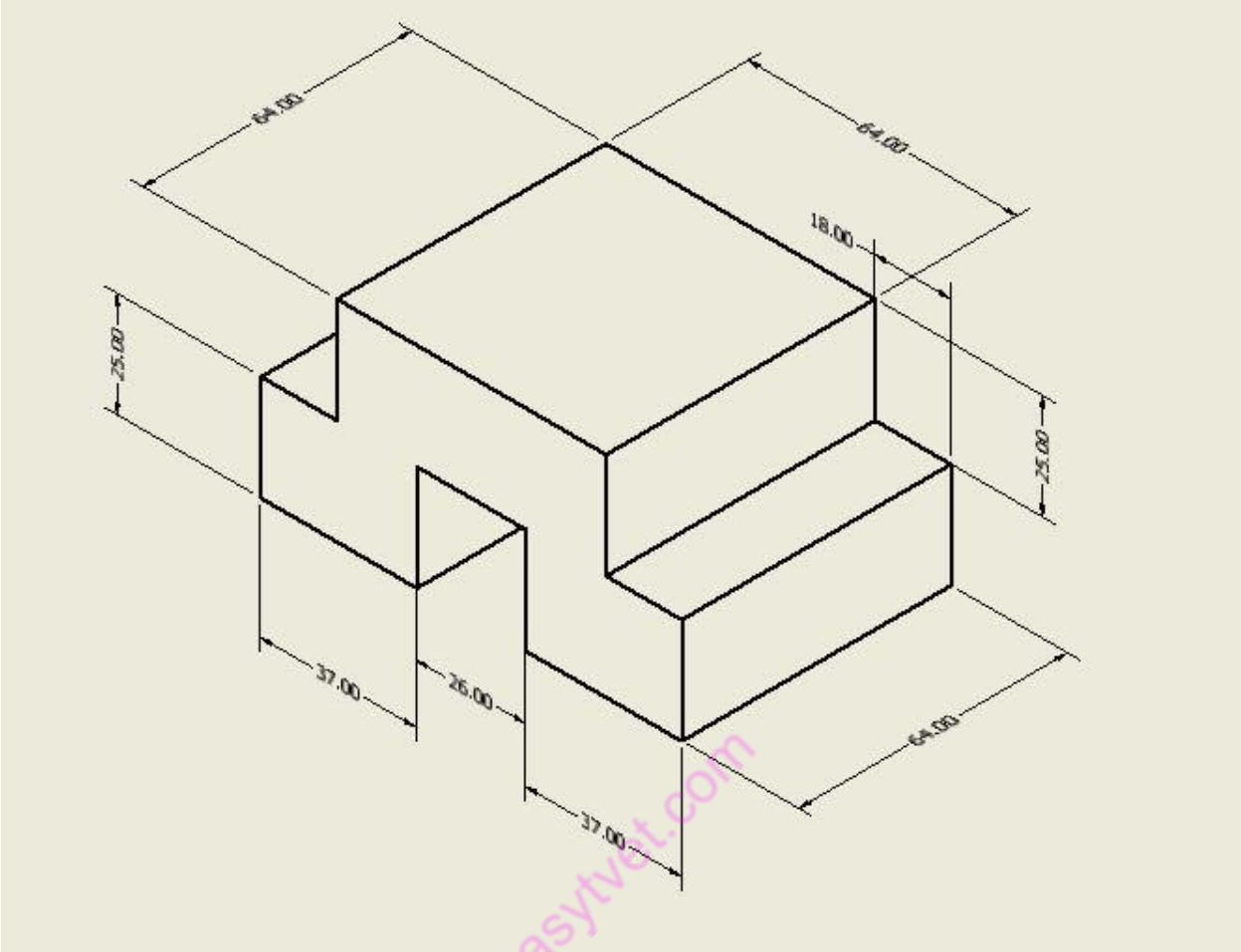




(Award 4 marks for each view that is accurately drawn, 4 marks for correct dimensioning, 3 marks for title block and 1 mark for neatness. The angle of projection should be correct.)

15. The figure below shows the three views of a shaped block. On A3 size drawing paper and using drawing instruments draw the block in isometric projection and give 5 major dimensions. (20 marks)





(Award 10 marks for the accurately drawn figure, 5 marks for correct dimensioning, 3 marks for title block and 2 marks for neatness and correct use of pencils)