CHAPTER 5 TECHNICAL DRAWING / PREPARE AND INTERPRET TECHNICAL DRAWING

5.1 Introduction of the Unit of Learning / Unit of Competency

Technical Drawing is the skill of creating a range of plans/ drawings that visually communicate an idea that needs to be constructed or how it functions. Competencies in Technical Drawing are applied in a wide range of areas that include electronics, architecture, manufacturing, engineering, and computer drafting and modelling. This unit covers technical drawing principles, interpretation of technical drawings, drawing equipment and materials, plain geometry, solid geometry, pictorial and orthographic drawings, computer-aided design and drafting, and safe drawing procedures. The essential resources in this course include but not limited to drawing room, computer lab, drawing equipment and materials, computers, CAD package, and a projector. Upon the completion of this course, a trainee should be able to produce a wide range of technical drawings/ designs while following good technical drawing practices. Technical drawing prepares the trainee as a drafting/design technician in the fields of electrical, mechanical and architectural engineering.

5.2 Performance Standard

Drawing equipment and materials are gathered and utilized according to task requirements, waste materials are disposed in accordance with workplace procedures and environmental legislations, drawing lines are used as per standard drawing conventions, different plain geometrical forms are produced according to standard drawing conventions, different solid geometries are produced as per standard drawing conventions, varied pictorial and orthographic drawings are produced according to the standard drawing conventions, and appropriate CAD packages are applied as standard operating procedures.

easytvet.com

5.3 Learning Outcomes

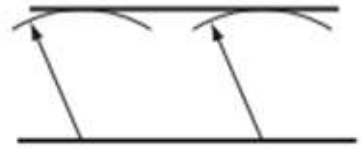
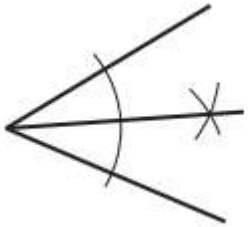
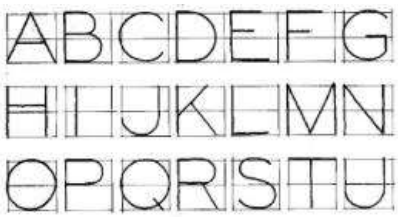
5.3.1. List of Learning Outcomes

a) Use and maintain drawing equipment and materials
b) Produce plain geometry drawings
c) Produce solid geometry drawings
d) Produce pictorial and orthographic drawings of components
e) Apply CAD packages

5.3.2 Learning Outcome No.1: Use and maintain drawing equipment and materials

5.3.2.1 Learning Activities

Select equipment and materials in construction of parallel lines, bisecting angles and lettering.

Learning Activity	Special Instructions
Select equipment and materials required draw the illustrated tasks.   Parallel lines ,Bisecting angles  Lettering Learning Activity Select equipment and materials required draw the various tasks.	Provide the trainee with a variety of exercise to build confidence in selecting appropriate drawing equipment and tools.

easytvet.com

5.3.2.2 Information Sheet No 2/LO1: Use and maintain drawing equipment and materials

Introduction

This area of competence covers use and care of technical drawing equipment and materials, overview of ISO technical drawing standards, drawing office procedures, environmental legislations and work place procedures regarding disposal of waste, and the use of personal protective equipment.

Definition of key terms

Drawing.
This is the use of lines, shapes, and sizes to construct objects or structures either in 2-dimesnional or 3-dimensional view.

Technical drawing
Technical drawing a precise detailed representation of an idea using symbols, lines, and signs in creating objects in the manufacturing of engineering articles.

Drafting
This is the act of producing a picture/sketch either in 2-dimesnional or 3-dimensional view and providing dimensions and notes. It is usually a quick sketch/ presentation with details and not to scale.

Designing
This is the act of producing drawings to clearly define the requirements for concepts or products in order to be in line with the expected outcome.

Principles of Engineering Drawing

Engineering drawings should be language-independent in order for drafting/ design technician anywhere in the world can specify a product that can be made and assembled in different countries. Thus, technical drawing serves a language of its own in transmitting information from drafter/designer to the manufacturer and the assembler. Technical Drawing is defined by rules that are embodied in the publications of standards organizations e.g. the British Standards Institution (BSI), the American National Standards Institute (ANSI) and in the International Standards Organization (ISO), which the global body giving guidelines superseding individual countries standards.

easyvet.com

Recommended resource for further information

Zammit S.J (1987), Motor vehicle engineering science for technicians, Longman Group UK Ltd, London

Watch a 4.11min video on technical drawing tools on the link:
https://youtu.be/k3IhsuJnfh8?t=189

Content

Identification and care of drawing equipment, identification and care of drawing materials, drawing standards and drawing office procedures, workplace procedures, use and maintenance of drawing equipment and materials, and use of Personal Protective Equipment (PPEs).

Conclusion

This outcome covered drawing instruments and materials, ISO drawing rules, drawing office procedures, and use of PPEs in drawing practices.

Trainees' assignment;

- Select different types of drawing sheets as determined by desired quality of a specific job.
- Select drawing pencils required for different drawing features i.e. used in object drawing, outlines, hidden details, and construction lines.

Trainer

- Check that the completed assignments show evidence of understanding of drawing office procedures and housekeeping procedures. Ensure assignments are completed on time. Observe trainee's work behavior from time to time.

5.3.2.3 Self-Assessment

1. The accuracy of the drawing depends on the quality of the instruments used.
   a) True
   b) False

easytvet.com

2. Which of the following instrument is made of thin strips of wood arranged in a line to form a rectangle and on which, the drawing is made?
   a) Mini – drafter
   b) Drawing Board
   c) Protractor
   d) Scale

3. Which of the following tools is used to draw horizontal lines?
   a) Mini – drafter
   b) Protractor
   c) T – square
   d) French curve

4. Which of the following instrument can be used to draw accurate perpendicular lines, parallel lines and angular lines?
   a) Mini – drafter
   b) T – square
   c) Protractor
   d) Set square

5. According to the Indian Standard Institute (ISI), which among the following designation has the size 1000 x 700 (in mm)?

a) B0
b) B1
c) B2
d) B3

6. Which is the most common tool used for drawing circles?
a) French curve
b) Mini – drafter
c) Divider
d) Compass

7. For drawing circles with a large radius, which of the following tool is used?
a) Bow compass
b) Lengthening bar compass
c) Divider
d) Protractors

8. The preferred size of the drawing sheets is recommended by the _____
a) B.I.S.
b) ASME
c) ASTM
d) NIST

easytvet.com

9. The untrimmed size for _____ sheet is 240 mm x 330 mm.
a) A1
b) A3
c) A4
d) A5

10. SP: 46 (2003) recommends the borders of _____ mm width for the sheet sizes A0 and A1, and _____ mm for the sizes A2, A3, A4 and A5.
a) 10, 20
b) 15, 20
c) 20, 10
d) 15, 10

11. The false statement regarding orientation mark.
a) The orientation mark coincides with one of the centering marks
b) Represents the direction to which sheet is placed
c) Orientation mark can be used for the orientation of drawing sheet on the drawing board
d) Facilitate positioning of the drawing for reproduction purpose

12. The size of the title block is _____ mm x _____ mm.
    a) 25 x 10
    b) 100 x 25
    c) 65 x 185
    d) 185 x 65

13. The number of folding methods for folding of various sizes of drawing sheets is _____
    a) 1
    b) 2
    c) 3
    d) 4

14. Which of the following is reducing scale?
    a) 10:1
    b) 10:2
    c) 0.5:1
    d) 2:1

15. 8. 1:10000 is enlarging scale.
    a) True
    b) False

easytvet.com

16. _____ is not an essential thing for free-hand sketching.
    a) A soft-grade pencil
    b) French curves
    c) A soft rubber-eraser
    d) A paper in form of a sketch-book or a pad

17. Which statement is false?
    a) Drawing for instruction manual: This is assembly drawing without dimensions. This is also used for explaining the working principle of each part
    b) Exploded assembly drawing: This type of assembly drawing is used for explaining the working principle of any machine
    c) Drawing for catalogue: Special assembly drawings are prepared for catalogues, with overall and principal dimensions
    d) Patent drawing: It is generally assembly drawing either in pictorial form or principal view of orthographic projection of a machine

18. Select and apply different drawing paper holders

5.3.2.4 Tools, Equipment, Supplies and Materials for the specific learning outcome

- Drawing room
- Computer lab
- Drawing equipment and materials
- CAD packages
- Projector
- Computer

5.3.2.5 References

Heather, S and Shrock, C.R (2019) Begging AUTOCAD Exercise Workbook. Industrial Press, Inc USA

Davies, B. L., Robotham, A. J., & Yarwood, A. (1991). Computer-aided drawing and design. London: Chapman & Hall.

Hubka, V. (2015). Principles of engineering design. Elsevier.

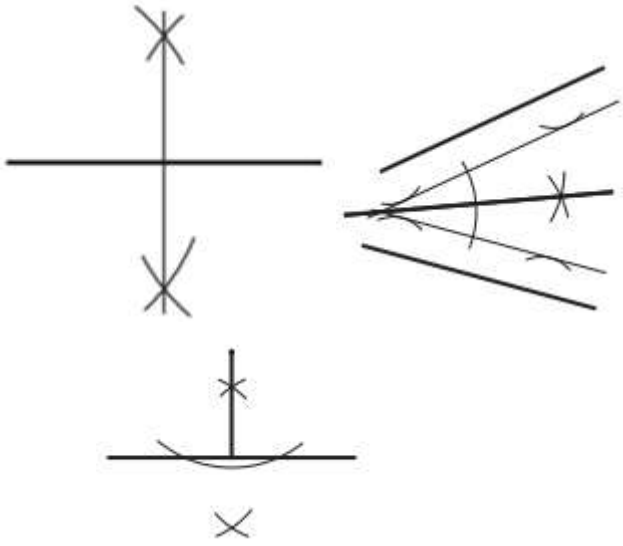
Zammit S.J (1987), Motor vehicle engineering science for technicians, Longman Group UK Ltd, London

Morling, K 92012) Geomtric and Engineering Drawing. Routledge, amozon

easytvet.com

5.3.3 Learning Outcome No. 2: Produce plain geometry drawings

5.3.3.1 Learning Activities

Learning Outcome #2: Produce plain geometry drawings	
Learning Activities	Special Instructions
Activity 1: Produce different types of two- dimensional figures i.e. lines, different angles, bisecting angles, and geometric forms • Select appropriate equipment and materials for the specific work • Draw varied lines, different angles, bisect angles, and varied 2-D geometrical forms **Activity 2**: Measure different angles, lines, and geometric forms • Select appropriate equipment and materials for the specific work Carry out measuring of varied lines, different angles, bisect angles, and varied 2-D geometrical forms Produce different types of two- dimensional figures i.e. lines, different angles, bisecting angles, and geometric forms Measure different angles, lines, and geometric forms. 	Provide feedback and focused instruction to aid trainees to refine their, develop their competencies producing a variety of plain geometries.

easyBet.com

5.3.3.2 Information Sheet No.2/LO2: Produce plain geometry drawings

Introduction

This outcome covers a variety of plain geometry drawings that include lines, triangles, quadrilaterals, polygons, dimensioning and drawing rules.

Definition of key terms

easytvet.com

Drawing instruments
These are the tools/equipment that are essential in producing drawings
Drawing materials
These are consumables that are utilized in technical drawing.
Plane geometry
This type of geometry involves production of drawings in two dimensions.
Solid geometry
Solid geometry involves production of drawings in three dimensions.

Plane geometry principle

A line projects as a true length when a view is taken looking perpendicular to the line. A line parallel to the vertical plane will appear as a true length in elevation. A line parallel to the horizontal plane will appear as a true length in plan. Parallel lines appear parallel in every orthographic view. If a line is parallel to any line on a plane, it is parallel to the plane. A line projects as a point when we look along its true length. A plane projects as an edge when any line on the plane projects as a point. The true shape of a plane is seen on a projection plane which is parallel to the plane. Two planes intersect in a line.

Content

Plane geometry: Types of lines, construction of different geometric forms, construction of different angles, measurement of angles, bisection of different angles and lines, polygons, circles, triangles, and drawing symbols and abbreviations.

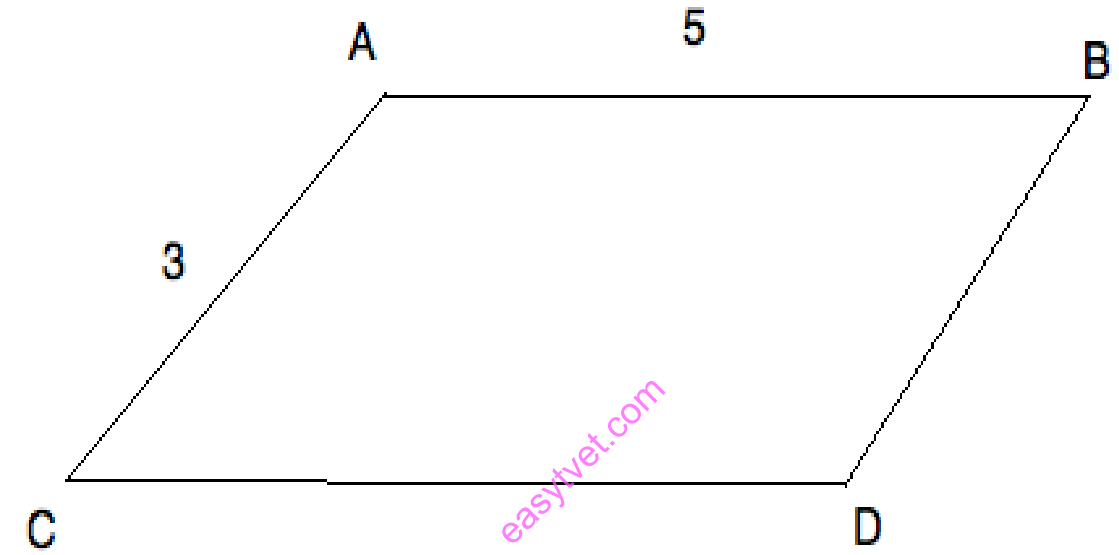


Figure 47: Plane Geometry

Plain geometry can take various shape such as in figure 1 and figure 2

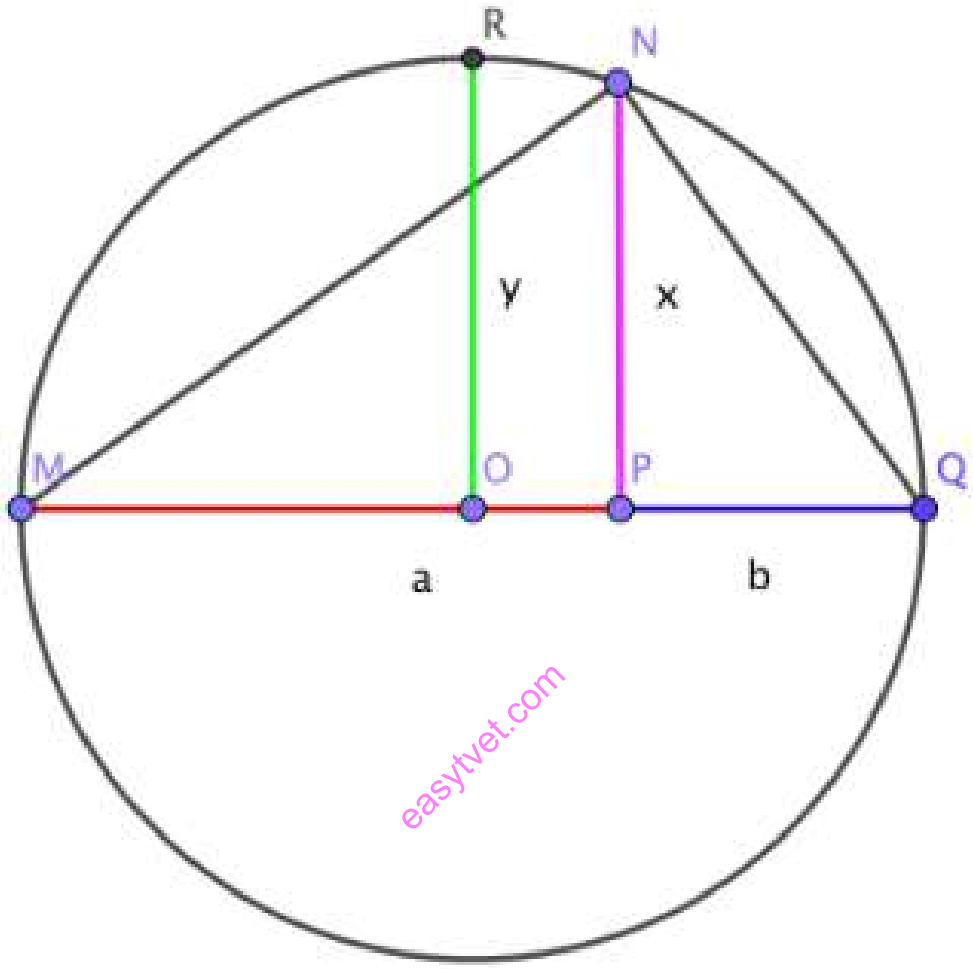


Figure 48: Plane Geometry circle

Conclusion

This outcome covered plane geometries drawings i.e. types of lines, polygons, triangles, quadrilaterals, dimensioning and drawing rules.

.

Trainees' assignment;

- Construct an equilateral triangle, given one of the sides, AB = 100.
- Construct a square given the diagonal
- Construct a triangle given the base, the altitude and the vertical angle(base 100mm and vertical angle 65^{o})
- Construct a triangle given the perimeter and the ratio of the sides
- Construct a triangle similar to another triangle but with a different perimeter

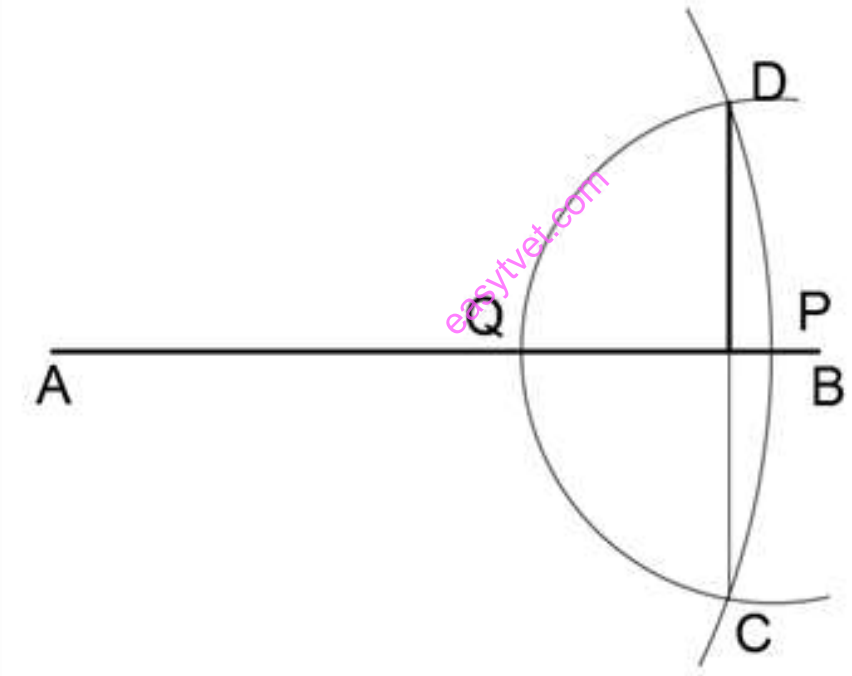
Trainer

- Check that the completed assignments show evidence of understating a variety of plane geometries, drawing rules and housekeeping procedures. Ensure assignments are completed on time. Observe trainees' work from time to time.

5.3.3.3 Self-Assessment

1. While drawing a perpendicular to a line from a point within the line but nearer to the end of the line, all the arcs drawn in the process are of _____
   a) Different radii
   b) Different radii but one
   c) Same radii but one
   d) Same radii

2. In the given figure which of the following construction line is drawn first?

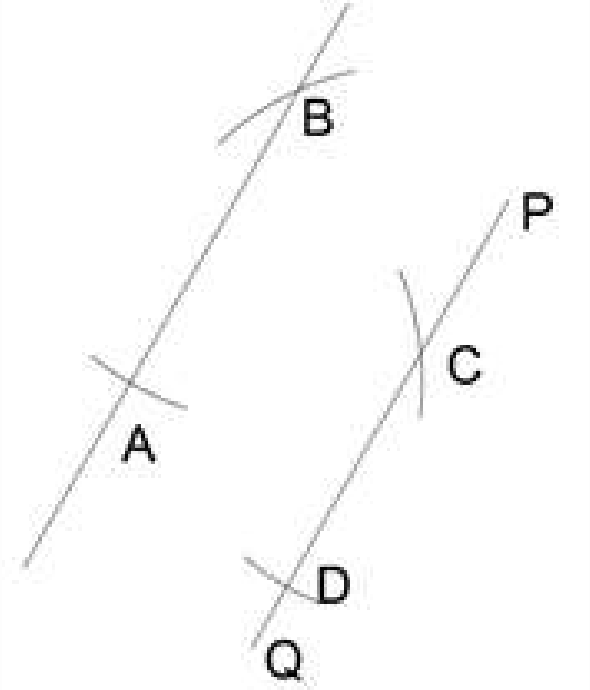


easytvet.com

   a) Line AP
   b) Arc DPC
   c) Arc DQC
   d) Line DC

3. For drawing parallel lines to a given line through a given point we make use of ____
   a) Arcs
   b) Triangles
   c) Lines
   d) Quadrilaterals

4. Which of the following arcs is made first to draw a parallel line to the given line PQ?



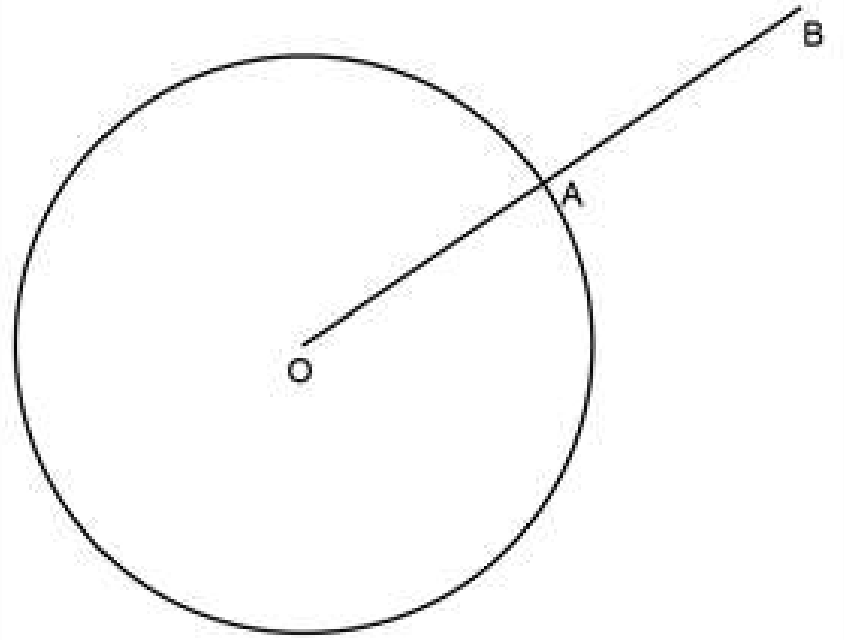
a) A
b) B
c) C
d) D

easytvet.com

5. A tangent to a circle is a line which touches the circle at one and only one point.
a) True
b) False

6. The line perpendicular to a tangent and is passing through the point of contact is called as _____
a) Perpendicular bisector
b) Angle bisector
c) Normal
d) Tangent

7. In the following figure, the tangent at point A can be drawn by _____

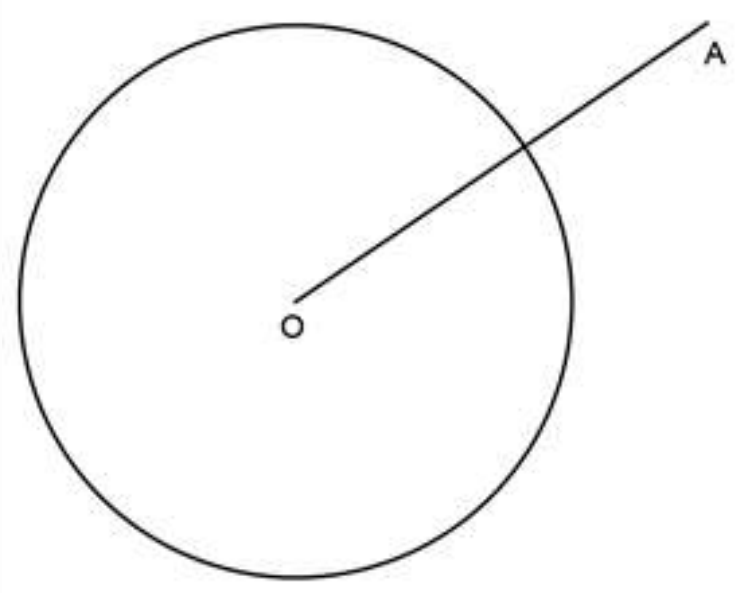


a) Angle bisector
b) Perpendicular bisector
c) Rectangle
d) Arc

easytvet.com

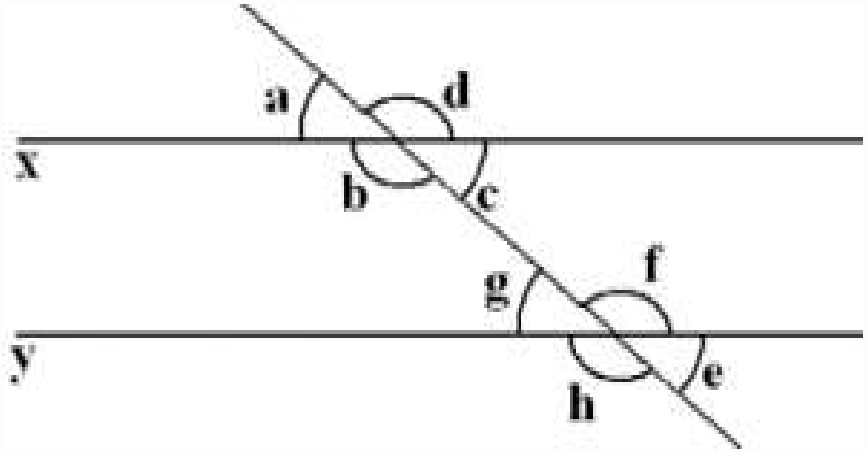
8. How many tangents can be drawn from a point outside a given circle?
a) 4
b) 3
c) 2
d) 1

9. In the following figure, how will make a tangent from the point outside the circle?



a) By drawing a semicircle with diameter as OA
b) By drawing a perpendicular bisector
c) By drawing an angle bisector
d) By drawing circle with the same radius from A

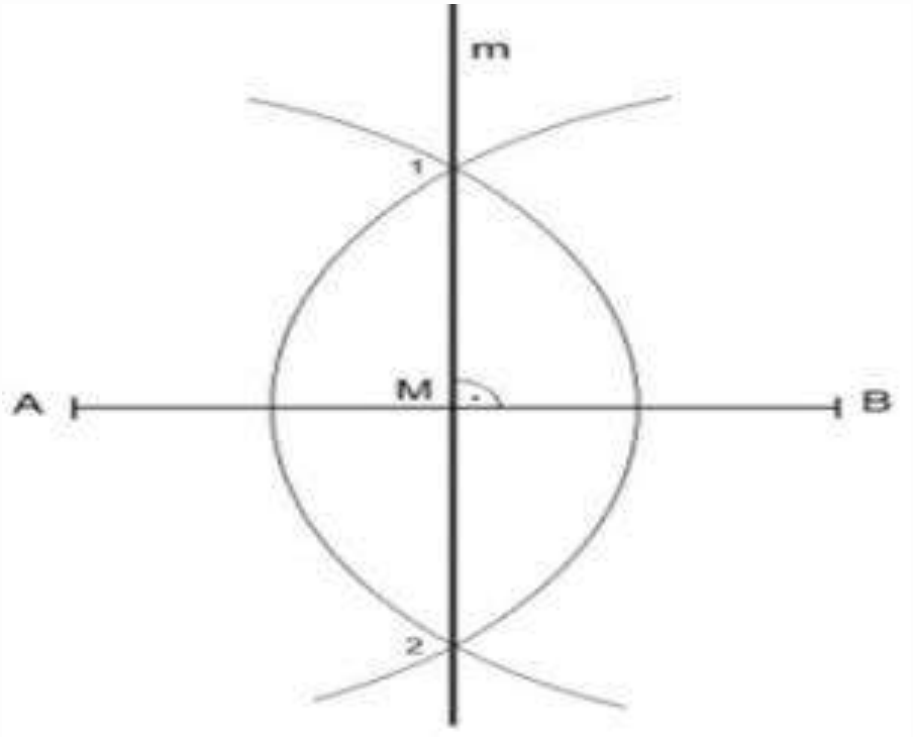
10. Which geometric principle is used to justify the construction below?



11.
a) A line perpendicular to one of two parallel lines is perpendicular to the other
b) Two lines are perpendicular if they intersect to form congruent adjacent angles
c) When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel
d) When two lines are intersected by a transversal and the corresponding angles are congruent, the lines are parallel

easytvet.com

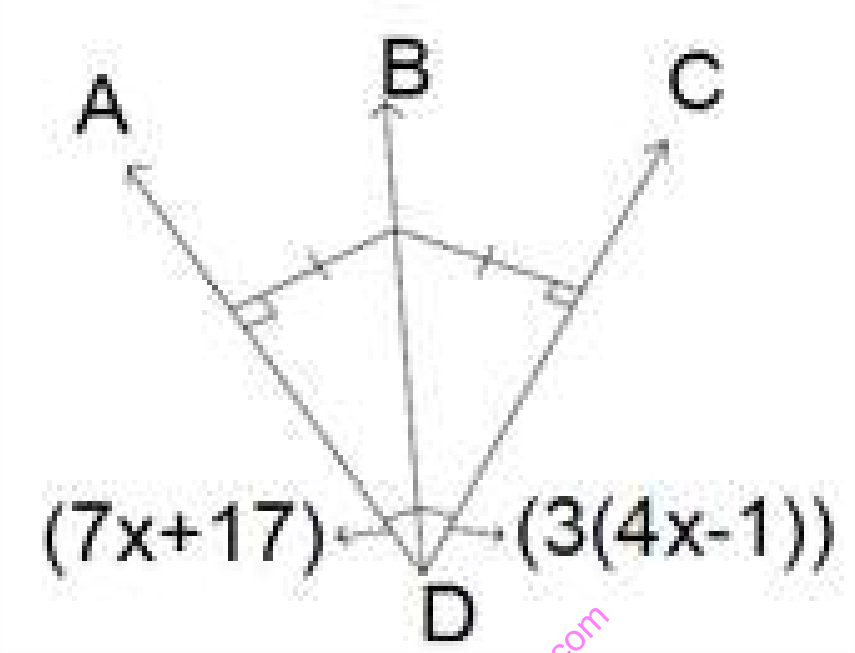
12. The diagram below shows the construction of the perpendicular bisector of AB.



Which statement is not true?
a) AM=MB

b) MB=1/2AB
c) AM=2AB
d) AM+MB=AB

13. Find angle BDC shown in the figure below.



a) 30
b) 65
c) 60
d) 45

easytvet.com

15. Construct an isosceles triangle given the perimeter and the altitude (perimeter 150mmand altitude 70mm).
16. Construct a rhombus given the diagonal and the length of the sides
17. Construct a trapezium given the lengths of the parallel sides, the perpendicular distance between them and one angle
18. Construct a regular octagon given the diameter, i.e. within a given square

5.3.3.4 Tools, Equipment, Supplies and Materials for the specific learning outcome

- Drawing room
- Computer lab
- Drawing equipment and materials
- CAD packages
- Projector
- Computer

5.3.3.5 References

Heather, S and Shrock, C.R (2019) Begging AUTOCAD Exercise Workbook. Industrial Press, Inc USA

Davies, B. L., Robotham, A. J., & Yarwood, A. (1991). Computer-aided drawing and design. London: Chapman & Hall.

Hubka, V. (2015). Principles of engineering design. Elsevier.

Zammit S.J (1987), Motor vehicle engineering science for technicians, Longman Group UK Ltd, London

Morling, K 92012) Geomtric and Engineering Drawing. Routledge, amozon

easytvet.com

5.3.4 Learning Outcome No. 3: Produce solid geometry drawings

5.3.4.1 Learning Activities

Learning Outcome #4: Produce solid geometry drawings	
Learning Activities	Special Instruction
• Construct two dissimilar square prisms meeting at right angles. • Construct two dissimilar hexagonal prisms meeting at an angle. • Construct two dissimilar hexagonal prisms meeting at an angle. • Construct two dissimilar hexagonal prisms meeting at an angle.	

5.3.4.2 Information Sheet #3: Produce solid geometry drawings

Introduction

In this outcome, these areas are covered interpretation of sketches and drawings of patterns, surface development of interpenetrating solids ad truncated solids, and interpenetration of solids.

easytvet.com

Content

Solid geometry: interpretation of sketches and drawings, surface development of prisms, cylinders, truncated prisms, cones, and pyramids. Development of surfaces of interpenetration cylinders and truncated solids, and interpenetration of cylinder to cylinder and cylinder to prism or prism to prism of equal and unequal diameters

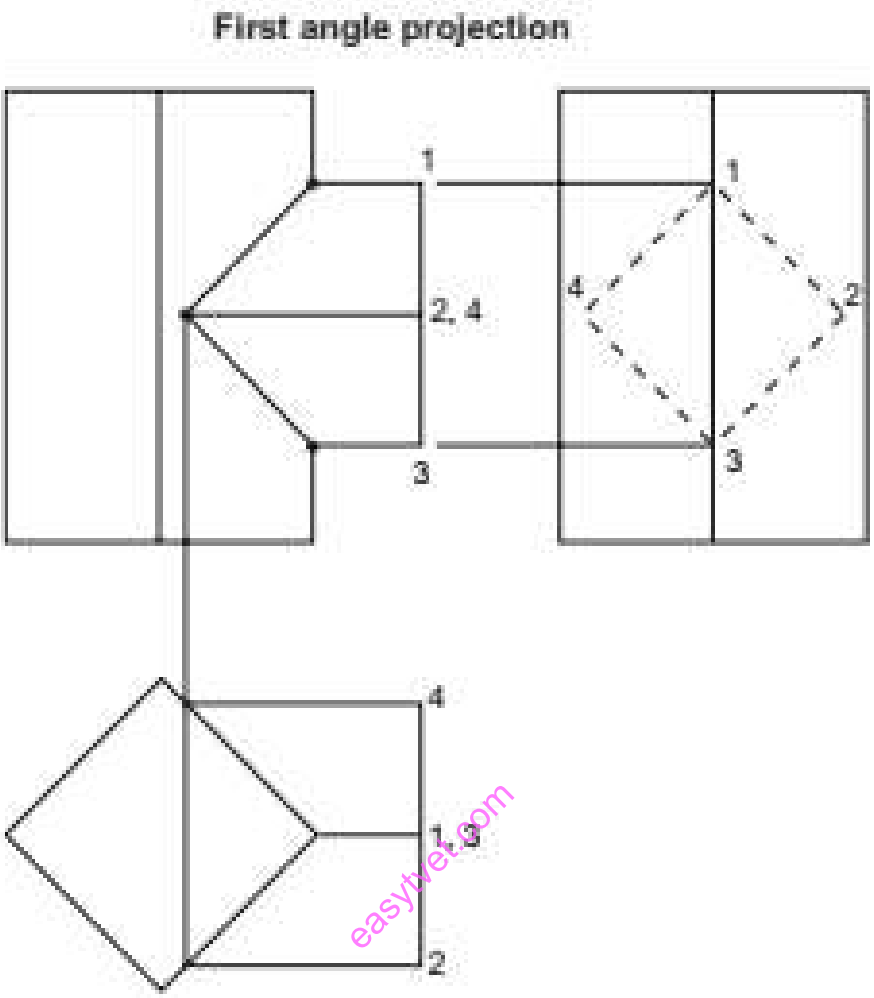


Figure 49: First angle Projection Source: Morling, (2012)

easytvet.com

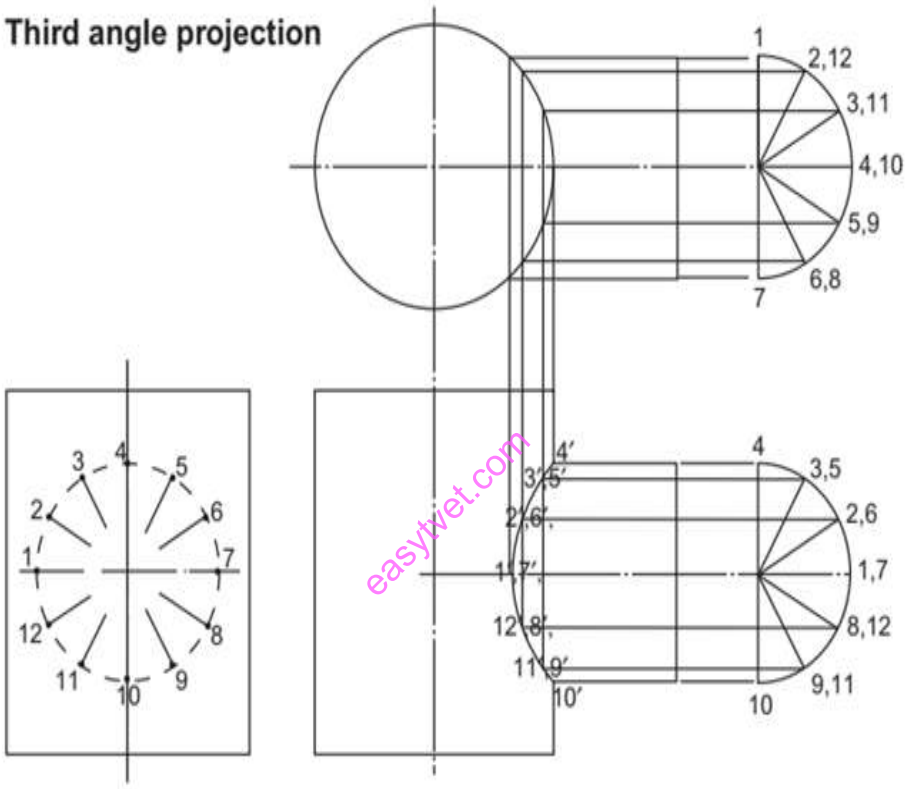


Figure 50: Third and first angle Projection

Watch the video\;htt9UMxr7BT8CEps://www.youtube.com/watch?v=

Conclusion

This outcome covered interpretation of sketches and drawings, surface development of solids, and interpenetration of surfaces.

Trainees' assignment;

- Construct an equilateral triangle, given one of the sides, AB = 100.
- Construct Two dissimilar square prisms meeting at an angle
- Construct a hexagonal prism meeting a square prism at right angles
- Construct a square prism meeting a square pyramid at right angles
- Construct a cylinder meeting a square pyramid at an angle

Trainer

- Check that the completed assignments show evidence of understating a variety of solid geometries, drawing rules and housekeeping procedures. Ensure assignments are completed on time. Observe trainees' work from time to time.

Recommended sources for further information;
Geometric and Engineering drawing Third Edition K Morling.

5.3.4.3 Self-assessment

1. A cylinder is placed on H.P on its base and section plane is parallel to V.P cutting the solid the section gives _____
   a) parabola
   b) circle
   c) rectangle
   d) ellipse

2. A cylinder is placed on H.P on its base and section plane is parallel to H.P cutting the solid the section gives _____
   a) parabola
   b) circle
   c) rectangle
   d) ellipse

easytvet.com

3. A cylinder is placed on H.P on its base and section plane is inclined to V.P and perpendicular to H.P cutting the solid the section gives _____
   a) parabola
   b) circle
   c) rectangle
   d) ellipse

4. If a plane is inclined with both the reference plane then the plane come under _____
   a) auxiliary plane
   b) oblique plane
   c) perpendicular plane
   d) cross planes

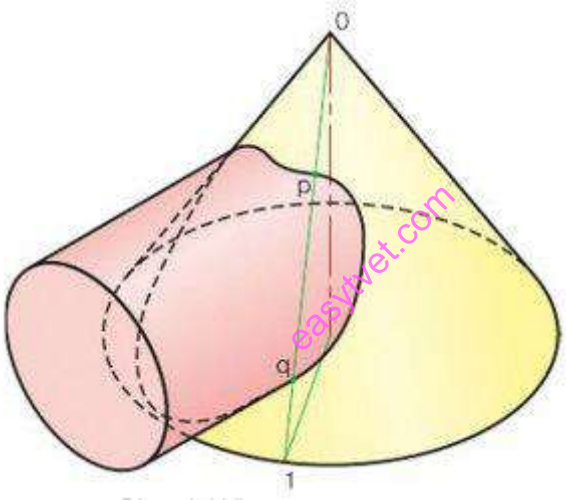
5. If a plane is inclined to both the reference planes then the traces would meet at _____ line except the plane perpendicular to picture plane.
   a) XY reference
   b) Vertical reference
   c) Above the XY reference plane

d) Below the XY reference plane

6. When a surface of the plane is inclined to the H.P and an edge is parallel to the H.P and inclined to V.P. The projections are drawn in 2 stages.
a) True
b) False

7. Draw a radial element (0, 1) in one of the orthographic views. Find the points on the line of interpenetration (ie, p & q) and project them to the other views.

8. Repeat with more radial elements until you have enough points to draw the lines of interpenetration



easytvet.com

Figure 51: Cylinder intersecting a cone

9. Given pyramid is cut by plane, ⊥ to the frontal plane and inclined at 70o to the top plane. The cutting plane cuts the axis of the pyramid at 15mm from the apex. Draw the projections of the remaining part of the pyramid and the true shape of the cut section

5.3.4.4 Tools, Equipment, Supplies and Materials for the specific learning outcome

- Drawing room
- Computer lab
- Drawing equipment and materials
- CAD packages
- Projector
- Computer

5.3.4.5 References

Heather, S and Shrock, C.R (2019) Begging AUTOCAD Exercise Workbook. Industrial Press, Inc USA

Davies, B. L., Robotham, A. J., & Yarwood, A. (1991). Computer-aided drawing and design. London: Chapman & Hall.

Hubka, V. (2015). Principles of engineering design. Elsevier.

Zammit S.J (1987), Motor vehicle engineering science for technicians, Longman

Group UK Ltd, London

Morling, K 92012) Geomtric and Engineering Drawing. Routledge, amozon

easytvet.com

5.3.5. Learning Outcome No 4: Produce pictorial and orthographic drawings of components

5.3.5.1. Learning Activities

- Produce orthographic views in first angle and third angle elevations.
- Isometric Projection (Isometric Drawing).
- Produce Circles and Curves Drawn in Isometric Projection.
- Produce components in oblique projection.

Learning Outcome #4: Produce pictorial and orthographic drawings of components	
Learning Activities • Produce orthographic views in first angle and third angle elevations	Special Instructions
• Produce isometric projection (isometric) drawing of the above components.	
• Produce Circles and Curves Drawn in Isometric Projection	
• Produce the above component in oblique projection.	

easytvet.com

5.3.5.2 Information Sheet #4: Produce pictorial and orthographic drawings of components

Introduction

This outcome covers meaning of pictorial and orthographic drawings and sectioning, symbols and abbreviations, drawing of isometric, oblique, axonometric, auxiliary and perspective views, drawing of first and third angle projections, sectioning of components, and free hand sketching of tools, equipment, components, geometric forms and diagrams.

Definition of key terms

- Orthographic projection
- Oblique projection

Recommended resources

Engineering Drawing with CAD Applications by O.OSTROWSKY

Geometric and Engineering drawing Third Edition K Morling

Zammit S.J (1987), Motor vehicle engineering science for technicians, Longman Group UK Ltd, London

Solid geometry principles

All views presented in a solid geometry are assumed to be from the same object, and only the particular object but from different points of view and that all views are at the same scale. All the visible edge are depicted by a line and assumptions are made that those edge progress away from the viewer to form faces that are flat abd at right angles. The true angle between a line and a plane is seen in a view showing the line as a true length and the plane as an edge. All horizontal sections of an upright or inverted right cone are circles. A sphere appears as a circle in every view. A sphere and cone in contact will have a common tangent plane. When two spheres touch one another: the point of contact lies on the line joining the two centres, the distance between their centres is equal to the sum of the radii, and the point of contact can be located in any view, by dividing the line in the ratio of the radii. The vertical trace of a plane is the line in which the plane meets the vertical lane. The horizontal trace of a plane is the line in which the plane meets the horizontal plane.

easytvet.com

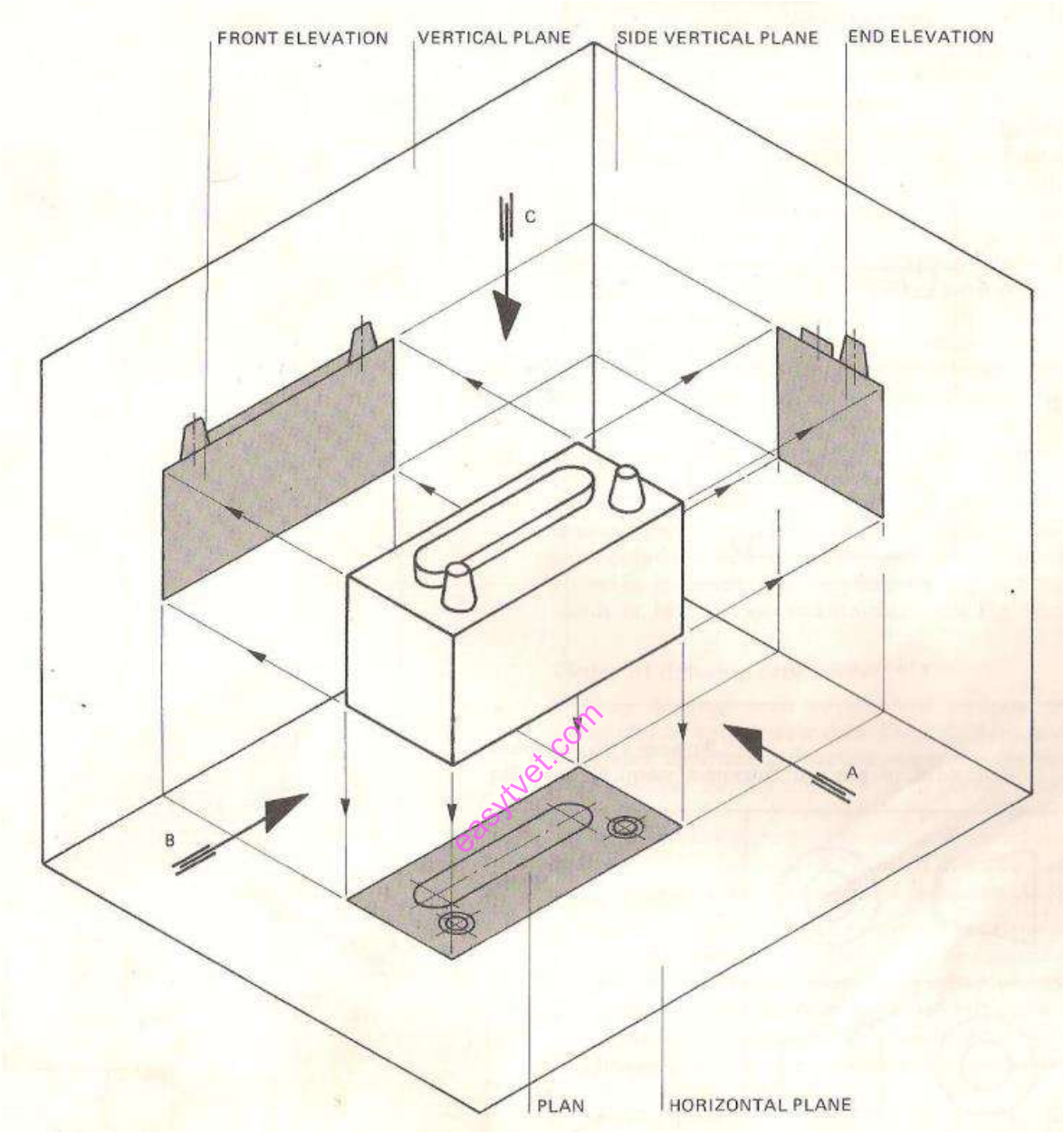
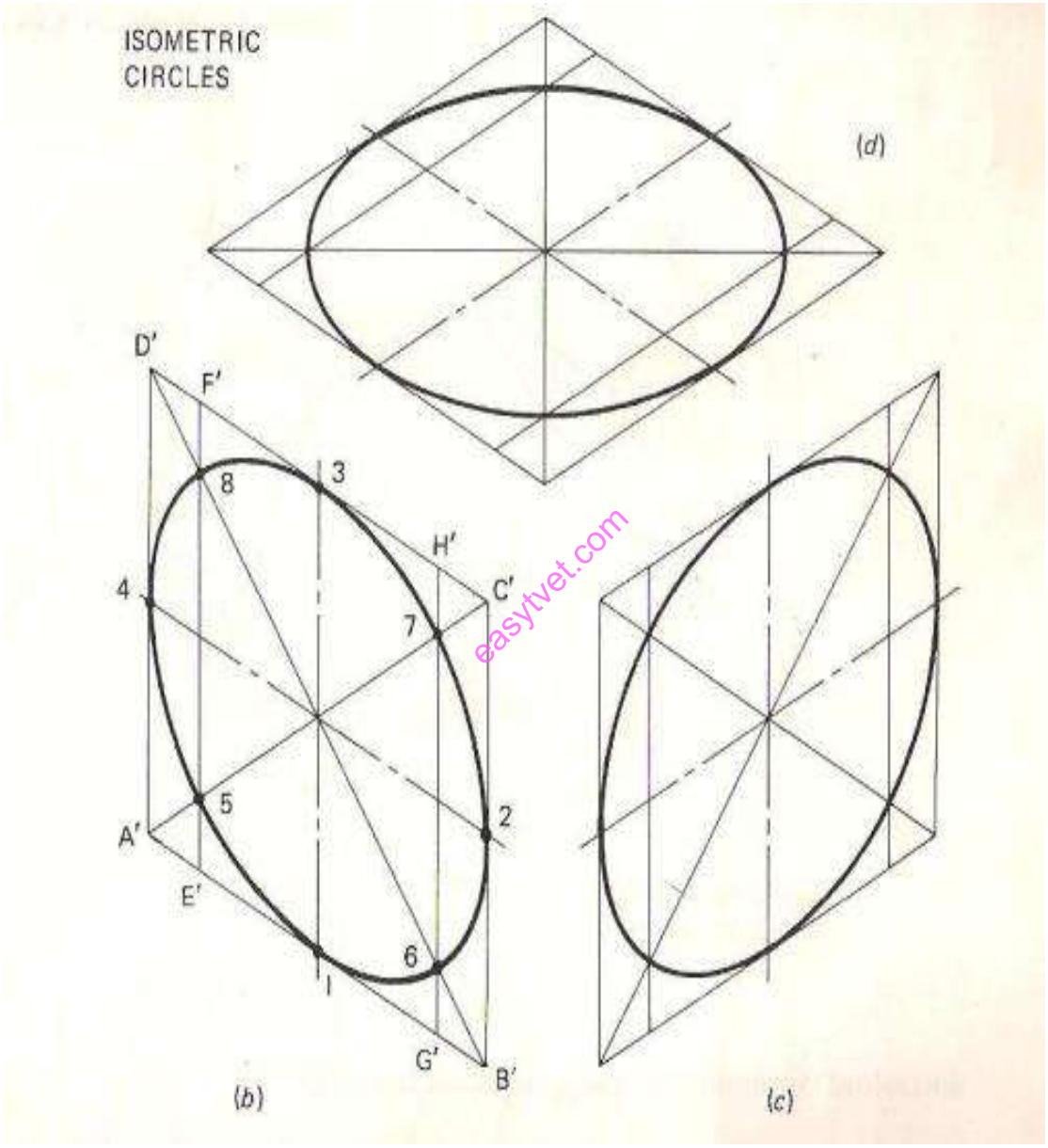


Figure 52: Isometric drawing

Content

Solid geometry: orthographic drawings, oblique projections, pictorial projections, axonometric, auxiliary and perspective views, drawing of first and third angle projections, sectioning of components, and free hand sketching of tools, equipment, components, geometric forms and diagrams.



easytvet.com

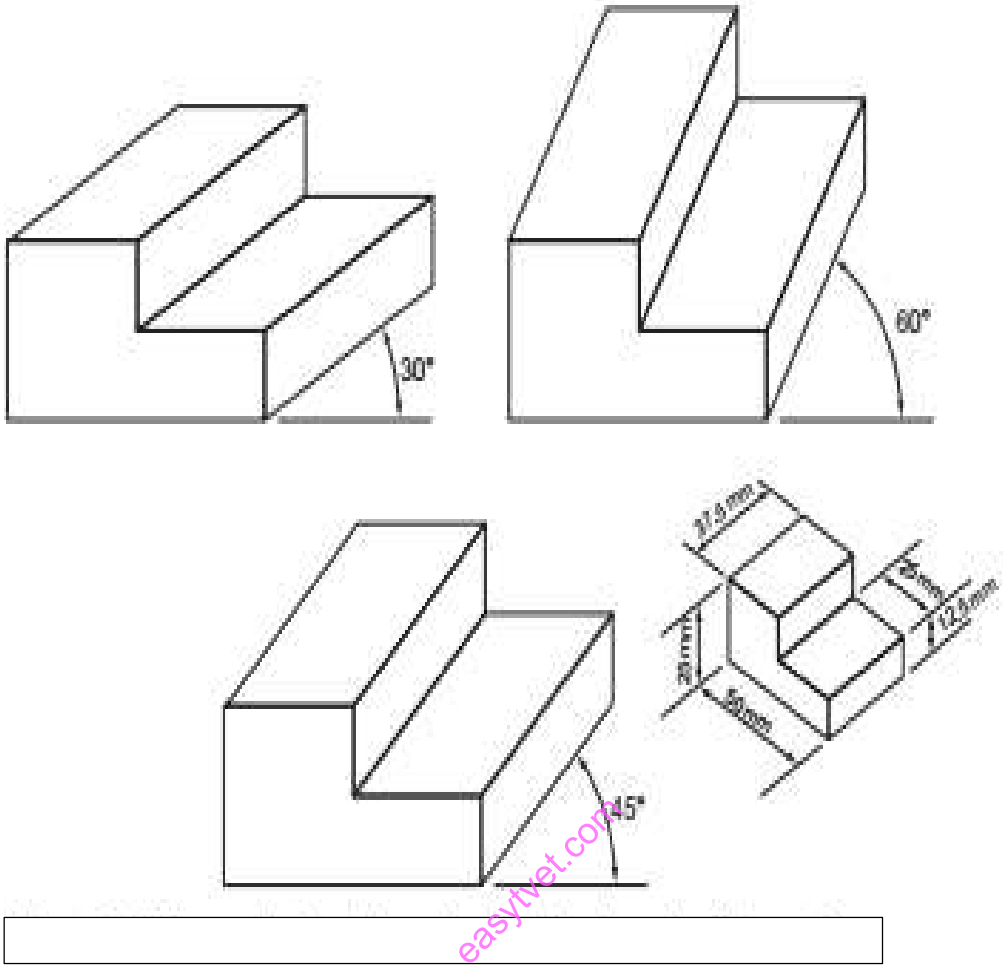
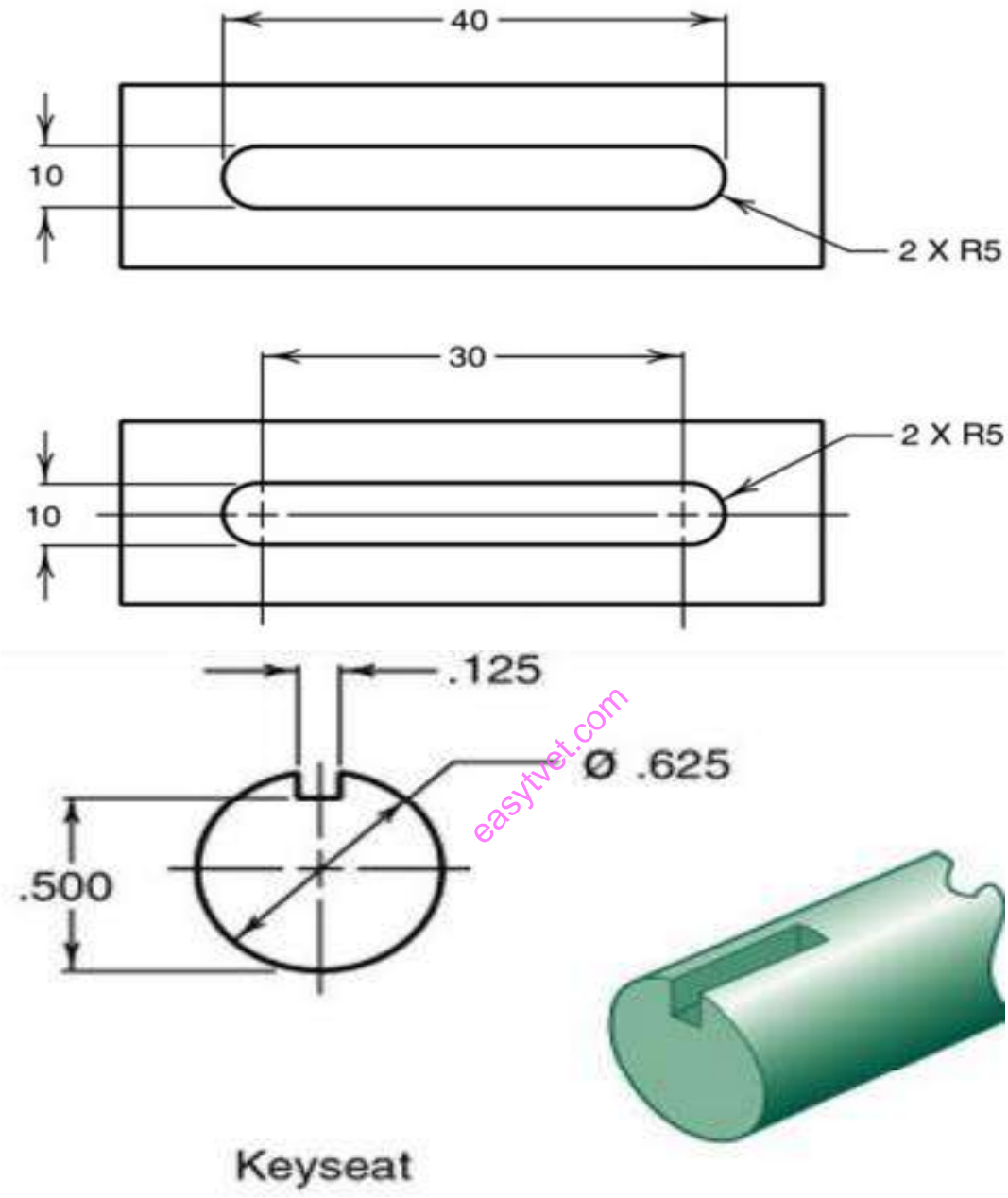


Figure 54: Oblique Projection

Illustrations on dimensioning



easytvet.com

Figure 55: Technical drawing key seat Slots Keyway

Conclusion

This outcome covered orthographic views, pictorial drawing, oblique drawings, sectioning, axonometric, auxiliary first, and third angle projections, and free hand sketching.

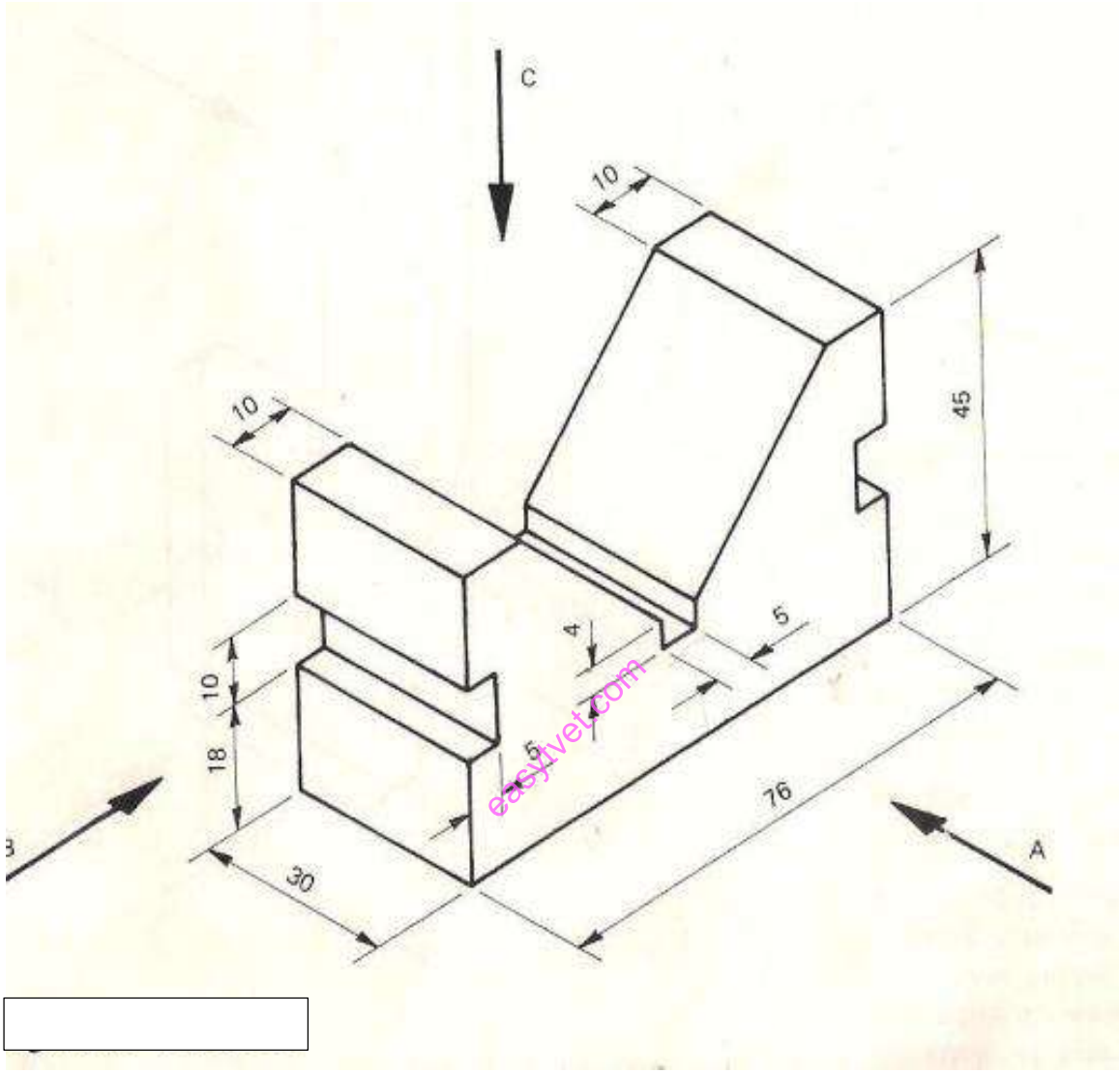


Figure 56: Vee Block, (source, Morling, 2012)

Trainees' assignment;

Draw the following views of the stub below in first angle projection.

a) Front elevation looking from the direction arrow A
b) End elevation looking from the direction arrow B
c) A plan

Show all the hidden detail and fully dimension the finished drawing

The casting is symmetrical about the vertical centre line and both lugs are identical
Construct Two dissimilar square prisms meeting at an angle

Draw twice full size of the front elevation looking in the direction of arrow A. from this front elevation, project an end elevation and plan looking in the direction of the arrows B and C respectively. Insert five main dimensions and add the title block and the scale.

Trainer
- Check that the completed assignments show evidence of understating a variety of solid geometries, drawing rules and housekeeping procedures. Ensure assignments are completed on time. Observe trainees' work from time to time.

easytvet.com

Recommended sources for further information;
Geometric and Engineering drawing Third Edition K Morling.
Engineering Drawing with CAD Applications by O.OSTROWSKY

2.3.5.3 Self-Assessment

1. Orthographic projection is drawn using two methods which is _____
a) Second angle and third angle method
b) First angle and third angle method
c) First angle and fourth angle method
d) Second angle and fourth angle method

2. The method in which the object is placed in the first quadrant is known as _____ method.
a) third angle
b) second angle
c) first angle
d) fourth angle

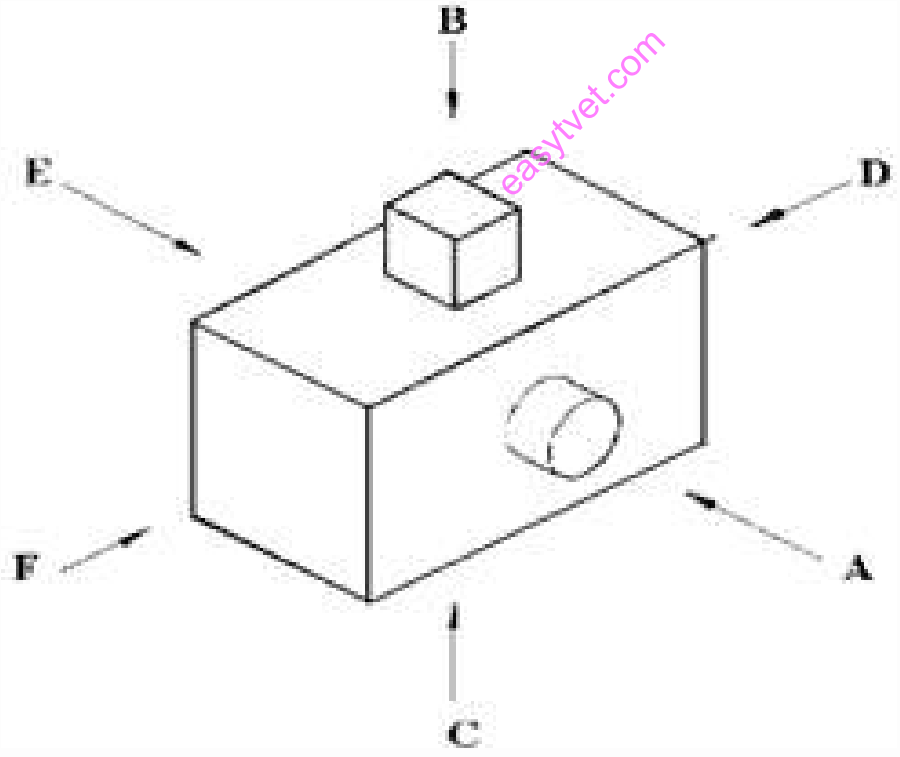
3. In first angle method the top view is drawn _____ of the front view.
a) above
b) right Side

c) left side
d) bottom

4. The method in which the object is placed in the third quadrant is known as _____ method.
a) third angle
b) second angle
c) first angle
d) fourth angle

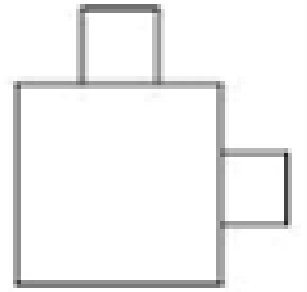
5. In third angle method the top view is drawn _____ of the front view.
a) above
b) right Side
c) left side
d) bottom

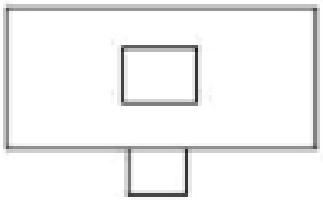
6. **Question 6 to 11 is for the diagram drawn below:-**

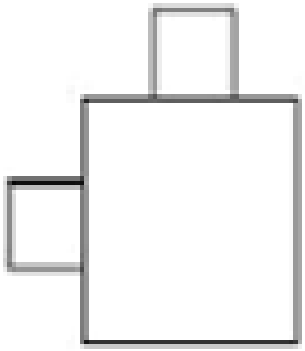


easytvet.com

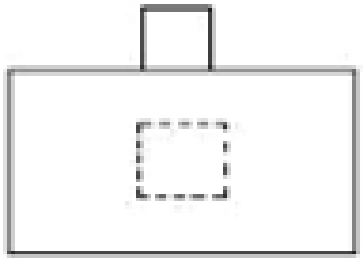
7. Taking ‘A’ as the FRONT VIEW. Which view will letter ‘D’ represent?

a) 

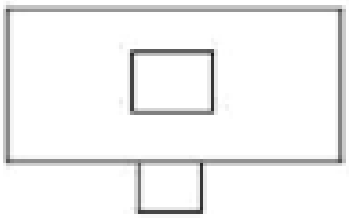
b) 

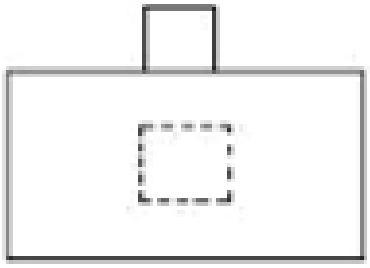
c) 

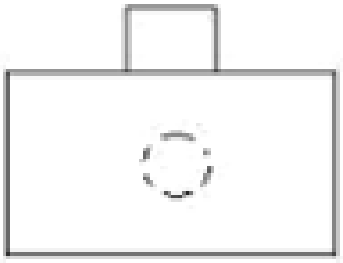
easytvet.com

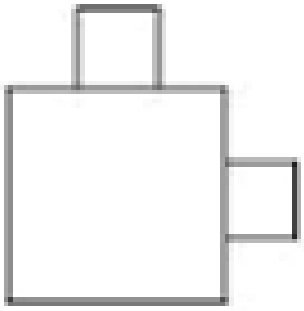
d) 

8. Which view will letter ‘C’ represent?

a) 

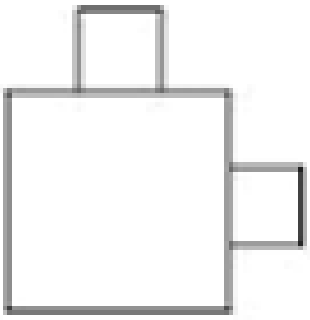
b) 

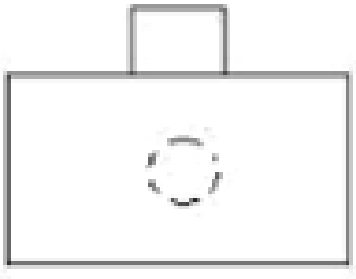
c) 

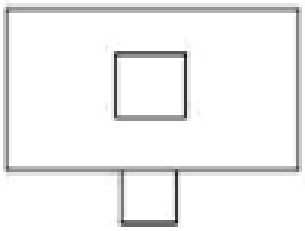
d) 

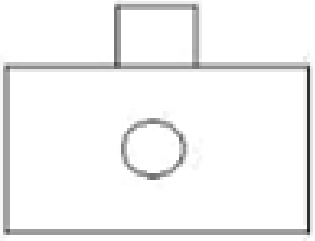
easytvet.com

9. Which view will letter ‘E’ represent?

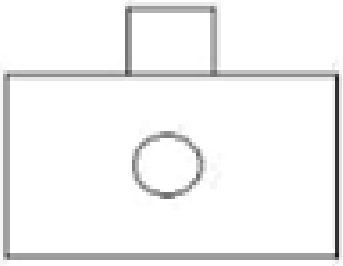
a) 

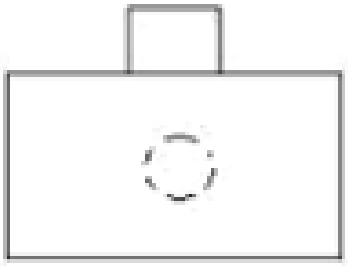
b) 

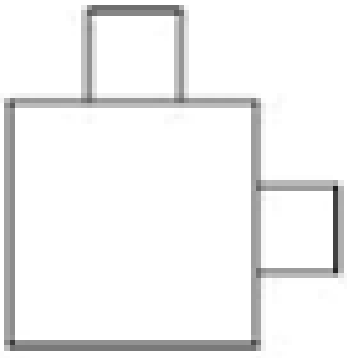
c) 

d) 

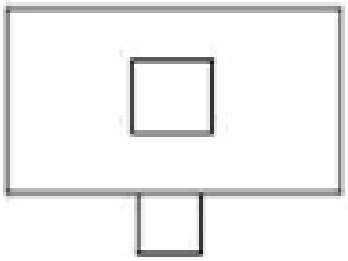
10. Which view will letter ‘B’ represent?

a) 

b) 

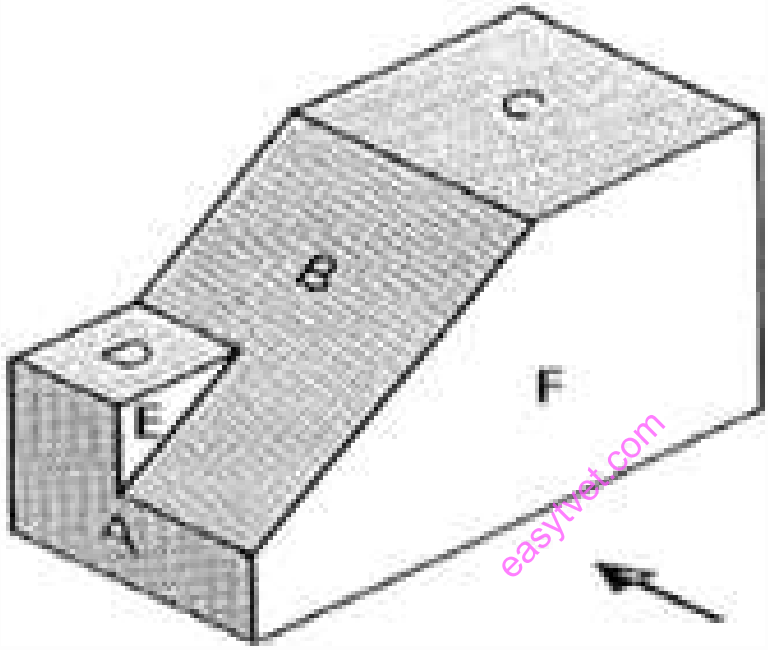
c) 

easytvet.com



d)

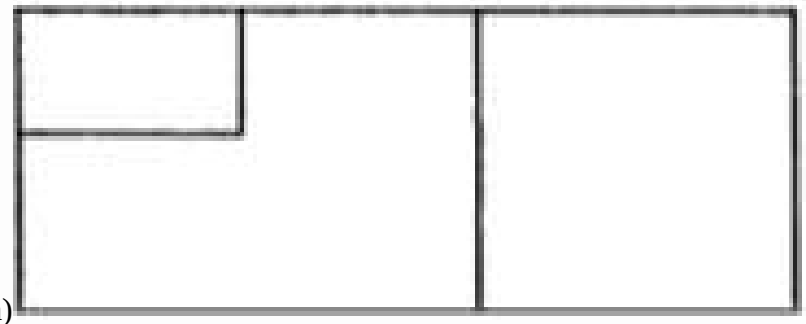
11. **Questions 12 and 13 are for the diagram drawn below:-**



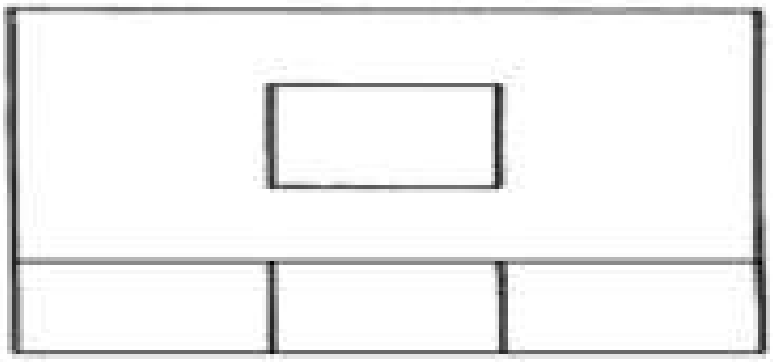
easytvet.com

12. 'A', 'B' view will be represented by which figure?

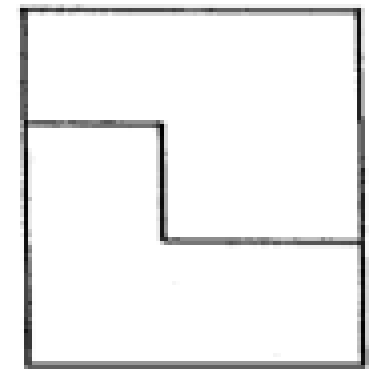
a)



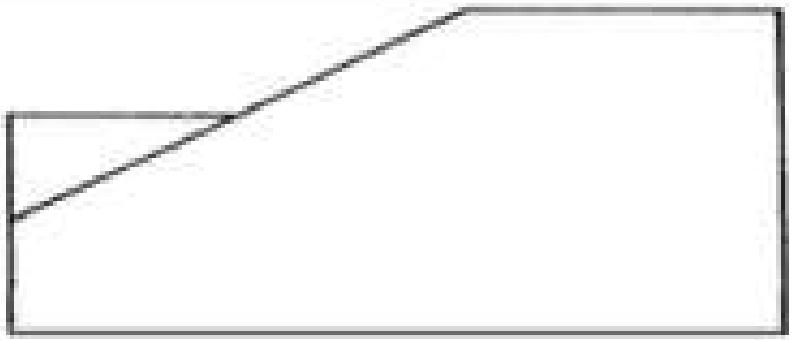
b)



c)



d)

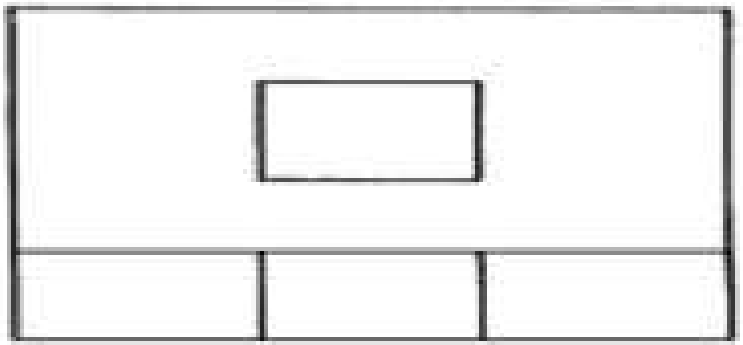


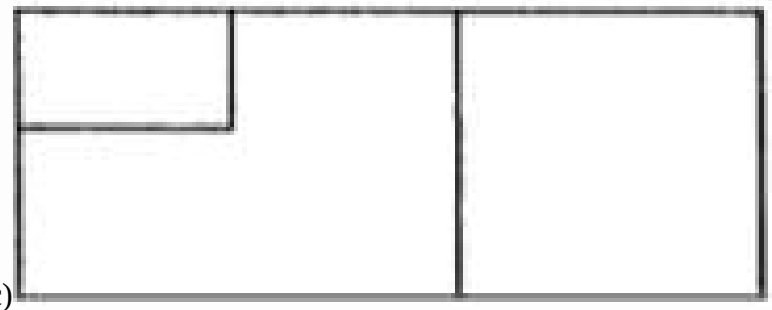
13. ’F’, ‘E’ view will be represented by which figure

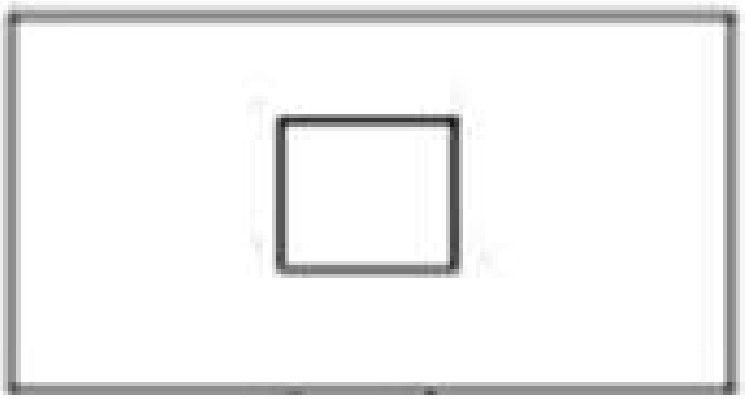
easytvet.com

a)

b)



c) 

d) 

14. Any object can be viewed from_____ mutually perpendicular views.

a) Two
b) Four
c) Three
d) Six

easytvet.com

2.3.2.4 Tools, Equipment, Supplies and Materials for the specific learning outcome

- Drawing room
- Computer lab
- Drawing equipment and materials
- CAD packages
- Projector
- Computer

2.3.4.5 References

Heather, S and Shrock, C.R (2019) Begging AUTOCAD Exercise Workbook. Industrial Press, Inc USA

Davies, B. L., Robotham, A. J., & Yarwood, A. (1991). Computer-aided drawing and design. London: Chapman & Hall.

Hubka, V. (2015). Principles of engineering design. Elsevier.

Zammit S.J (1987), Motor vehicle engineering science for technicians, Longman Group UK Ltd, London

Morling, K 92012) Geomtric and Engineering Drawing. Routledge, amozon

easytvet.com

5.3.6. Learning Outcome No. 5: Apply CAD packages in drawing

5.3.6.1 Learning Activities

Learning Outcome #5: Apply CAD packages in drawing	
Learning Activities	Special Instructions
• Draw a drawing the views of the various figures using CAD application and save on the desktop. • Draw a variety of figures using CAD applications • Draw 2 dimensional objects of the given views. • Draw 2 dimensional objects of the given views.	Make sure your computers have CAD packages. understand

easyvet.com

5.3.6.2 Information Sheet #5: Apply CAD packages in drawing

Introduction

This outcome covers use of CAD applications to draw pictorial and orthographic drawings and sectioning, symbols and abbreviations, drawing of isometric, oblique, axonometric, auxiliary and perspective views, drawing of first and third angle projections, sectioning of components.

Definition of key terms

- 2D and 3Ddrafting technique
- Computer aided design

Content

Solid geometry: application of CAD technology in orthographic drawings, oblique projections, pictorial projections, axonometric, auxiliary and perspective views, drawing of first and third angle projections, and sectioning of components.

Illustrations on dimensioning

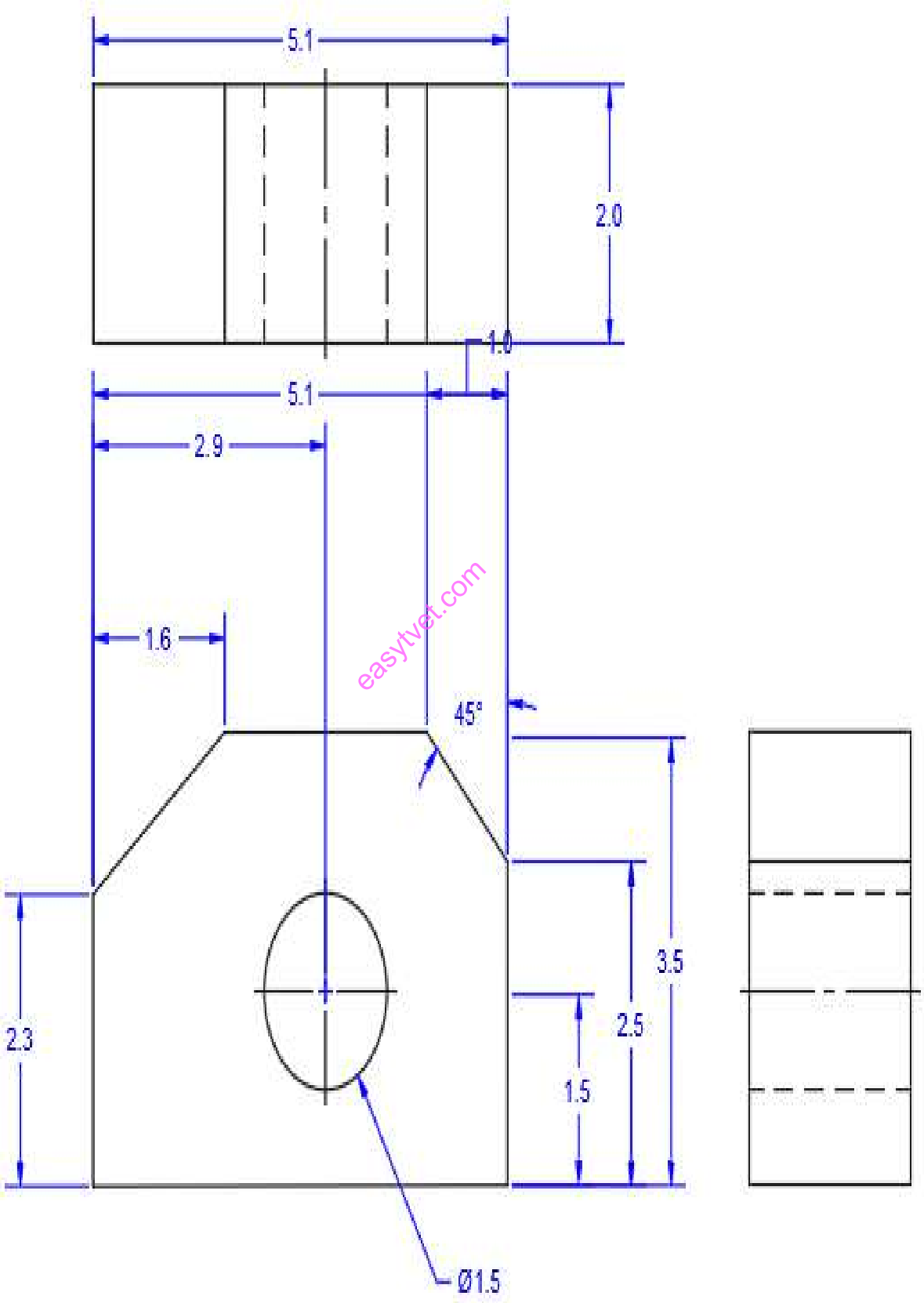


Figure 57: Dimensioning

Conclusion

This outcome covered application of CAD in orthographic views, pictorial drawing, oblique drawings, sectioning, and axonometric, auxiliary first, and third angle projections.

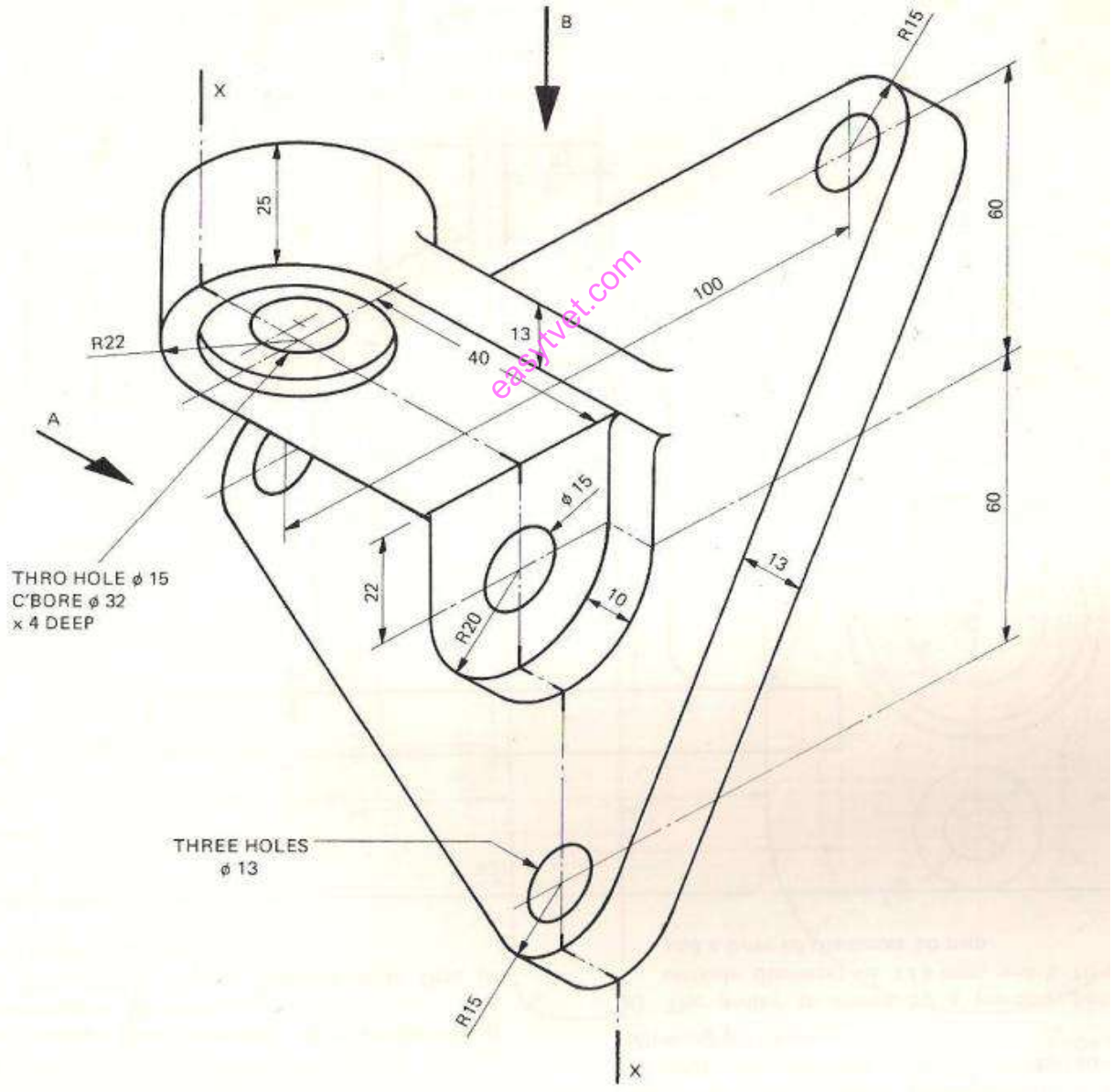
Trainees' assignment;

i. Use CAD application to draw the following views of the figure below in first angle projection.

a) Front elevation looking from the direction arrow A

b) End elevation looking from the direction arrow B

c) A plan



easytvet.com

Trainer

Check that the completed assignments show evidence of understating a variety of solid geometries, use of CAD technology, safe use of computers and housekeeping procedures. Ensure assignments are completed on time. Observe trainees' work from time to time.

5.3.6.3. Self-Assessment

1. The computer-aided design (CAD) hardware doesn't include.
   a) Graphic display terminals
   b) Computer
   c) Computer programmes
   d) Keyboard

2. How many types of CAD are there?
   a) 6
   b) 4
   c) 2
   d) 5

3. Modem CAD systems are based on:
   a) ICG
   b) GCI
   c) GIF
   d) IFG

easytvet.com

4. The computer communicates with the user via:
   a) CPU
   b) CRT
   c) Graphics
   d) Display button

5. The process of designing consists of _____ identifiable steps.
   a) 8
   b) 5
   c) 4
   d) 6

6. Implementing CAD improves communications.
   a) True
   b) False

7. The functionality areas of CAD application can be grouped into _____ categories.
   a) 2
   b) 3
   c) 4
   d) 5

8. The colour on CRT screen is obtained by the combination of:
   a) Red, yellow, blue
   b) Red, green, blue
   c) Green, black, yellow
   d) Red, black, yellow

9. The input devices in CAD can be divided into:
   a) 2
   b) 5
   c) 3
   d) 4

10. An orthographic projection map is a map projection of _____
   a) Sphere
   b) Earth
   c) Cartography
   d) Top view

easytvet.com

5.3.6.4. Tools, Equipment, Supplies and Materials for the specific learning outcome

- Drawing room
- Computer lab
- Drawing equipment and materials
- CAD packages
- Projector
- Computer

5.3.6.5. References

Davies, B. L., Robotham, A. J., & Yarwood, A. (1991). Computer-aided drawing and design. London: Chapman & Hall.

Hubka, V. (2015). Principles of engineering design. Elsevier.

Zammit S.J (1987), Motor vehicle engineering science for technicians, Longman Group UK Ltd, London

Morling, K 92012) Geomtric and Engineering Drawing. Routledge, amozon