	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	**Department: SCIENCE 2026 – 27** **SUBJECT: ENGINEERING GRAPHICS**	**Date: 06/04/2026**
Worksheet No: 1 **WITH ANSWERS**	**UNIT 1: ISOMETRIC PROJECTION**	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS & SEC: XII B**	**ROLL NO.**

MULTIPLE CHOICE QUESTIONS

1. When drawing an isometric projection, at what angles are the three principal axes positioned relative to the horizontal baseline?

a) 120°, 120°, and 120°
b) 45°, 90°, and 45°
c) 30°, 90°, and 30°
d) 0°, 90°, and 180°

2. In which type of axonometric projection are the two angles between the three principal axes equal and over 90°?

a) Isometric projection

b) Diametric projection

c) Trimetric projection

d) Perspective projection

3. How are non-isometric lines located and drawn? (CBSE BOARD PAPER – 2026)

a) They are drawn parallel to the isometric axis

b) They are measured using the angle from the orthographic/ helping view

c) They are located by determining their endpoints

d) They are measured directly using the given angle

4. An isometric projection of a square is drawn as (CBSE SAMPLE PAPER -2025)

a) a square having foreshortened length

b) a square having true length

c) a rhombus of true length

d) a rhombus of foreshortened length

5. What is isometric projection primarily used for? (CBSE BOARD PAPER – 2025)

a) Representing two-dimensional objects

b) Representing three-dimensional objects

c) Creating abstract art

d) Creating animations

6. Which industry commonly utilizes isometric projection? (CBSE BOARD PAPER – 2024)

a) Fashion

b) Agriculture

c) Engineering and design

d) Healthcare

7. Why is isometric projection valuable in architectural design? (CBSE SAMPLE PAPER – 2024)

a) It simplifies and helps in better visualization of complex parts of the project

b) It provides two-dimensional multiple views

c) It maintains accurate measurements of all dimensions

d) It helps in cutting the cost by reducing the size

8. Isometric projection is a type of ----------. (CBSE BOARD PAPER – 2026)

a) Axonometric projection

b) Perspective projection

c) Orthographic projection

d) Oblique projection

9. Identify the projection where all three angles between the principal axes are unequal.

a) Isometric projection

b) Diametric projection

c) Trimetric projection

d) Orthographic projection

10. _____is the projection used in engineering practices. (CBSE BOARD PAPER - 2022)

a) Isometric projection

b) Oblique projection

c) Perspective projection

d) Inclined projection

11._____projection gives the true size of the object. (CBSE Sample Paper -2023)

a) Isometric

b) Orthographic

c) Oblique

d) Perspective

12. The isometric projection of a sphere of radius ‘R’ is drawn using a radius equal to: (CBSE BOARD PAPER -2026)

a) Isometric R

b) 0.5 R

c) 2R

d) True R

13. The isometric length of 70 mm is _____.

a) Equal to true 70 mm

b) Less than true 70 mm

c) More than true 70 mm

d) Equal to true 100 mm

14. Which is the correct sequence in case of the first-angle method of projection? (CBSE SAMPLE PAPER -2023)

a) Observer, Plane of projection, Object

b) Observer, Object, Plane of projection

c) Object, Plane of projection, Observer

d) Object, Observer, Plane of projection

15. The angle difference between the true scale and the isometric scale is -------

a) 30 degree

b) 15 degree

c) 45 degree

d) 10 degree

16. Name the type of line that is used for dimensioning.

a) Small dashed line

b) Chain line

c) Wavy line

d) Thin continuous line

17. In isometric projection, all three principal axes are inclined at an angle of -------

a)120 degree

b) 45 degree

c) 30 degree

d) 60 degree

18. The isometric projection of a sphere is --------

a) Ellipse

b) circle

c) Sphere

d) None of the above

19. The isometric length is measured in an isometric scale at an angle of ----------

a) 90 degree

b)45 degree

c) 30 degree

d) 20 degree

20. The true length is measured in an isometric scale at an angle of ----------

a) 15 degree

b) 90 degree

c) 45 degree

d) 30 degree

21. The isometric projection of a circle is --------

a) circle

b) Sphere

c)Ellipse

d) None of the above

22. The isometric view is the drawing with -----

a) Reduced scale

b) Actual scale

c) Vernier scale

d) Isometric scale

23. Isometric projection is smaller than actual drawings up to the value --------

a) 82 %

b)90 %

c)75%

d)None of the above

24. _____ resembles an inverted solid. (CBSE SAMPLE PAPER -2021)

a) A cone filled with ice cream

b) A glass prism

c) Pyramid of Giza

d) A cylindrical glass tumbler

25. Select the correct sequence of drawing- the isometric projection of a square pyramid resting vertically and centrally on the top pentagon face of a pentagonal prism.(CBSE BOARD PAPER -2023)

A. Complete the isometric projection of the two solids with dimensioning, direction of viewing and their common axis using conventional lines.

B. Indicate the center of the top face with conventional lines.

C. Join all the visible edges (no hidden lines) of the two solids by using thick lines.

D. Draw an isometric projection of the box that encloses pentagonal prism having one of its rectangular face, in front, parallel to V.P.

E. Around the center 'O' draw the rhombus of the square base of the pyramid. Draw the axis of the pyramid from the center to apex.

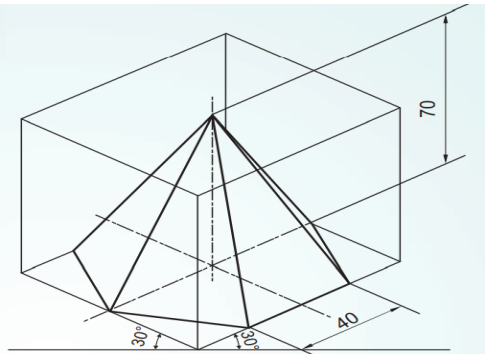
a) B, D, A, C, E

b) C, A, D, E, B

c) A, B, C, D, E

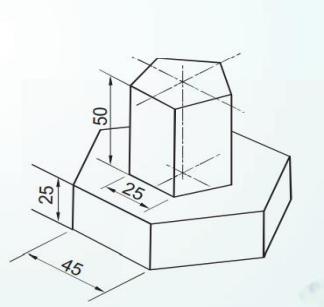
d) D, B, E, C, A

26.



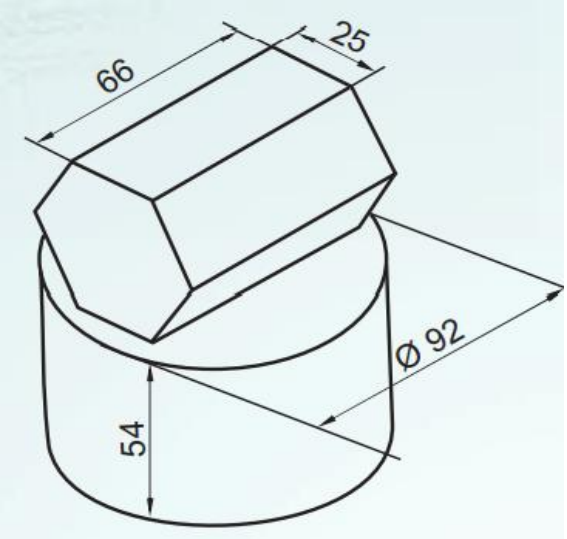
a) The axis is inclined to H.P.
b) The axis is inclined to V.P.
c) The axis is perpendicular to H.P. and parallel to V.P.
d) The axis is perpendicular to V.P. and parallel to H.P

27.



a) The top solid is square prism and the bottom solid is triangular prism.
b) The top solid is pentagonal prism and the bottom solid is hexagonal slab
c) Both the solids are hexagonal prisms.
d) Both the solids are pentagonal prisms

28.



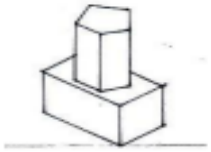
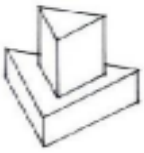
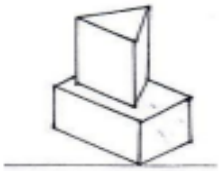
a) A pentagonal prism is kept centrally on the top surface of a cylinder with rectangular faces on it.

b) A hexagonal prism is kept centrally on the top circular surface of a cylinder with its rectangular faces on it.

c) A hexagonal pyramid is kept centrally on the top rectangular face of a hexagonal prism with its triangular faces on it.

d) A hexagonal prism is kept centrally on the top of a cylinder with its hexagonal face on it.

29. Match the LIST I with LIST II (CBSE BOARD SAMPLE PAPER – 2024)

LIST I: ISOMETRIC PROJECTION OF SOLIDS	LIST II:TOTAL NUMBER OF RECTANGULAR SURFACE(S)
1. Pentagonal prism kept on a square prism 	(i) six
2. pentagonal prism kept on a pentagonal slab 	(ii) seven
3. Triangular prism kept on a triangular slab 	(iii) nine
4. Triangular prism kept on a square prism 	(iv) ten

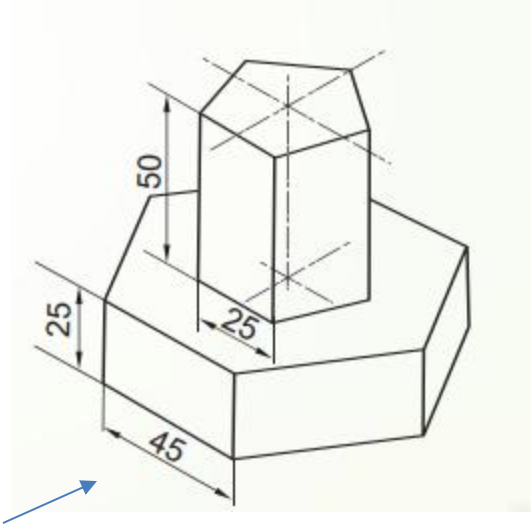
a) 1-iii, 2-iv, 3-i, 4-ii

b) 1-i, 2-iii, 3-ii, 4-iv

c) 1-iv, 2-ii, 3-iii, 4-i

d) 1-ii, 2-i, 3-iv,4-iii

30. Match the LIST I with LIST II (CBSE BOARD PAPER – 2025)



List – I	List - II
1. Total number of hexagonal faces	(i) Perpendicular to VP
2. Total number of rectangular faces	(ii) Perpendicular to HP
3. Bases of both solids	(iii) Eleven
4. Axes of both solids	(iv) Two

a) 1 – (iv), 2 – (iii), 3- (i), 4 – (ii)
b) 1- (iii), 2- (ii), 3-(iv), 4- (i)
c) 1- (ii), 2- (iv), 3 – (iii), 4 – (i)
d) 1- (i), 2 – (ii), 3 – (iv), 4- (iii)

Q31 to 34: Read the following paragraph and answer the questions given below (CBSE SAMPLE PAPER -2024)

"Isometric art is a drawing or illustration style that makes two-dimensional figures appear three-dimensional. From the Greek for "equal measure," isometric images can illustrate interiors, exteriors, objects, or logos with height, width, and depth to create the illusion of a 3D perspective."
It uses isometric drawings/projections for everything from simple shapes to complex animations. It is a type of axonometric projection (drawing measured along axes so they maintain a consistent scale). As compared to perspective projection, they appear the same, no matter how you place them on a canvas or where the viewer stands. Isometric shapes appear in architectural/structural drawings, interior design layouts, isometric maps, comics, video game art, infographics, icons, and 3D logos. And now, isometric drawings are popping up in the

metaverse as NFT buildings and other objects, as Adobe puts it, to discover the creative design side on their website.

31. What is “in equal measure” in isometric projection/drawing?
   a) Equal height and width
   b) Equally inclined axes
   c) Equal width and depth
   d) Equal/same shapes

32. What are the other types of axonometric projection?
   a) Dimetric, Trimetric
   b) Perspective, Oblique
   c) Perspective, Trimetric
   d) Dimetric, Oblique

33. Which shape is obtained on drawing the isometric projection of a sphere?
   a) A circle of true dimensions
   b) A circle of foreshortened dimensions
   c) An ellipse of true dimensions
   d) An ellipse of foreshortened dimensions

34. What will be the front view of an inverted square pyramid placed on top of a cylindrical disc?
   a) Square on a circle
   b) Rhombus on an ellipse
   c) Triangle on a circle
   d) Triangle on a rectangle

DESCRIPTIVE QUESTIONS

SINGLE SOLIDS

1. Draw the isometric projection of a cylinder of 75 mm length and a diameter of 50 mm resting on its base, keeping the axis parallel to VP.

2. Draw the isometric projection of an equilateral triangular prism of 50 mm base side and 75 mm axis resting on its base in HP with one of its base edges parallel to VP in front. (CBSE BOARD PAPER -2023)

3. Draw the isometric projection of an inverted hexagonal pyramid of base edge 30 mm and height of 60 mm, keeping two of its base sides parallel to the VP. (CBSE SAMPLE PAPER – 2018)

4. Draw the isometric projection of a cone of diameter 40 mm and axis of 60 mm resting on its base perpendicular to H.P.

5. A Pentagonal prism of base side of 25 mm and axis length of 55 mm is resting on its face with its axis parallel to both H.P and V.P. Draw its isometric projection. (CBSE BOARD PAPER - 2019)

6. A hexagonal prism of base side 30 mm and height of 70 mm resting on its face on H.P., with two of its bases are parallel to V.P. Draw its isometric projection, indicate the direction of viewing, and give all the dimensions. (CBSE BOARD PAPER -2017)

7. Draw the isometric projection of a sphere of diameter 50 mm.

8. Draw the isometric projection of a hemisphere of 60 mm diameter resting on its curved surface on HP.

9. Draw the isometric projection of an inverted pentagonal pyramid of base side 30 mm and axis of 60 mm resting on its base on H.P., with one of its base sides parallel to VP and nearer to the observer. (CBSE BOARD PAPER – 2025)

10. Draw the isometric projection of a cube of 50 mm side when it rests on HP on one of the square faces such that two of the base edges are parallel to VP.

COMBINATION OF SOLIDS

1. Draw an isometric projection of hemisphere resting centrally on its curved surface, on the top horizontal rectangular face of an equilateral triangular prism, keeping two triangular faces parallel to the VP. Side of equilateral triangle = 50mm, length of the prism = 70 mm and diameter of the hemisphere = 60 mm. (CBSE BOARD PAPER – 2018)

2. Draw an Isometric Projection of 32 mm cube resting centrally on the top face of an equilateral triangular prism having 50 mm base side and height = 30 mm. One rectangular face of the prism is away from the observer and kept parallel to the V.P.

3. Draw an Isometric Projection of a vertical regular pentagonal pyramid resting centrally, having one base edge away from the observer parallel to V.P., on top of a vertical cylinder. Side of the pentagon = 32 mm, height of pyramid = 50 mm, diameter of cylinder = 76 mm and height of cylinder = 40 mm.(CBSE BOARD PAPER – 2016)

4.Draw an Isometric Projection of a sphere resting centrally on a rectangular face of a horizontal hexagonal prism having its hexagonal ends perpendicular to V.P. Side of hexagon = 30 mm, length of the prism = 80 mm and diameter of sphere = 60 mm. (CBSE BOARD PAPER – 2019)

5. Draw an Isometric Projection of a vertical regular hexagonal pyramid resting vertically and centrally having two of its base edges perpendicular to V.P. On the top rectangular face of a horizontal square prism with its square ends perpendicular to V.P. Side of the square = 50 mm, length of the prism =100 mm, side of the hexagon = 30 mm and height of the pyramid = 60 mm.

6. Draw an Isometric Projection of a right circular cone resting vertically and centrally on the top horizontal rectangle of a pentagonal prism having its axis parallel to H.P. and V.P. both. Side of pentagon = 34 mm, length of the prism = 80 mm, diameter of the cone = 44 mm and height of cone = 60 mm.(CBSE BOARD PAPER – 2014)

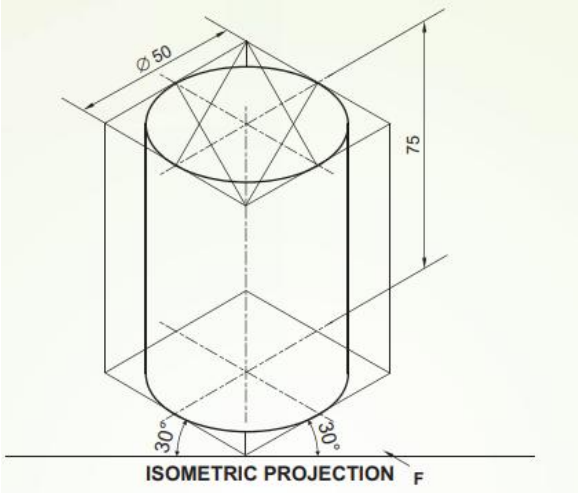
ANSWER KEY – MULTIPLE CHOICE QUESTIONS	
1.	c) 30°, 90°, and 30°
2.	b) Diametric projection
3.	c) They are located by determining its endpoints
4.	d) a rhombus of foreshortened length
5.	b) Representing three-dimensional objects
6.	c) Engineering and design
7.	a) It simplifies and helps in better visualization of complex parts of the project
8.	a) Axonometric projection
9.	b) Diametric projection
10.	a) Isometric projection
11.	b) Orthographic
12.	d) True R
13.	b) Less than true 70 mm
14.	b) Observer, Object, Plane of projection

15.	b) 15 degree
16.	d) Thin continuous line
17.	a)120 degree
18.	b) Circle
19.	c) 30 degree
20.	c) 45 degree
21.	c) Ellipse
22.	b) Actual scale
23.	a) 82%
24.	a) A cone filled with ice-cream
25.	d) D, B, E, C, A
26.	c) The axis is perpendicular to H.P. and parallel to V.P.
27.	b) The top solid is pentagonal prism and the bottom solid is hexagonal slab
28.	b) A hexagonal prism is kept centrally on the top circular surface of a cylinder with its rectangular faces on it.
29.	a) 1-iii, 2-iv, 3-i, 4-ii
30.	a) 1 – (iv), 2 – (iii), 3- (i), 4 – (ii)
31.	b) Equally inclined axes
32.	a) Diametric, Trimetric
33.	a) A circle of true dimensions
34.	d) Triangle on a rectangle

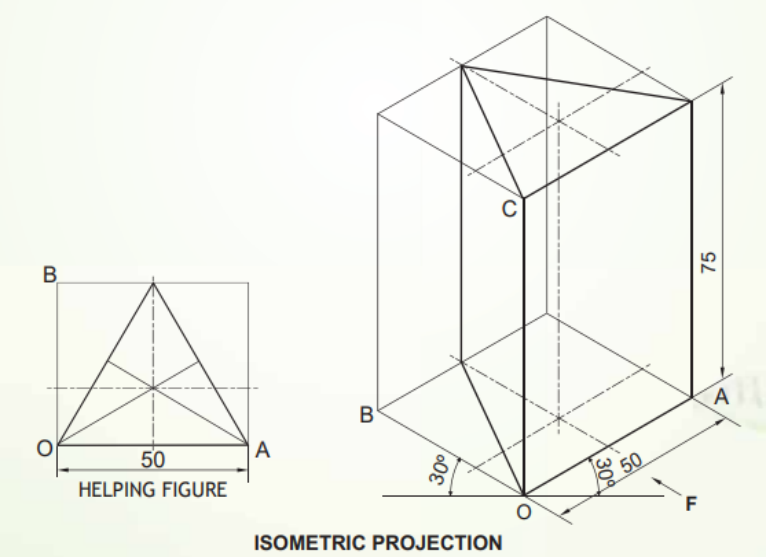
SOLUTIONS FOR DRAWINGS

SINGLE SOLIDS

1.


Ø 50
75
30°
30°
ISOMETRIC PROJECTION
F

2.


B
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HELPING FIGURE
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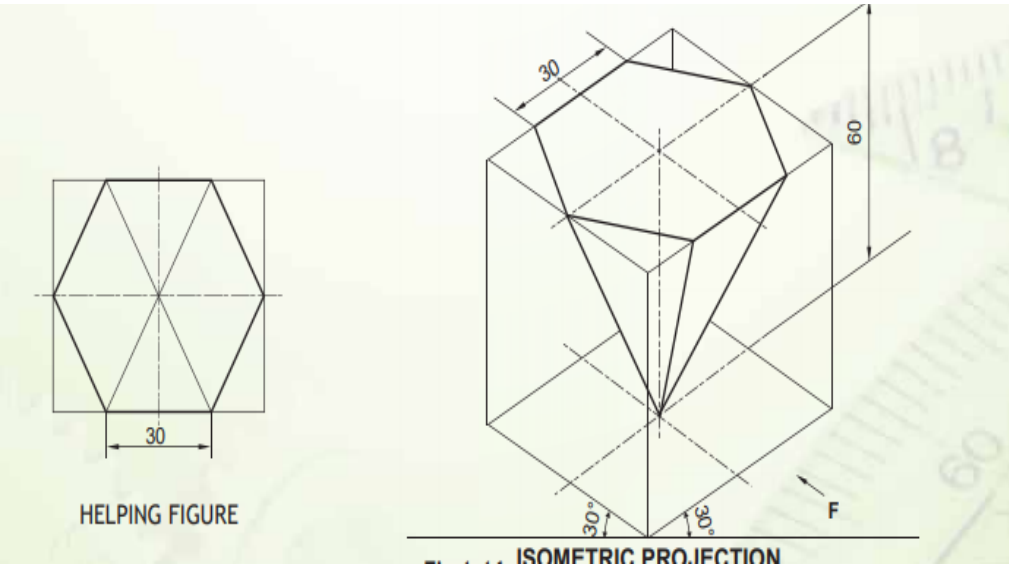
ISOMETRIC PROJECTION

3.



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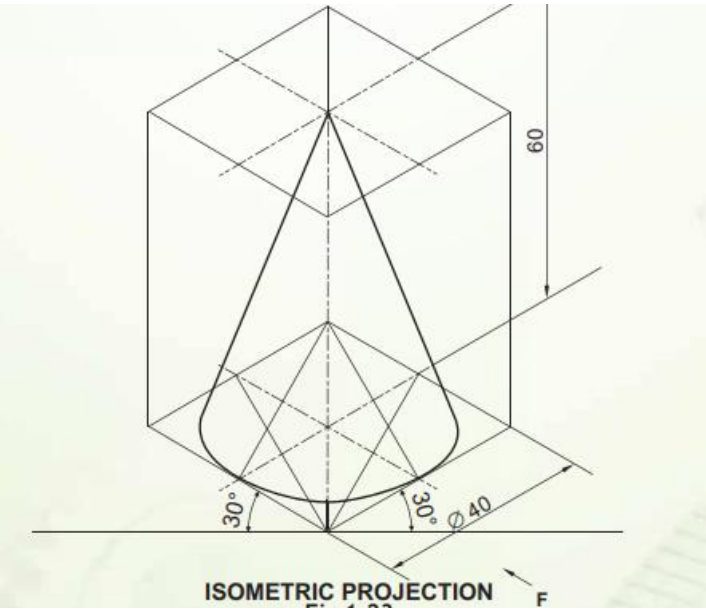
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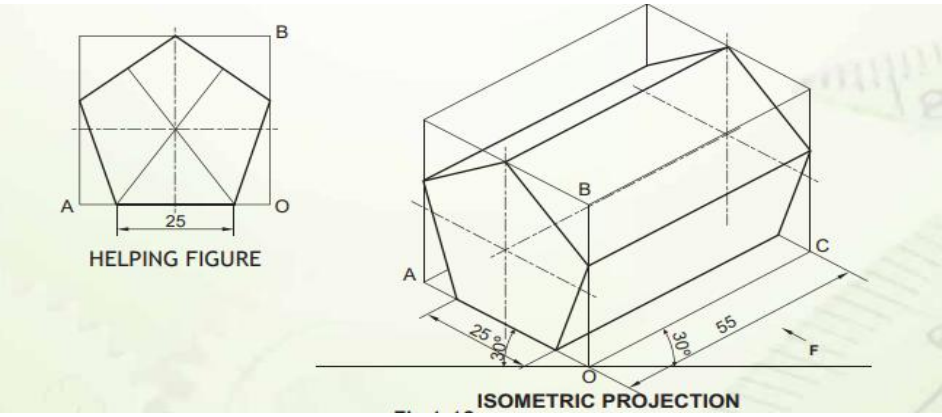
ISOMETRIC PROJECTION

5.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HELPING FIGURE
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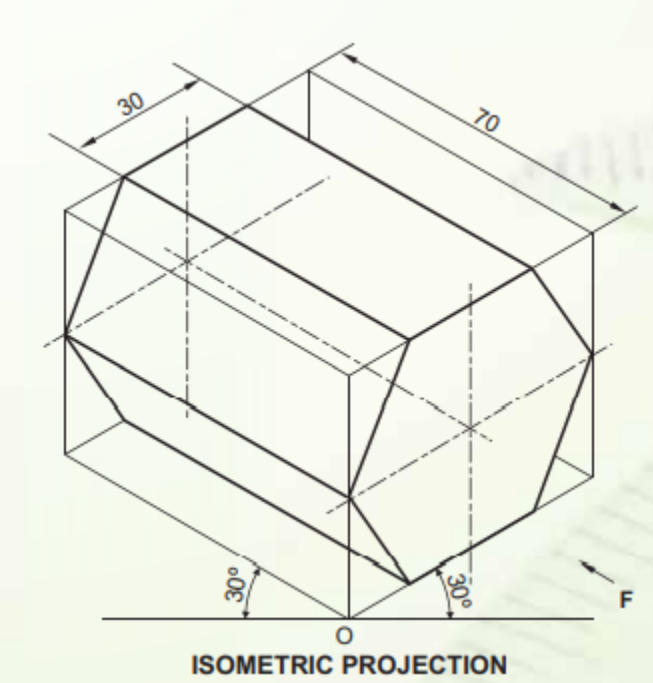
ISOMETRIC PROJECTION

6.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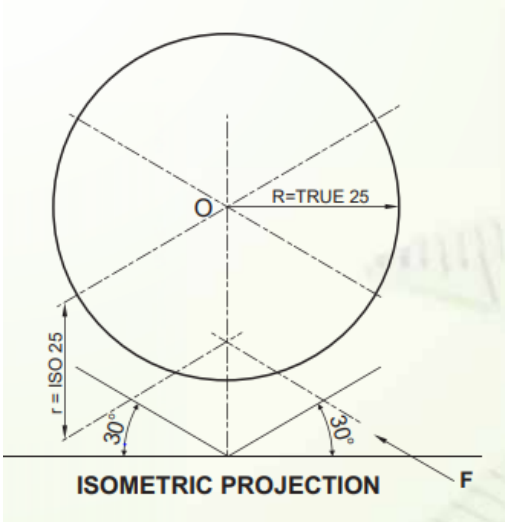
ISOMETRIC PROJECTION

7.


O
R=TRUE 25
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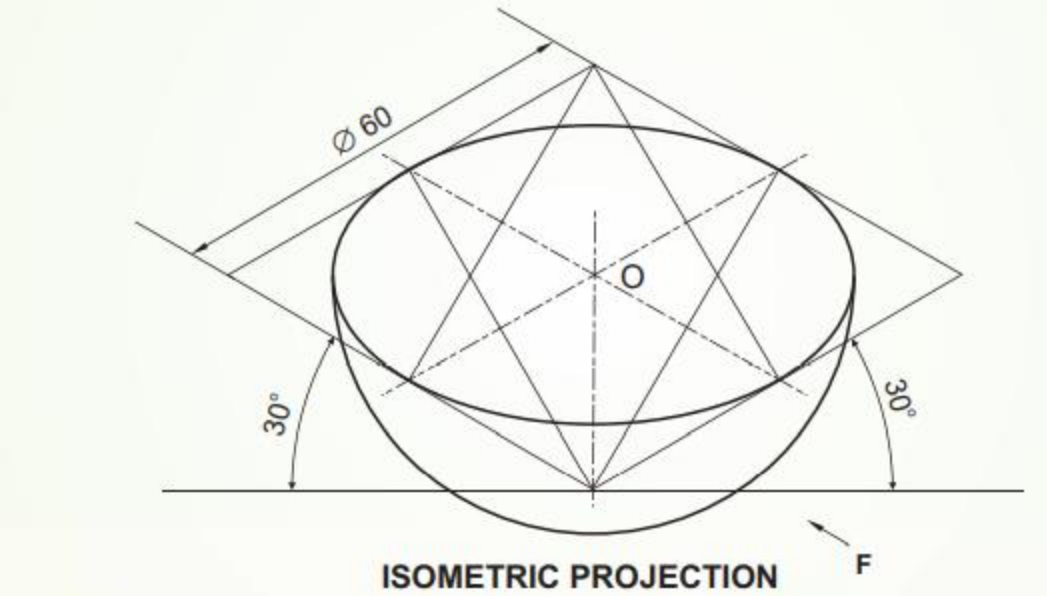
ISOMETRIC PROJECTION

8.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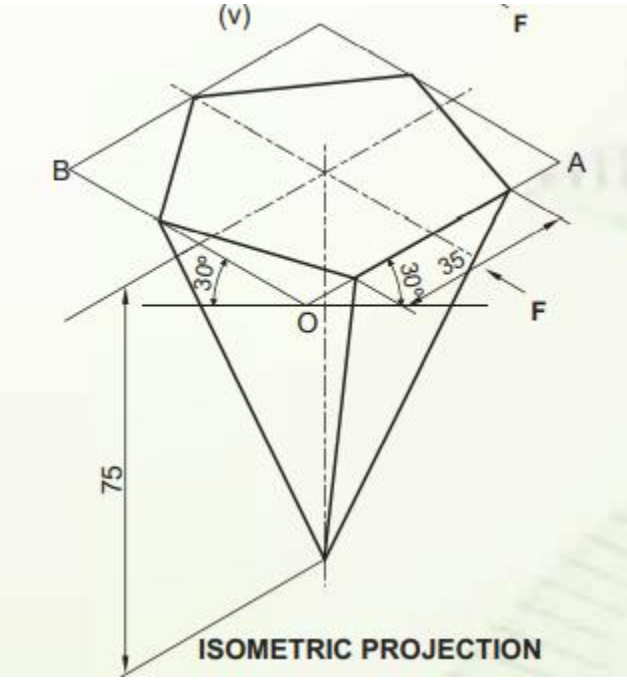
ISOMETRIC PROJECTION

9.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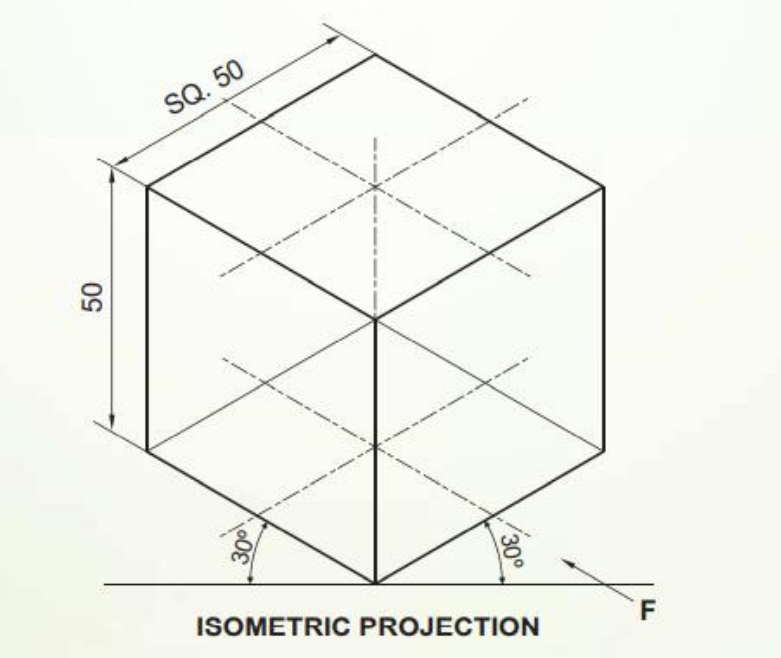
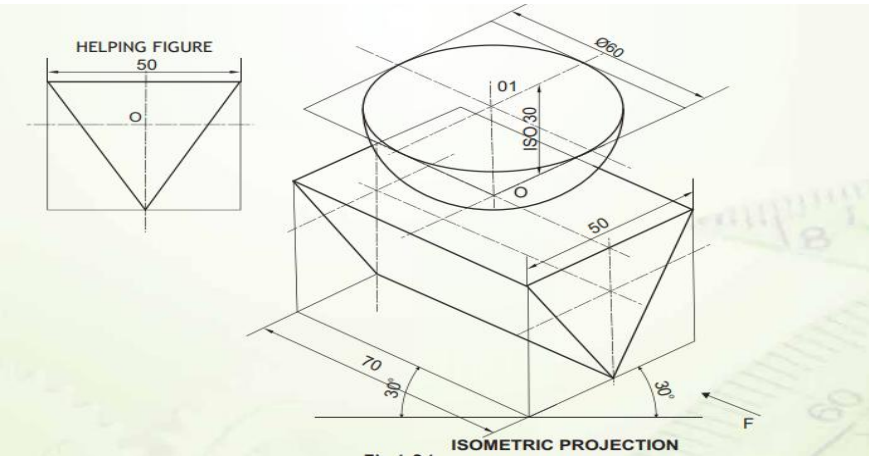
75
ISOMETRIC PROJECTION

10.



COMBINATION OF SOLIDS

1.



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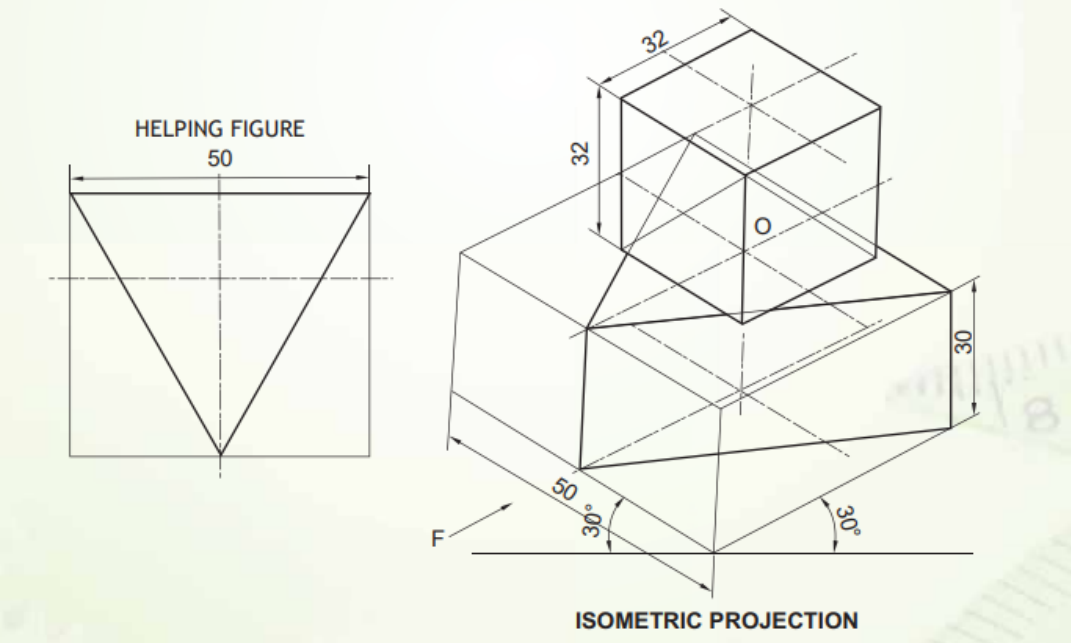
HELPING FIGURE
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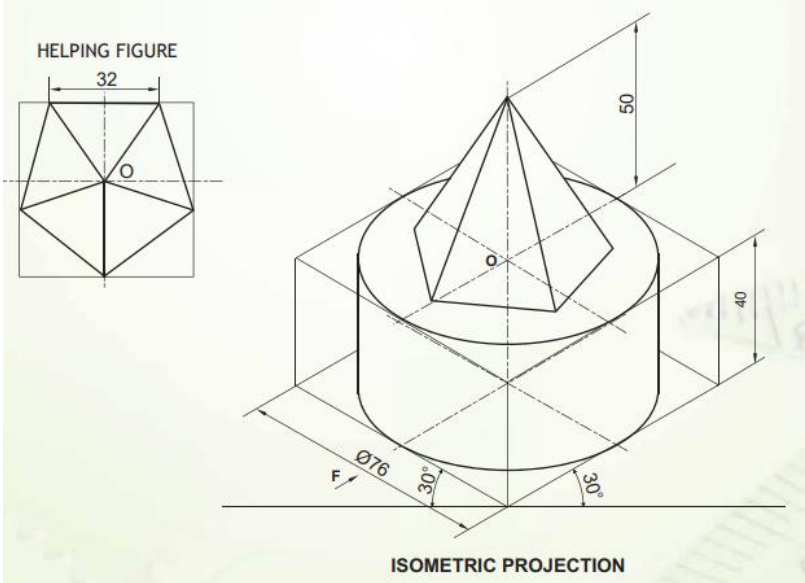
F
ISOMETRIC PROJECTION

3.


HELPING FIGURE
32
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50
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40
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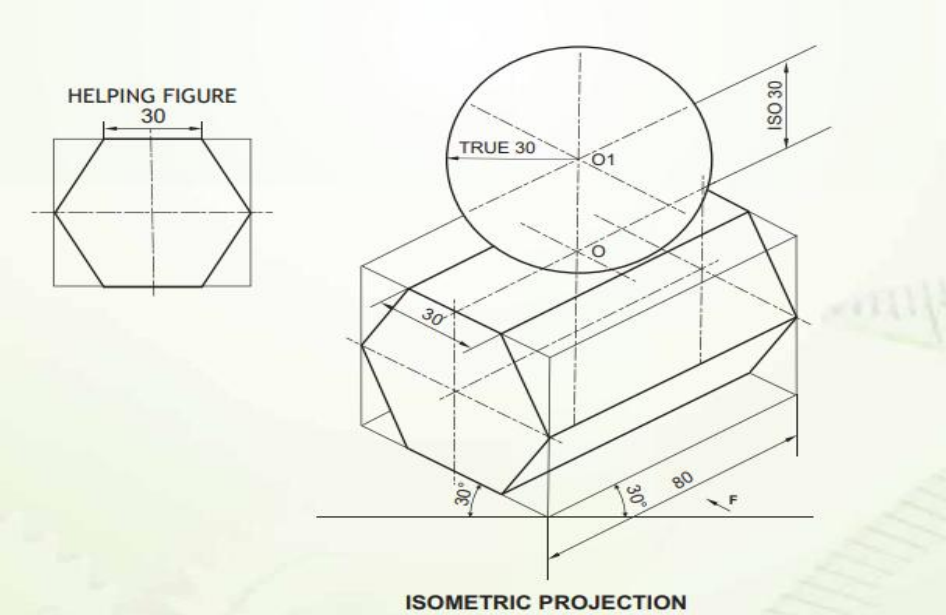
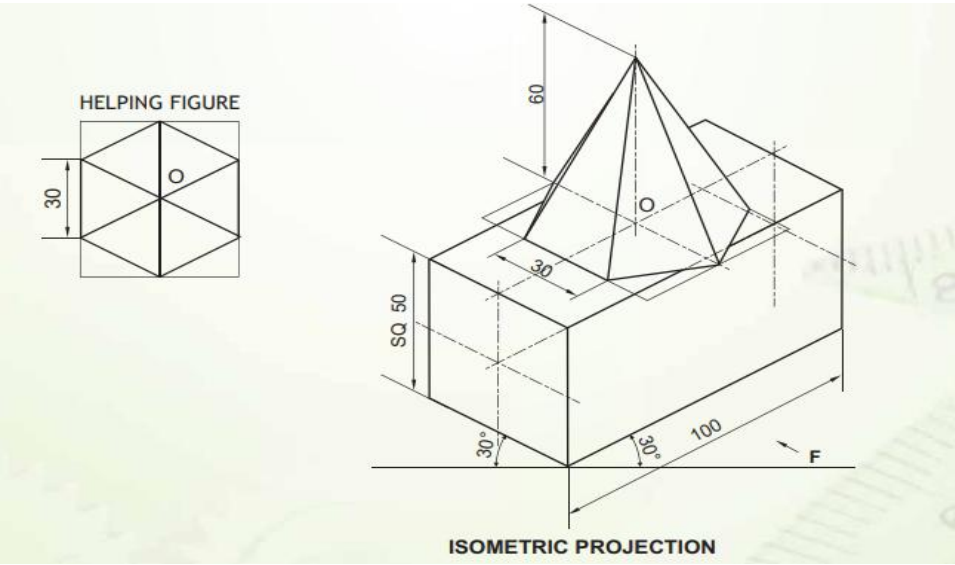
F
30°
30°
ISOMETRIC PROJECTION

4.


HELPING FIGURE
30
TRUE 30
O1
ISO 30
O
30
30°
30°
80
F
ISOMETRIC PROJECTION

5.


HELPING FIGURE
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60
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100
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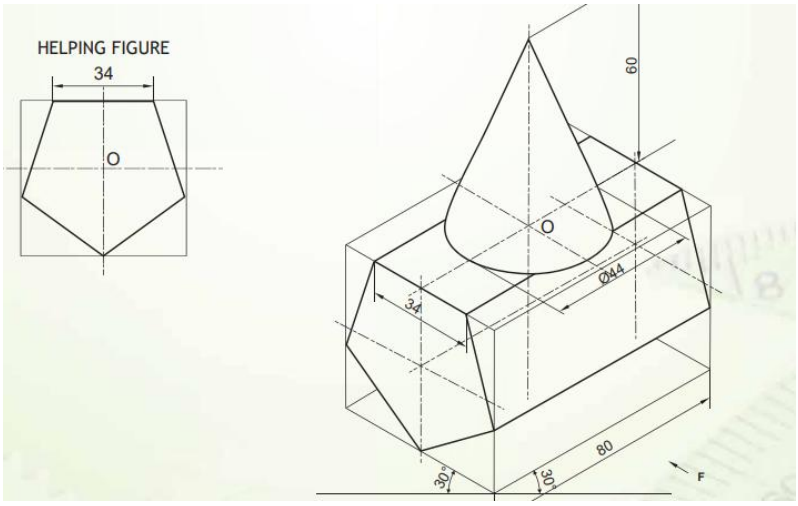
ISOMETRIC PROJECTION

6.



Prepared by: *Ms Aiswarya Deepthi P*	*Checked by:* *HOD Science*