	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	**Department: SCIENCE 2024 – 25** **SUBJECT: ENGINEERING GRAPHICS**	**Date of submission:28.04.2024**
Worksheet No: 1 **WITH ANSWERS**	**UNIT 1: ISOMETRIC PROJECTION**	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS & SEC: XII C/E**	**ROLL NO.**

MULTIPLE CHOICE QUESTIONS

1.Identify which one is not a one plane drawing?

(a) Axonometric projection

(b) Perspective projection

(c) Orthographic projection

(d) Oblique projection

2. Identify the projection with two angles of the principal axes will be equal and one will be unequal.

a) Isometric projection

b) Diametric projection

c) Trimetric projection

d) Orthographic projection

3. _____is the projection used in engineering practices.

a) Isometric projection

b) Oblique projection

c) Perspective projection

d) Inclined projection

4._____projection gives the true size of the object.

a) Isometric

b) Orthographic

c) Oblique

d) Perspective

5.Isometric projection comes under which category of projections----------

a) Axonometric projection

b) Perspective projection

c) Oblique projection

d)None of the above

6.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

7.Which is the correct sequence in case of first angle method of projection?

a) Observer, Plane of projection, Object

b) Observer, Object, Plane of projection

c) Object, Plane of projection, Observer

d) Object, Observer, Plane of projection

8.The angle difference between true scale and isometric scale is -------

a) 30 degree

b) 15 degree

c) 45 degree

d) None of the above

9. Name the type of line which is used for dimensioning.

a) Small dash line

b) Chain line

c) Wavy line

d) Thin continuous line

10.In isometric projection all the three principal axes are inclined at an angle of -------

a) 120 degree

b) 45 degree

c) 30 degree

d) 60 degree

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

a) Ellipse

b) circle

c) Sphere

d) None of the above

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

a) 90 degree

b) 45 degree

c) 30 degree

d) 20 degree

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

a) 15 degree

b) 90 degree

c) 45 degree

d) 30 degree

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

a) circle

b) Sphere

c)Ellipse

d) None of the above

15.The isometric view is the drawings with -----

a) Reduced scale

b) Actual scale

c) Vernier scale

d) Isometric scale

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

a) 82 %

b) 90 %

c) 75%

d) None of the above

17. _____ resembles an inverted solid.

a) A cone filled with ice-cream

b) A glass prism

c) Pyramid of Giza

d) A cylindrical glass tumbler

18. 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.

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.

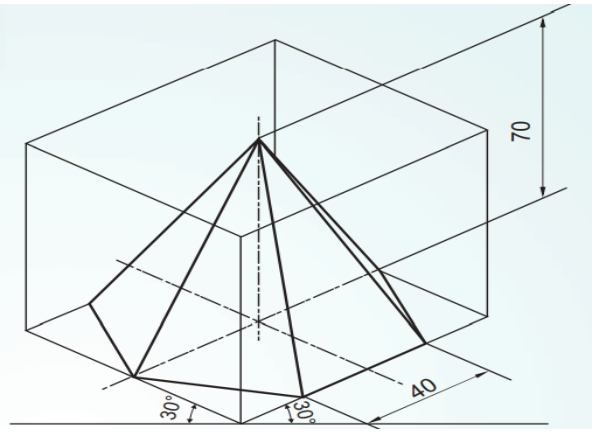
a) B, D, A, C, E

b) C, A, D, E, B

c) A, B, C, D, E

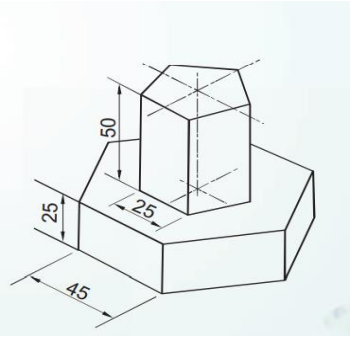
d) D, B, E, C, A

19.



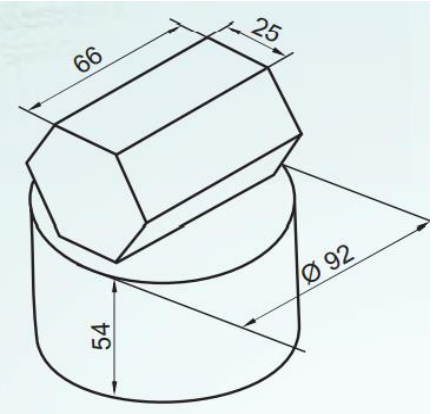
a) The axis is inclined to H.P.
b) The axis is inclined to V.P.
c) The axis is perpendicular to H.P. and parallel to V.P.
d) The axis is perpendicular to V.P. and parallel to H.P

20.



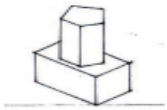
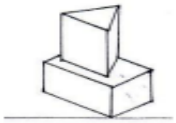
a) The top solid is square prism and the bottom solid is triangular prism.
b) The top solid is pentagonal prism and the bottom solid is hexagonal slab
c) Both the solids are hexagonal prisms.
d) Both the solids are pentagonal prisms

21.



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.

22.Match the LIST I with LIST II

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

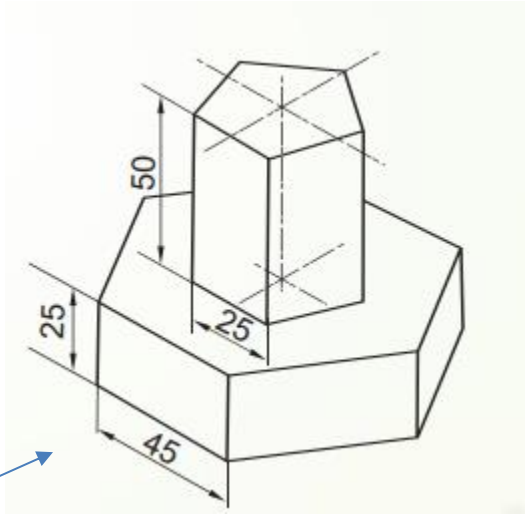
a) 1-iii, 2-iv, 3-i, 4-ii

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

23. Match the List I with List II, for the given isometric projection of combination of solids.



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)

Q24. to 28: Read the following paragraph and answer the questions given below

Amit buys a football as a gift for his brother. The radius of the football is 15 cm. He packs it in a square box (cube) which is just fit enough. His brother is very happy. He is a footballer and he also love to sketch. He sketches a 3-D model of this football placed on the apex of a triangular pyramid, making it look like a trophy. He might 3-D Print his model as an inspiration. He is aspiring to win the Inter-School Football Championship this year.

24. What will be the minimum dimension of side of the gift-box (cube)?

a) 15 cm

b) 30 cm

c) 45 cm

d) 60 cm

25. If he has used isometric projection method to obtain the 3 – D model, then the size of the football drawn will be
    a) double

    b) foreshortened

    c) same

    d) halved

26. The isometric projection of the equilateral triangular base of his model will be

    a) an equilateral triangle

    b) an isosceles triangle

    c) a scalene triangle

    d) a right-angled triangle

27. What is the orientation of the common axis of these two solids?

    a) Axis parallel to HP and VP

    b) Axis perpendicular to HP

    c) Axis perpendicular to VP

    d) None of the above

28. He used _____ in his isometric projection method.

    a) True scale

    b) Vernier scale

    c) Diagonal scale

    d) Isometric scale

WORKSHEET PRACTICE QUESTIONS

SINGLE SOLIDS

1. Draw the isometric projection of a cylinder of 75 mm and 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 edge parallel to VP in front.

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 side parallel to the VP.

4. Draw the isometric projection of 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.

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.

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 side parallel to VP and nearer to the observer.

10. Draw the isometric projection of a cube of 50 mm side when it rests on HP on one of 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.

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.

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.

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.

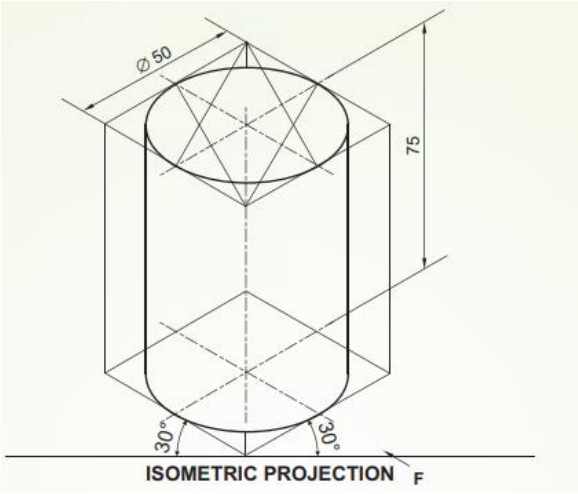
ANSWER KEY – MULTIPLE CHOICE QUESTIONS	
1	c) Orthographic projection
2	b) Diametric projection
3	a) Isometric projection
4	b) Orthographic
5	a) Axonometric projection
6	b) Less than true 70 mm
7	b) Observer, Object, Plane of projection
8	b) 15 degree
9	d) Thin continuous line
10	a)120 degree
11	b) Circle
12	c) 30 degree
13	c) 45 degree
14	c) Ellipse
15	b) Actual scale

16	a) 82%
17	a) A cone filled with ice-cream
18	d) D, B, E, C, A
19	c) The axis is perpendicular to H.P. and parallel to V.P.
20	b) The top solid is pentagonal prism and the bottom solid is hexagonal slab
21	b) A hexagonal prism is kept centrally on the top circular surface of a cylinder with its rectangular faces on it.
22	a) 1-iii, 2-iv, 3-i, 4-ii
23	a) 1 – (iv), 2 – (iii), 3- (i), 4 – (ii)
24	b) 30 cm
25	c) same
26	c) a scalene triangle
27	b) axis perpendicular to HP
28	d) Isometric scale

SOLUTIONS FOR DRAWINGS

SINGLE SOLIDS

1.



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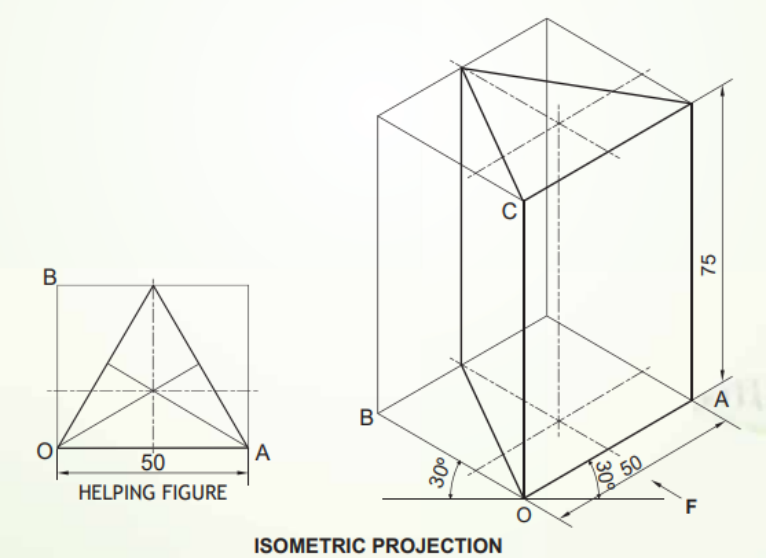
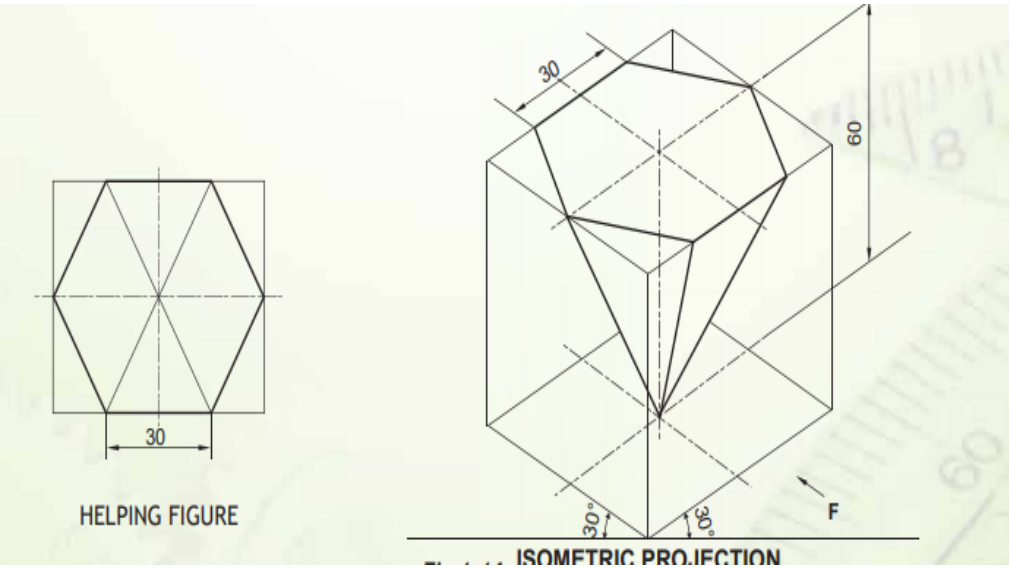
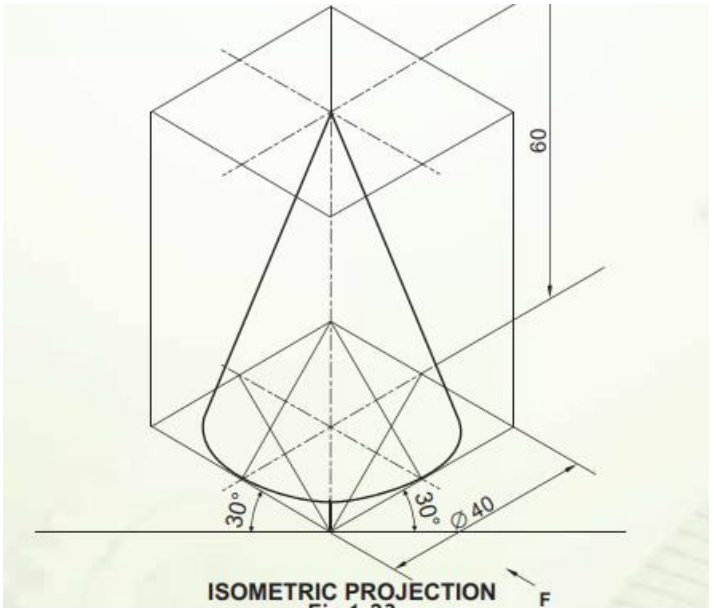

B
O
50
A
HELPING FIGURE
C
75
B
A
30°
30°
50
O
F
ISOMETRIC PROJECTION

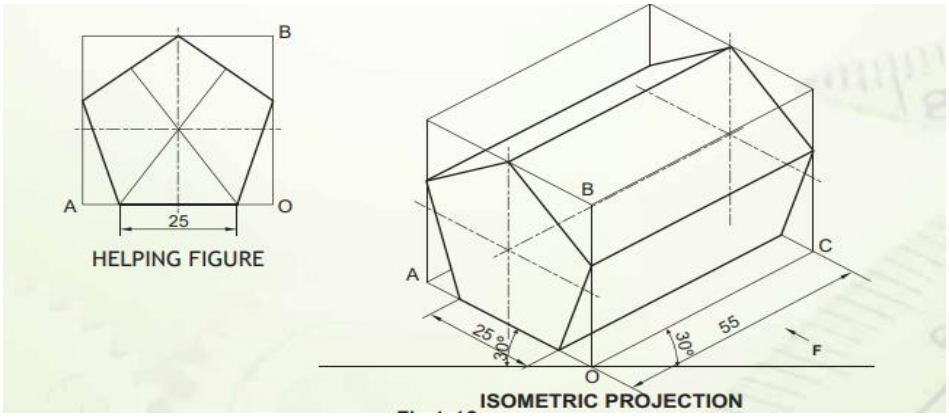
3.


30
HELPING FIGURE
30
60
30°
30°
F
ISOMETRIC PROJECTION

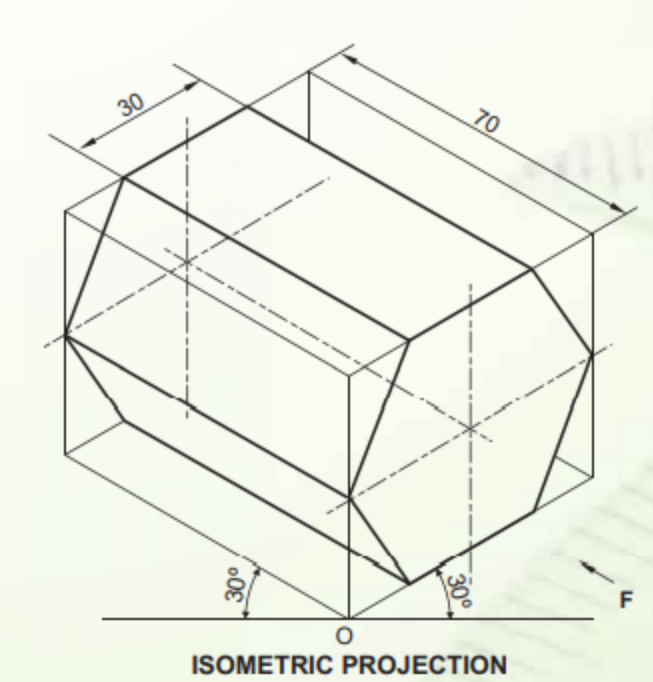
4.


60
30°
30°
Ø40
F
ISOMETRIC PROJECTION

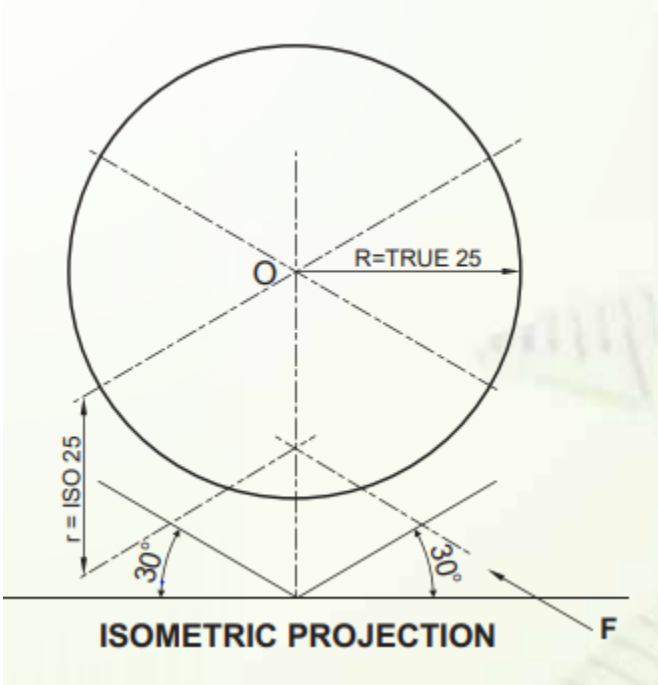
5.


B
A
O
25
HELPING FIGURE
B
C
A
25
30°
55
30°
F
O
ISOMETRIC PROJECTION

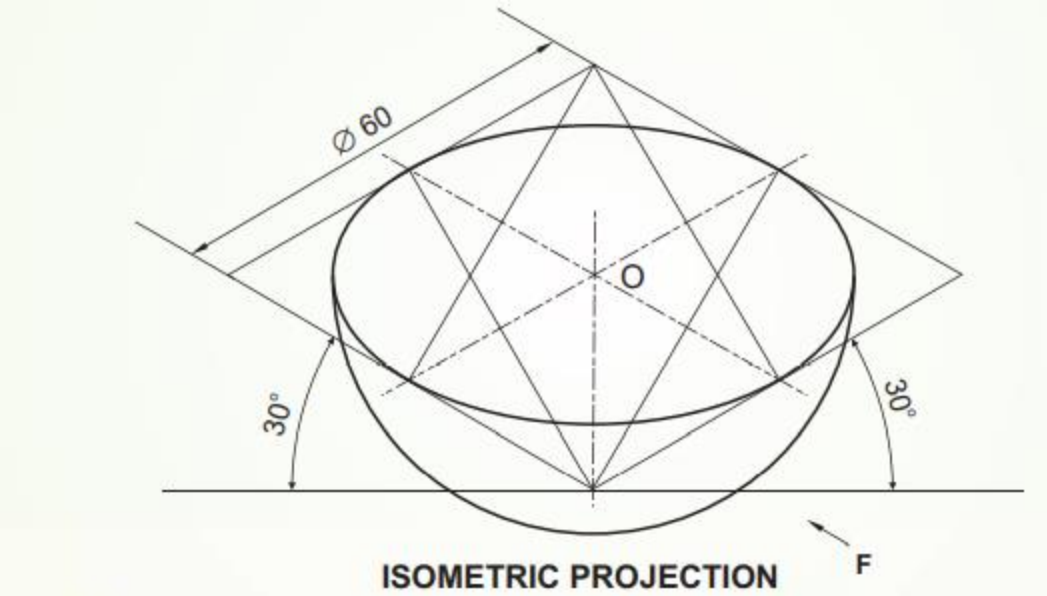
6.


30
70
30°
30°
F
O
ISOMETRIC PROJECTION

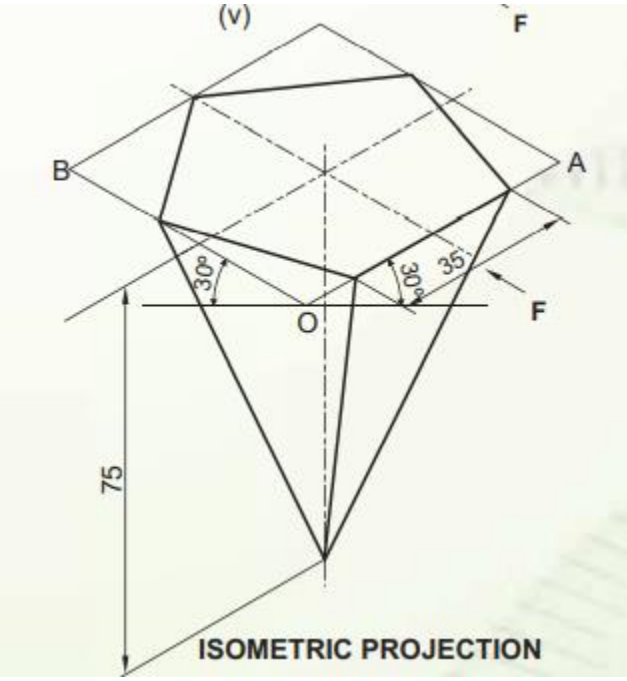
7.


O
R=TRUE 25
r = ISO 25
30°
30°
F
ISOMETRIC PROJECTION

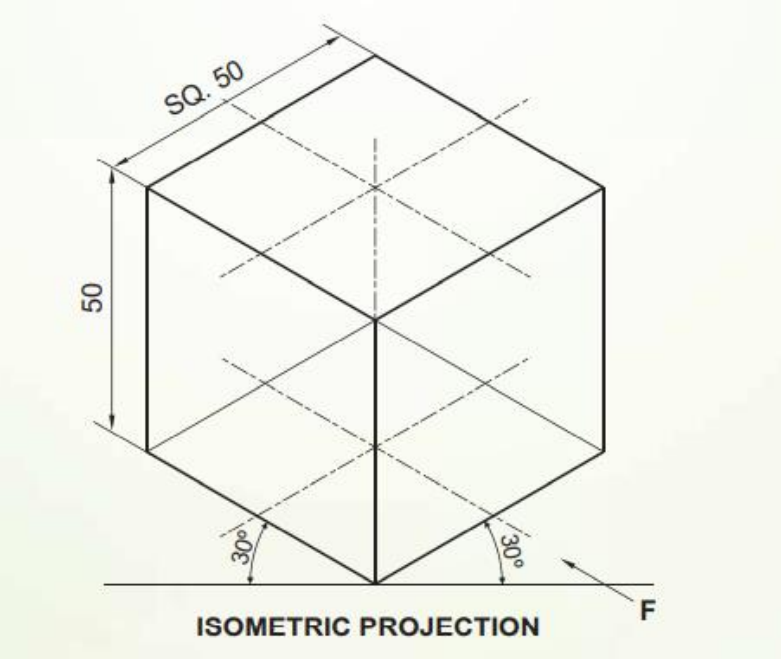
8.


Ø 60
O
30°
30°
F
ISOMETRIC PROJECTION

9.

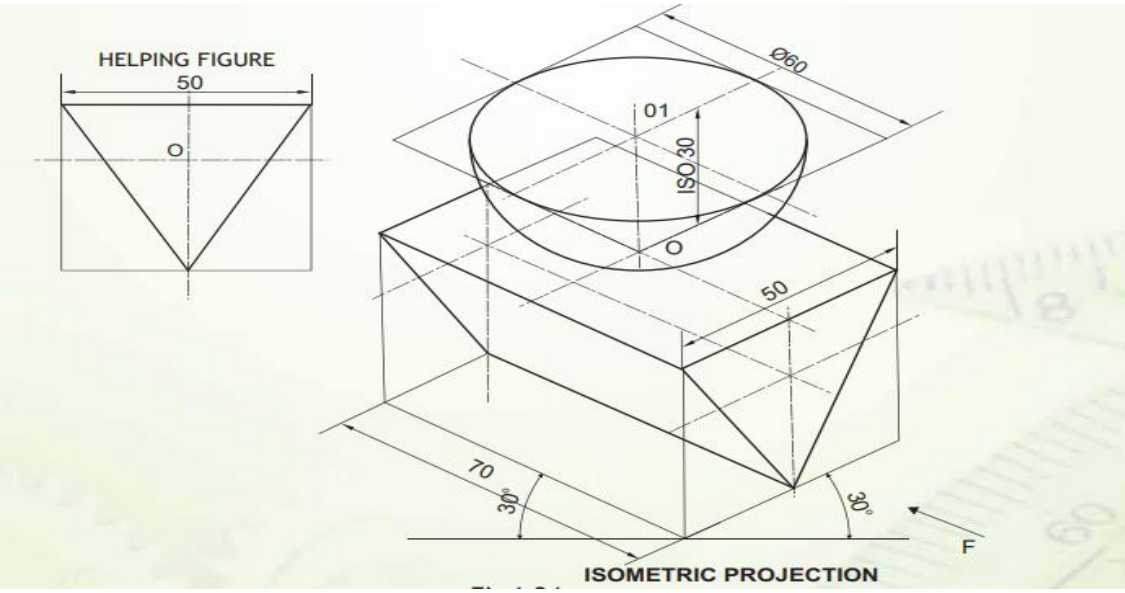

(v)
F
B
A
30°
30°
35°
O
F
75
ISOMETRIC PROJECTION

10.



COMBINATION OF SOLIDS

1.



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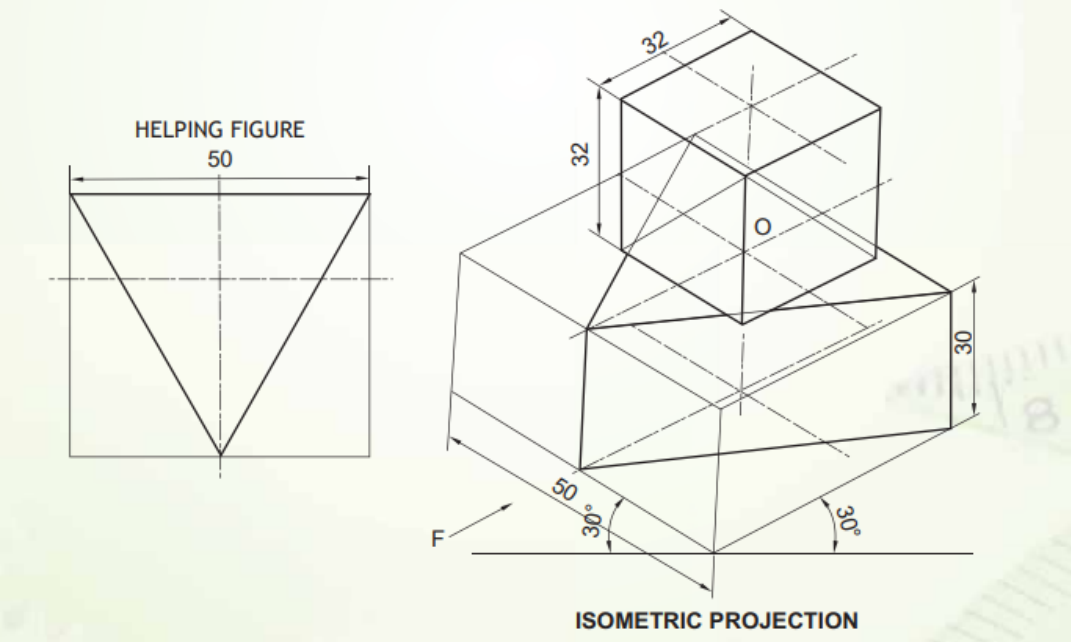
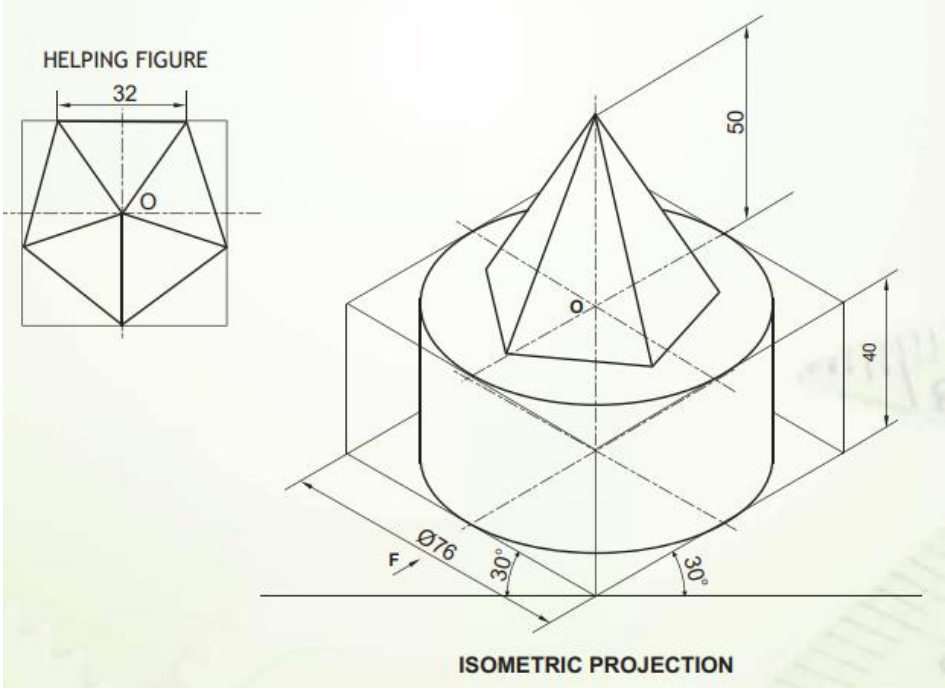
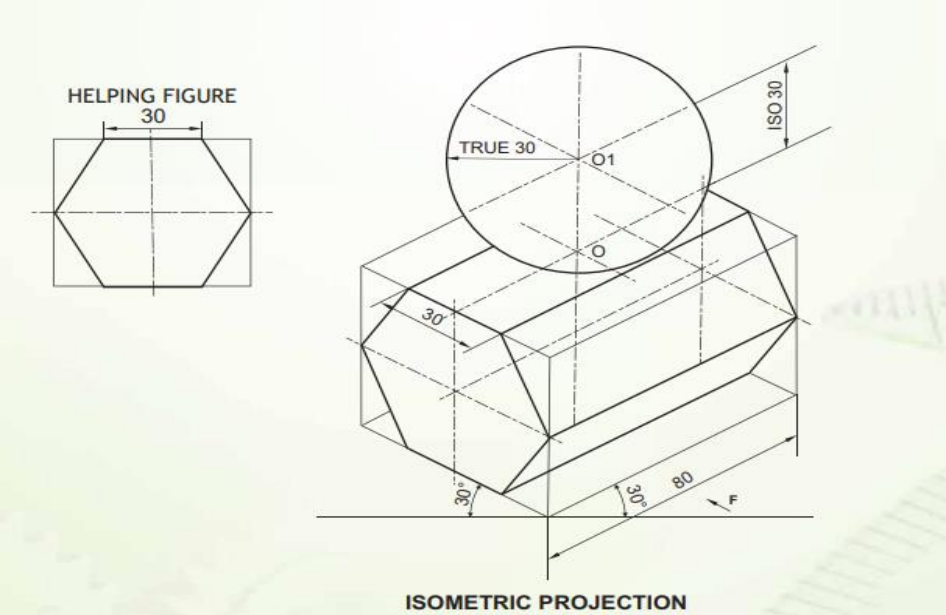

HELPING FIGURE
50
32
32
O
30
50
30°
30°
F
ISOMETRIC PROJECTION

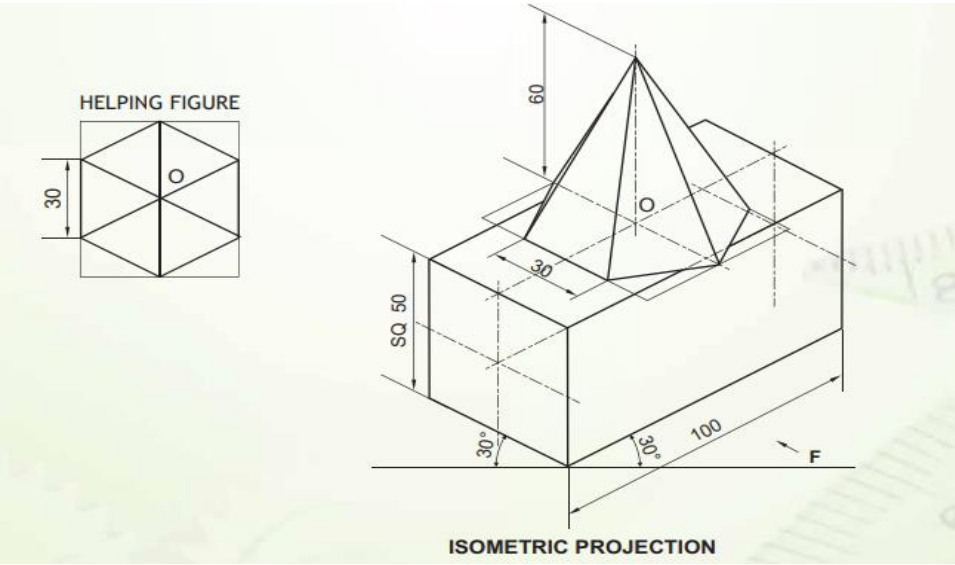
3.


HELPING FIGURE
32
O
50
O
40
Ø76
30°
30°
F
ISOMETRIC PROJECTION

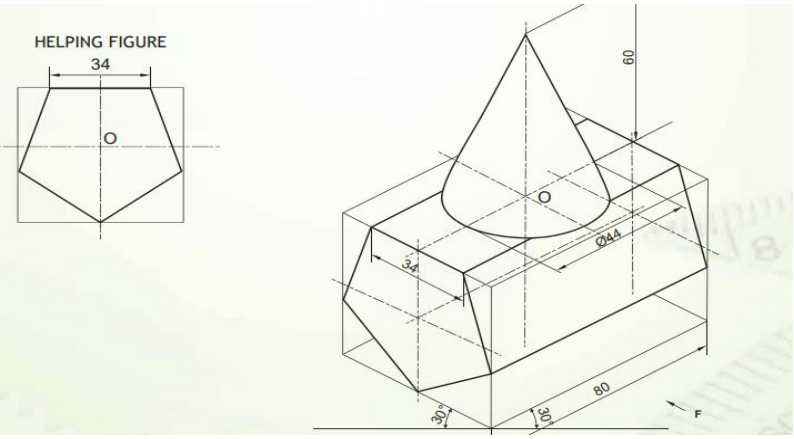
4.


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

5.


HELPING FIGURE
O
30
60
O
30
SQ 50
30°
30°
100
F
ISOMETRIC PROJECTION

6.



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