

ROLL NUMBER				
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CODE NUMBER	046/1/1
SET NUMBER	1



**INDIAN SCHOOL MUSCAT  
FIRST PRE BOARD EXAMINATION 2023  
ENGINEERING GRAPHICS (046)**



CLASS : XII

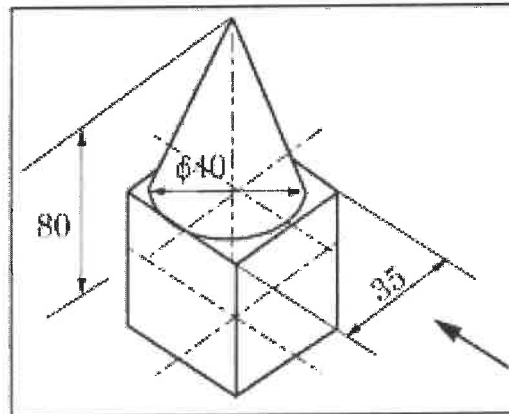
DATE: 30-11-2023

TIME ALLOTTED : 3 HRS.

MAXIMUM MARKS: 70

**GENERAL INSTRUCTIONS:**

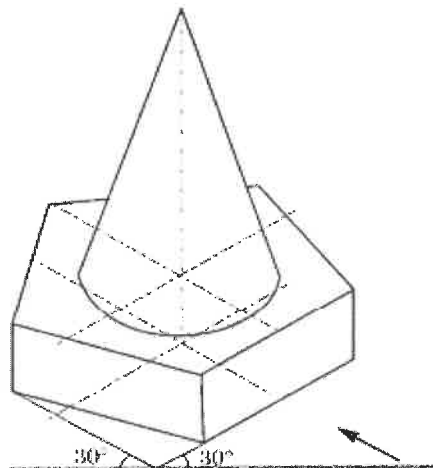
- I. Attempt all the questions.
  - II. Use both sides of the drawing sheet, if necessary.
  - III. All dimensions are in millimeters.
  - IV. Missing and mismatching dimensions, if any, may be suitably assumed.
  - V. Follow the SP: 46 – 2003 revised codes. (with first angle method of projection)
  - VI. In no view of question 22, are hidden edges or lines required.
  - VII. In question 24, hidden edges or lines are to be shown in views without section.
1. Which one of the following is a pictorial drawing? 1
    - a) Orthographic
    - b) Development
    - c) Isometric
    - d) Auxiliary
  2. Below HP and behind VP is the rule for which quadrant? 1
    - a) First quadrant
    - b) Second quadrant
    - c) Third quadrant
    - d) Fourth quadrant
  3. Which is the correct sequence in case of first angle method of projection? 1
    - a) Observer, Plane of projection, Object
    - b) Observer, object, Plane of projection
    - c) Object, Plane of projection, Observer
    - d) Object, observer, Plane of projection
  4. In preparing isometric scale, true scale is drawn at ----- to the horizontal. 1
    - a) 30°
    - b) 120°
    - c) 90°
    - d) 45°
  5. Select the correct option corresponding to the orientation of the given isometric projection. 1



- a) A cube is placed on a cone
- b) A cone is placed on a cube
- c) The axis of both the solids are vertical
- d) Both b and c

6. Select the correct option corresponding to the orientation of the given isometric projection.

1

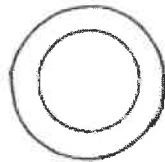
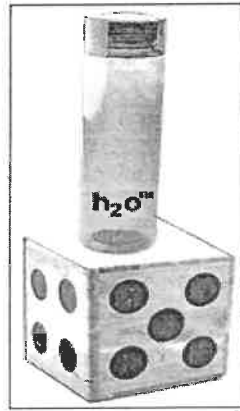


- i. A cone is kept on a pentagonal slab when one of the base edges of the prism parallel to VP and nearer to the observer.
- ii. A cone is kept on a pentagonal pyramid when one of its base edges parallel to VP and away from the observer.
- iii. A cone is kept on a pentagonal pyramid when one of the base vertices of the pyramid is at the rear.
- iv. A cone is kept on a pentagonal prism when one of the base vertices of the prism is at the rear.

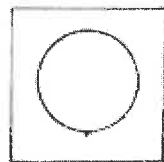
- a) (ii) and (iv) only
- b) (ii) and (iii) only
- c) (i) and (iv) only
- d) (i) and (iii) only

7. Select the top view of given combination of solids.

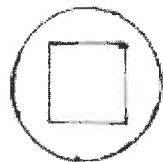
1



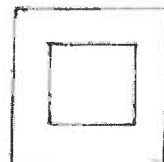
(a)



(b)



(c)



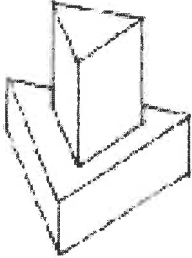
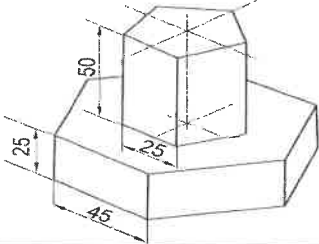
(d)

8.

Match the LIST I with LIST II

1

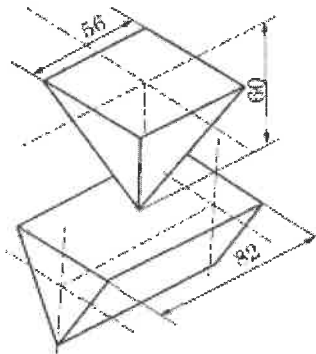
LIST I: ISOMETRIC PROJECTION OF SOLIDS	LIST II: TOTAL NUMBER OF RECTANGULAR SURFACE(S)
<p>1. Square prism kept on a square slab</p>	<p>(i) Six</p>
<p>2. Pentagonal prism kept on a square prism</p>	<p>(ii) Eight</p>
<p>3. Triangular prism kept on a triangular slab</p>	<p>(iii) Eleven</p>

	
<p>4. Pentagonal prism kept on a hexagonal slab</p> 	<p>(iv) Nine</p>

- 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-iv, 3-i, 4-iii

9. Choose the incorrect statement/s for the given figure.

1



- i) Both solids are triangular prisms  
ii) Bottom solid is a triangular prism and top solid is a square pyramid  
iii) Bottom solid is a triangular pyramid and top solid is a triangular prism  
iv) The top solid is an inverted square pyramid

- a) (i) only  
b) (ii) and (iii) only  
c) (i) and (iii) only  
d) (ii) and (iv) only

10. Match the LIST I with LIST II

1

LIST I	LIST II
1. U-shaped cast iron body	i. Cotter
2. Thin circular packing ring of soft material	ii. Open bearing
3. Uniform in thickness but tapering in width on one side	iii. Sleeve & cotter joint
4. Used to join two round rods	iv. Gasket

- a) 1-iv, 2-i, 3-ii, 4-iii  
 b) 1-iii, 2-ii, 3-i, 4-iv  
 c) 1-ii, 2-i, 3-iv, 4-iii  
 d) 1-ii, 2-iv, 3-i, 4-iii
11. A machine element which supports and guides a rotating shaft is called ----- 1  
 a) pulley  
 b) bearing  
 c) cotter  
 d) coupling
12. What is the thread angle of a BSW thread? 1  
 a)  $35^\circ$   
 b)  $40^\circ$   
 c)  $55^\circ$   
 d)  $60^\circ$
13. Which machine part is called as headless bolt? 1  
 a) Stud  
 b) Machine screw  
 c) Rivet  
 d) Bolt
14. Which bearing is useful for higher loads at medium speed? 1  
 a) Open bearing  
 b) Bushed bearing  
 c) Foot step bearing  
 d) Pivot bearing
15. Select the correct sequence of drawing the isometric projection of a vertical straight square pyramid placed centrally on top of a vertical pentagonal prism 1

A. Draw three principal axes at  $30^\circ$ ,  $90^\circ$  and  $30^\circ$  to the horizontal base line and copy the length of sides of helping figure's enclosing box on the respective principal axis and height of the prism on the third principal axis to form an enclosing box (cuboid) for pentagonal prism.

B. Draw the direction of viewing and do the dimensioning.

C. Draw the helping figure which is the base of vertical pentagonal prism (using isometric scale) and enclose it in a box, which is a rectangle.

D. Copy the coordinates of the centre and vertices of pentagon from the helping figure to enclosing box of pentagonal prism. Visible edges of pentagonal prism are joined by thick lines and axis of prism is drawn with chain line.

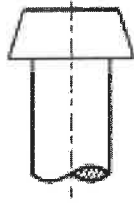
E. Draw the enclosing box for the base of square pyramid on the top surface of the prism and construct a square. Mark the height of the square pyramid (apex) from the centre of top surface of prism at  $90^\circ$ . Join the generators of the square pyramid

- a) B, D, A, C, E  
 b) C, A, D, E, B  
 c) A, B, C, D, E  
 d) D, E, B, A, C

**Read the following paragraph and answer the questions given below.**

MTEX is the Oman's largest International Machine Tool Business Exhibition. INTERNATIONAL MACHINE TOOLS EXPO was being held at Oman International Exhibition Centre in Muscat, Oman. Utility based machine tools and engineering products were being displayed in the expo. One of the Engineering Graphics teacher from Indian school has taken her students to the expo. Students were curious and elated to see the various engineering products which made the human life easy and comfortable. Some machine parts like machine screws, studs and rivets caught the attention of students.

16. Which machine part is used as a substitute where sufficient space for bolt head is not available? 1  
 a) Machine screw  
 b) Rivet  
 c) Stud  
 d) Nut
17. Snap head, pan head, flat head are some of the types of ----- 1  
 a) Machine screws  
 b) Rivet heads  
 c) Studs  
 d) Bolts
18. The outer diameter of head in cheese head machine screw of size M20 is ----- 1  
 a) 20  
 b) 30  
 c) 16  
 d) 17
19. Identify the name of the machine part from the given figure? 1  



 a) Pan head rivet.  
 b) Collar stud.  
 c) Grub screw.  
 d) Snap head rivet.
20. The standard dimension for calculating the nut end side in a plain stud is ----- 1  
 a)  $0.4d$   
 b)  $d$  to  $1.5d$   
 c)  $d$   
 d)  $2d+6$
21. Construct an isometric scale 5
22. A vertical triangular pyramid of base edge 50 mm and 80 mm height is standing on its apex on HP. One of its triangular edges is perpendicular to VP. Draw its Isometric Projection. Give all the dimensions and indicate the direction of viewing. 10
23. Draw to scale 1:1, the standard profile of Metric thread (External) with enlarged pitch as 40 mm. Give standard dimensions. 8

**OR**

Draw to scale 1: 1, the front view and top view of a square headed bolt (diameter 20 mm). Keep its axis vertical; take the length of the bolt as 120mm. Give standard dimensions.

24. The figure shows the details of the parts of a Sleeve and Cotter joint. Assemble these parts correctly and then draw the following views to scale 1:1. 27  
 (a) Front view upper half in section

**(14)**

- (b) Left hand side view (7)
- (c) Print title, scale used, sectional plane, projection symbol and give all dimensions. (6)

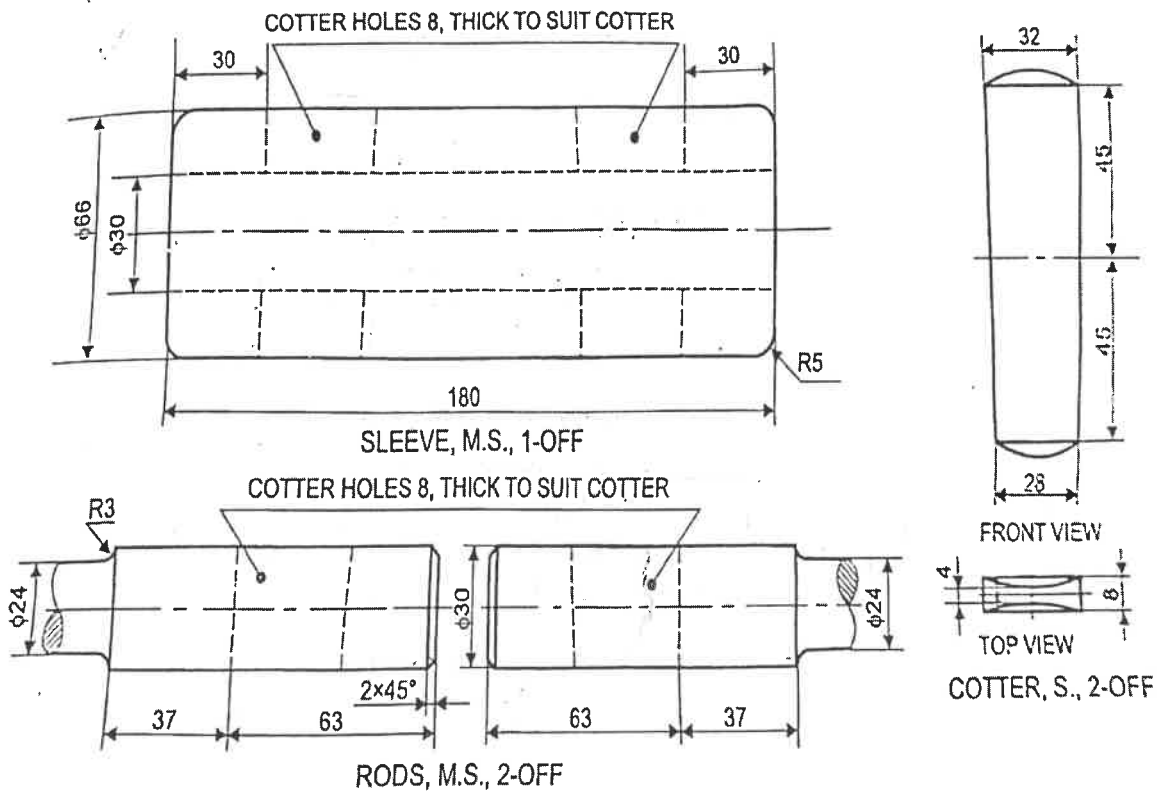
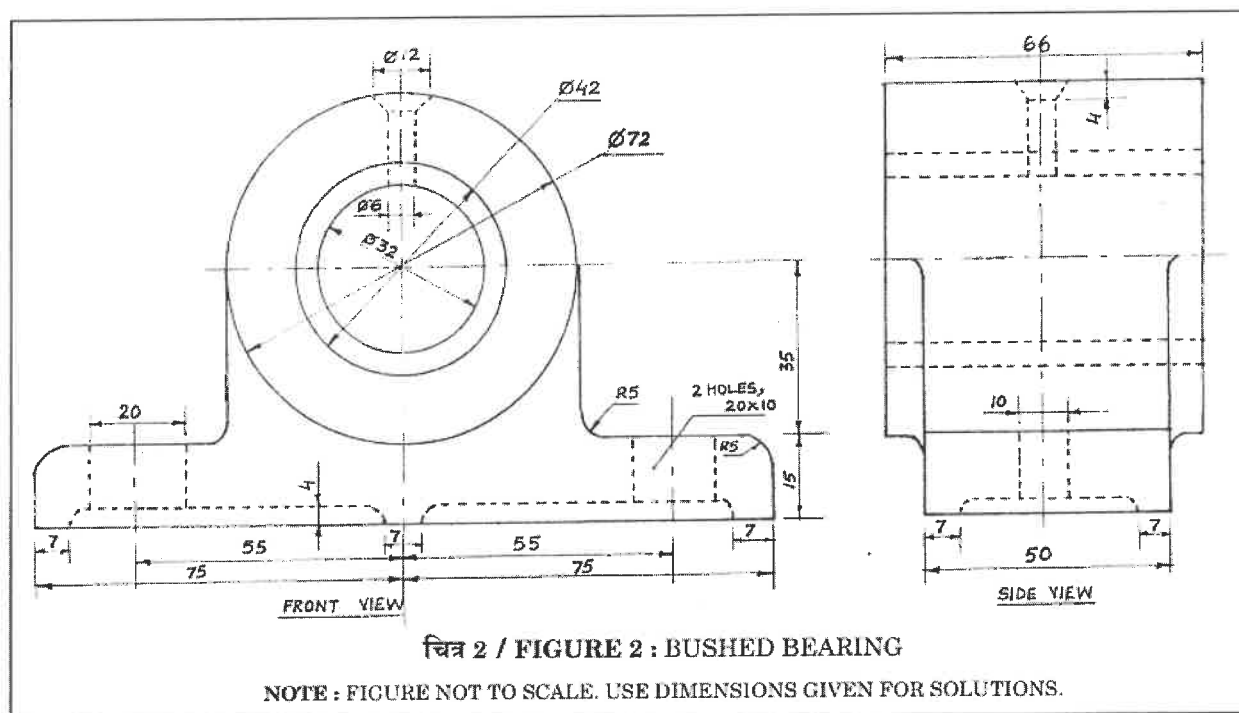


Fig. 5.18 SLEEVE AND COTTER JOINT (DETAILS)

(or)

The figure shows the assembly of a Bushed Bearing. Disassemble the parts correctly and then draw to scale 1: 1 the following views of the following components. Keep the same position of both, Body and Bush, with respect to H.P. and V.P.

- (i) Body : (14)
- Front view, left half in section.
  - Top view.
- (ii) Bush : (7)
- Full sectional front view.
  - Top view.
- (iii) Print the titles of both and scale used. Draw the projection symbol and sectional plan. (6)
- Give 6 important dimensions.



\*\*\*\*END OF THE QUESTION PAPER\*\*\*\*



ROLL NUMBER				
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CODE NUMBER	046/1/2
SET NUMBER	2



**INDIAN SCHOOL MUSCAT  
FIRST PRE BOARD EXAMINATION 2023  
ENGINEERING GRAPHICS (046)**



CLASS : XII  
DATE: 30-11-2023

TIME ALLOTTED : 3 HRS.  
MAXIMUM MARKS: 70

**GENERAL INSTRUCTIONS:**

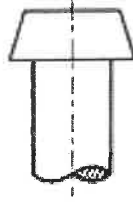
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- III. All dimensions are in millimeters.
- IV. Missing and mismatching dimensions, if any, may be suitably assumed.
- V. Follow the SP: 46 – 2003 revised codes. (with first angle method of projection)
- VI. In no view of question 22, are hidden edges or lines required.
- VII. In question 24, hidden edges or lines are to be shown in views without section.

**Read the following paragraph and answer the questions given below.**

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1. Which machine part is used as a substitute where sufficient space for bolt head is not available? 1
  - a) Machine screw
  - b) Rivet
  - c) Stud
  - d) Nut
2. Snap head, pan head, flat head are some of the types of ----- 1
  - a) Machine screws
  - b) Rivet heads
  - c) Studs
  - d) Bolts
3. The outer diameter of head in cheese head machine screw of size M20 is ----- 1
  - a) 20
  - b) 30
  - c) 16
  - d) 17

4. Identify the name of the machine part from the given figure? 1



- a) Pan head rivet.
- b) Collar stud.
- c) Grub screw.
- d) Snap head rivet.

5. The standard dimension for calculating the nut end side in a plain stud is ----- 1

- a)  $0.4d$
- b)  $d$  to  $1.5d$
- c)  $d$
- d)  $2d+6$

6. Select the correct sequence of drawing the isometric projection of a vertical straight square pyramid placed centrally on top of a vertical pentagonal prism 1

A. Draw three principal axes at  $30^\circ$ ,  $90^\circ$  and  $30^\circ$  to the horizontal base line and copy the length of sides of helping figure's enclosing box on the respective principal axis and height of the prism on the third principal axis to form an enclosing box (cuboid) for pentagonal prism.

B. Draw the direction of viewing and do the dimensioning.

C. Draw the helping figure which is the base of vertical pentagonal prism (using isometric scale) and enclose it in a box, which is a rectangle.

D. Copy the coordinates of the centre and vertices of pentagon from the helping figure to enclosing box of pentagonal prism. Visible edges of pentagonal prism are joined by thick lines and axis of prism is drawn with chain line.

E. Draw the enclosing box for the base of square pyramid on the top surface of the prism and construct a square. Mark the height of the square pyramid (apex) from the centre of top surface of prism at  $90^\circ$ . Join the generators of the square pyramid

- a) B, D, A, C, E
- b) C, A, D, E, B
- c) A, B, C, D, E
- d) D, E, B, A, C

7. Which bearing is useful for higher loads at medium speed? 1

- a) Open bearing
- b) Bushed bearing
- c) Foot step bearing
- d) Pivot bearing

8. Which machine part is called as headless bolt? 1

- a) Stud
- b) Machine screw
- c) Rivet
- d) Bolt

9. What is the thread angle of a BSW thread? 1

- a)  $35^\circ$
- b)  $40^\circ$
- c)  $55^\circ$
- d)  $60^\circ$

10. A machine element which supports and guides a rotating shaft is called -----

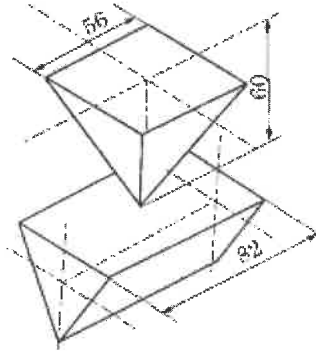
- a) pulley
- b) bearing
- c) cotter
- d) coupling

11. Match the LIST I with LIST II

LIST I	LIST II
1.U -shaped cast iron body	i. Cotter
2. Thin circular packing ring of soft material	ii.Open bearing
3.Uniform in thickness but tapering in width on one side	iii.Sleeve & cotter joint
4.Used to join two round rods	iv.Gasket

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

12. Choose the incorrect statement/s for the given figure.

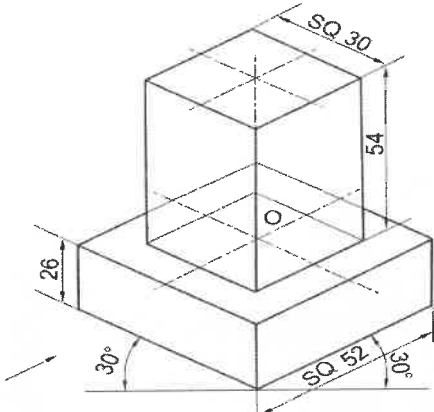
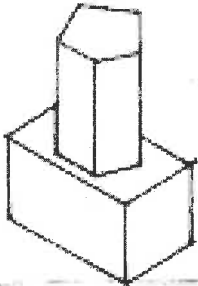
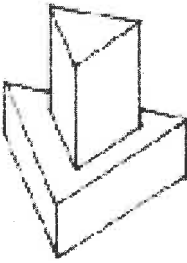
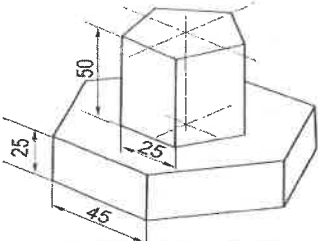


- i) Both solids are triangular prisms
- ii) Bottom solid is a triangular prism and top solid is a square pyramid
- iii) Bottom solid is a triangular pyramid and top solid is a triangular prism
- iv)The top solid is an inverted square pyramid

- a) (i) only
- b) (ii) and (iii) only
- c) (i) and (iii) only
- d) (ii) and (iv) only

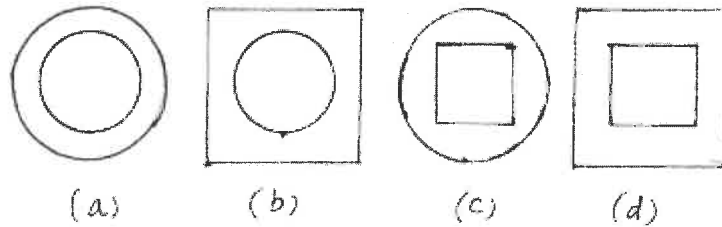
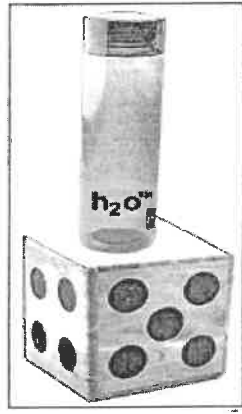
13. Match the LIST I with LIST II

LIST I: ISOMETRIC PROJECTION OF SOLIDS	LIST II:TOTAL NUMBER OF RECTANGULAR SURFACE(S)
1.Square prism kept on a square slab	(i)Six

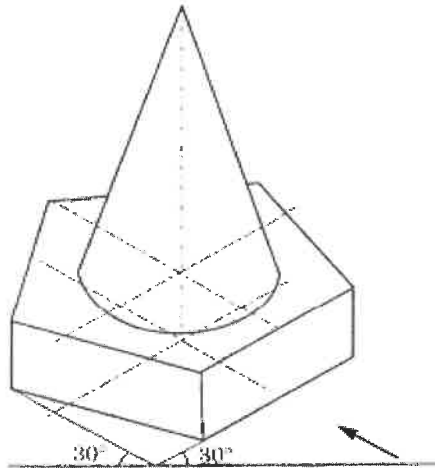
	
<p>2. Pentagonal prism kept on a square prism</p> 	(ii) Eight
<p>3. Triangular prism kept on a triangular slab</p> 	(iii) Eleven
<p>4. Pentagonal prism kept on a hexagonal slab</p> 	(iv) Nine

- 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-iv, 3-i, 4-iii

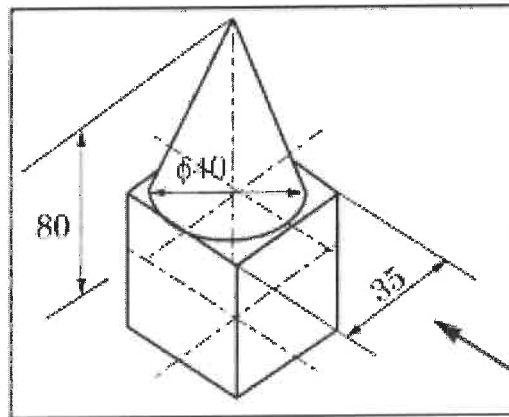
14. Select the top view of given combination of solids.



15. Select the correct option corresponding to the orientation of the given isometric projection. 1



- i. A cone is kept on a pentagonal slab when one of the base edges of the prism parallel to VP and nearer to the observer.
  - ii. A cone is kept on a pentagonal pyramid when one of its base edges parallel to VP and away from the observer.
  - iii. A cone is kept on a pentagonal pyramid when one of the base vertices of the pyramid is at the rear.
  - iv. A cone is kept on a pentagonal prism when one of the base vertices of the prism is at the rear.
- a) (ii) and (iv) only
  - b) (ii) and (iii) only
  - c) (i) and (iv) only
  - d) (i) and (iii) only
16. Select the correct option corresponding to the orientation of the given isometric projection. 1



- a) A cube is placed on a cone
- b) A cone is placed on a cube
- c) The axis of both the solids are vertical
- d) Both b and c

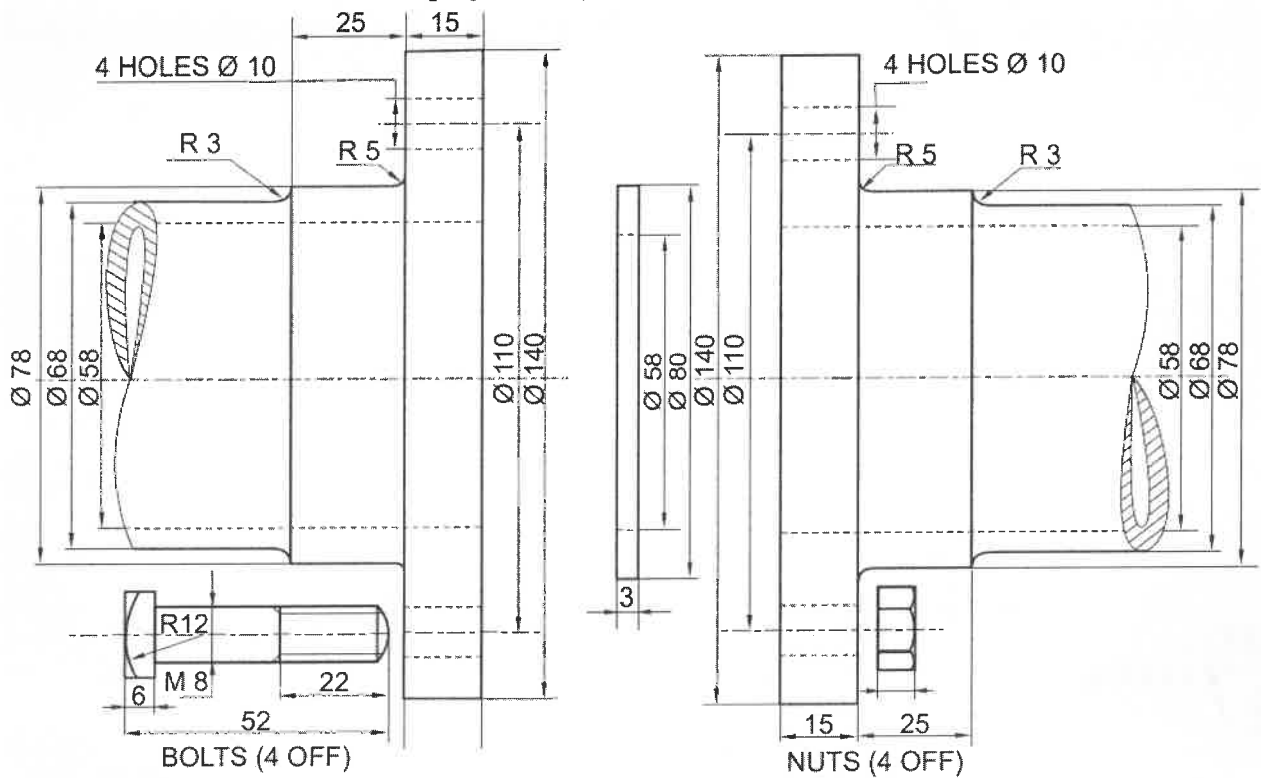
17. In preparing isometric scale, true scale is drawn at ----- to the horizontal. 1
- a)  $30^\circ$
  - b)  $120^\circ$
  - c)  $90^\circ$
  - d)  $45^\circ$
18. Which is the correct sequence in case of first angle method of projection? 1
- a) Observer, Plane of projection, Object
  - b) Observer, object, Plane of projection
  - c) Object, Plane of projection, Observer
  - d) Object, observer, Plane of projection
19. Below HP and behind VP is the rule for which quadrant? 1
- a) First quadrant
  - b) Second quadrant
  - c) Third quadrant
  - d) Fourth quadrant
20. Which one of the following is a pictorial drawing? 1
- a) Orthographic
  - b) Development
  - c) Isometric
  - d) Auxiliary
21. Construct an isometric scale 5
22. Draw the isometric projection of a sphere of diameter 50 mm. 10
23. Draw to scale, 1:1, the standard profile of a Knuckle thread both internal and external, taking enlarged pitch as 40mm 8

(Or)

Draw to scale 1:1, the front view and side view of the assembly of square headed bolt with a hexagonal nut and a washer, with the diameter of bolt as 30mm, keeping their axis parallel to V.P and H.P and two of the opposite sides of the square head of the bolt and of the hexagonal nut, parallel to V.P.

24. Figure shows the details of a Flanged Pipe Joint. Assemble these parts correctly, and then draw the following views to a scale full size: 27
- (a) Front view, showing bottom half in section
  - (b) Side view as seen, from the right.

Print title and scale used. Draw the projection symbol. Give important dimensions.



(or)

The two views of a Gib and Cotter Joint are given. Disassemble the parts as given below figure

(a) FORK END

(i) Front view upper half in section and top view without section.

(b) EYE END

(i) Front lower half in section and top view.

(c) GIB

(i) Front view and top view

(d) COTTER

(i) Front and top view.

Print headings of the above views and scale used. Draw projection symbol. Give six important dimensions.

**\*\*\*END OF THE QUESTION PAPER\*\*\***