

CBSE Class 12 Engineering Graphics 2025 - Set 68/S - Compartment



Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours

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 millimetres.
- (iv) Missing or mismatching dimensions, if any, may be suitably assumed.
- (v) Follow the SP 46:2003 revised codes, with first-angle method of projection.
- (vi) In Question 24, no hidden edges or lines are required.
- (vii) In Question 23, hidden edges or lines must be shown in views without section.

Section A

Q. 1 to Q. 14 : Answer the following Multiple Choice Questions. Print the correct choice on your drawing sheet. $14 \times 1 = 14$

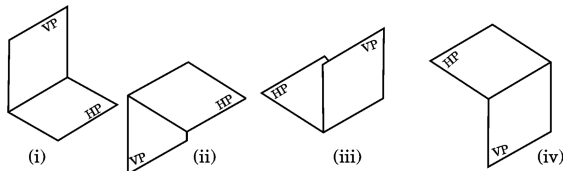
1. Leader line is :

- | | |
|--|---|
| (A) an inclined line followed by a horizontal line | (B) a line that is used where outline is not visible at viewing surface |
| (C) an inclined line followed by an inclined line | (D) a line that is similar to axis line but thick at ends |

2. In sectional projection of solids, the section plane indicates where :

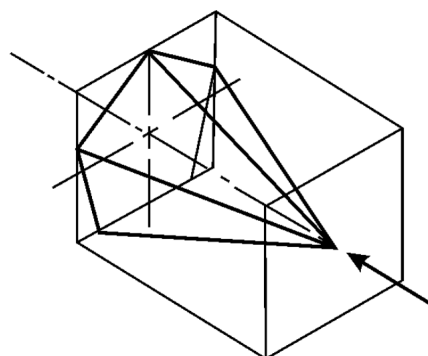
- | | |
|--|---|
| (A) the projection takes place. | (B) the imaginary cutting takes place. |
| (C) the development of surfaces takes place. | (D) the direction of viewing takes place. |

3. Which among the following is a depiction of first quadrant ?



- | | |
|-----------|----------|
| (A) (i) | (B) (ii) |
| (C) (iii) | (D) (iv) |

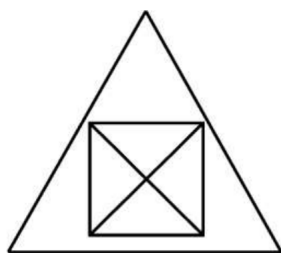
4. Select the correct statements for the given figure.



1. A horizontal pyramid is placed with its axis parallel to both H.P. and V.P.
2. The solid has five triangular faces in total.
3. A horizontal pyramid is placed with its axis perpendicular to V.P.
4. It is an example of solid of revolution.

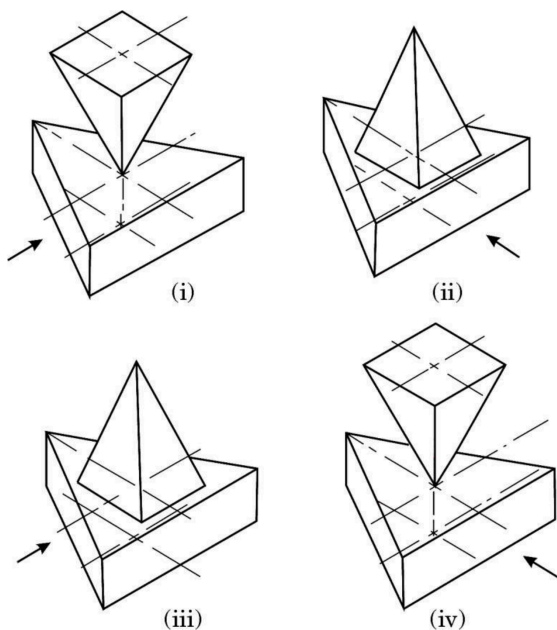
- | | |
|-------------------------|------------------------|
| (A) (ii) and (iii) only | (B) (i) and (iii) only |
| (C) (ii) and (iv) only | (D) (i) and (iv) only |

5.



TOP VIEW

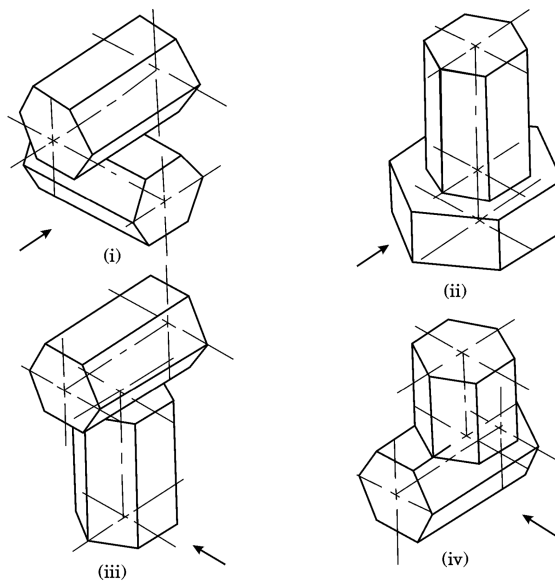
The above given top view corresponds to :



- (A) (i)
(C) (iii)

- (B) (ii)
(D) (iv)

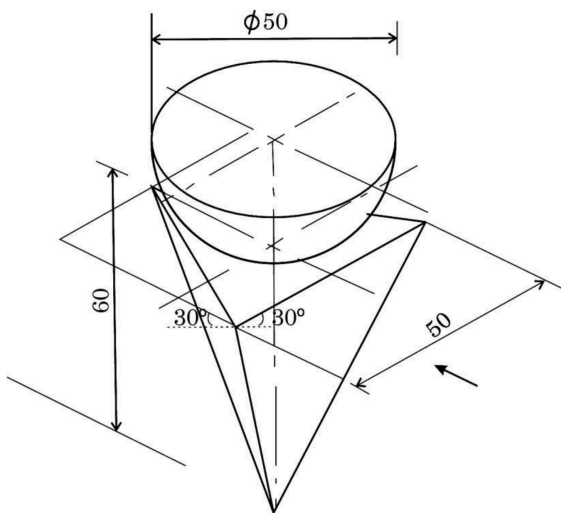
6. Identify the correct figure which represents the isometric projection of a horizontal hexagonal prism placed on a vertical hexagonal prism.



- (A) (i)
(C) (iii)

- (B) (ii)
(D) (iv)

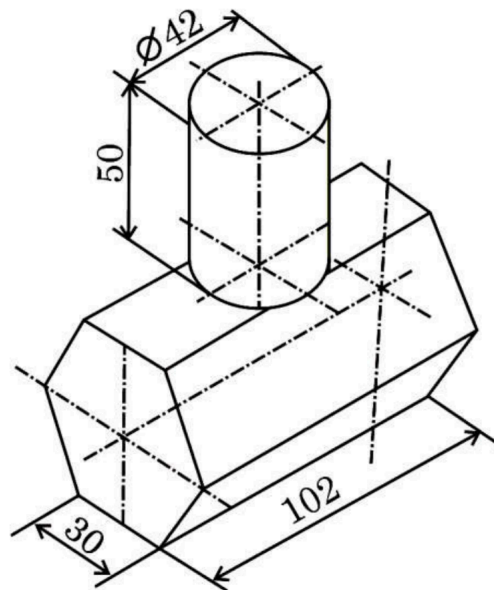
7. Identify the correct statements for the isometric projection of combination of solids given below :



1. A hemisphere is resting on its flat circular face on the top triangular face of a pyramid.
2. A hemisphere is resting on its curved surface on the top triangular face of a pyramid.
3. The axis is not common for both solids.
4. The axis of both solids are common and vertical.

(A) (iii) and (iv) only (B) (i) and (iii) only
(C) (ii) and (iv) only (D) (i) and (ii) only

8. Match List-I with List-II for the given isometric projection of combination of solids :



List-I	List-II
a. Axis of bottom solid	i. 30 mm
b. Axis of top solid	ii. 42 mm
c. Base edge of bottom solid	iii. Vertical
d. Base diameter of top solid	iv. Horizontal

(A) a-iv, b-i, c-iii, d-ii (B) a-iii, b-iv, c-ii, d-i
(C) a-i, b-ii, c-iii, d-iv (D) a-iv, b-iii, c-i, d-ii

9. A thread with triangular profile is found :

- (A) in external knuckle thread (B) in internal ACME thread
(C) in external metric thread (D) in internal knuckle thread

10. The head of a square bolt is a square prism with a _____ chamfer.

- (A) Cylindrical (B) Cuboidal
(C) Cubical (D) Conical

11. Select the correct statements regarding Plain Washer.

1. Washer is a circular piece of plate having a strap at the ends.
2. It resembles the gasket fitted in flange joint.
3. For a bolt of nominal diameter 25 mm, the thickness of the washer to be used is 3 mm.
4. Usually plain washer is used in a nut and bolt assembly to reduce the machining area.

- (A) (ii) and (iii) only (B) (ii) and (iv) only
(C) (i) and (ii) only (D) (i) and (iv) only

12. Open bearing is an example of _____

- (A) Journal bearing (B) Rolling bearing
(C) Pivot bearing (D) Thrust bearing

13. In a tie rod joint, the LH threaded rod is fitted from _____ side of the body.

- (A) top (B) left
(C) right (D) bottom

14. Match List-I with List-II related to Flange Pipe Joint :

List-I	List-II
a. Flange	i. The diameter of a circle on which the holes are placed equally apart
b. Gasket	ii. Nuts and bolts are used for joining the flanged pipes
c. P.C.D.	iii. Circular packing ring of soft material
d. Screw pair	iv. Projected circular ring on the ends of pipes

- (A) a-iv, b-iii, c-i, d-ii (B) a-i, b-ii, c-iv, d-iii
(C) a-iv, b-i, c-ii, d-iii (D) a-iii, b-iv, c-ii, d-i

Section B

Q. 15 to Q. 18 : Read the following paragraph and answer the questions given below : $4 \times 1 = 4$

The given image is a jewellery box. Assuming it comprises two parts, viz. bottom cylindrical portion and a top portion as a conical lid with a small handle on it. Assume that the diameter of the bottom cylindrical portion is 200 mm and its height is 140 mm. The axial height of conical lid is 60 mm.



15. The 3D projection method that is used in the design process of this product is :

- | | |
|-----------------------------|--------------------------|
| (A) Perspective projection | (B) Multiview projection |
| (C) Orthographic projection | (D) Isometric projection |

16. If a straight line rotates about another fixed straight line, keeping the angle between the two lines constant, the rotating line generates a _____ surface.

- | | |
|-------------------|-------------|
| (A) Spherical | (B) Conical |
| (C) Hemispherical | (D) Helical |

17. The total height in true scale, of the jewellery box, excluding the small handle at the top is :

- | | |
|------------|------------|
| (A) 100 mm | (B) 160 mm |
| (C) 200 mm | (D) 260 mm |

18. The capacity of the jewellery box, excluding the lid portion is _____.

(Hint : Volume of cylinder = $\pi r^2 h$)

- | | |
|--------------------------|--------------------------|
| (A) 4400 cm ³ | (B) 3500 cm ³ |
| (C) 1000 cm ³ | (D) 2600 cm ³ |

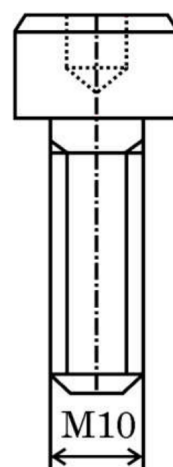
Q. 19 to Q. 22 : Read the following paragraph and answer the questions given below : $4 \times 1 = 4$

A book named “Seven Small Inventions that Changed the World (In a Big Way)” by the author Roma Agrawal was shortlisted for the 2023 Royal Society Science Book Prize. The author explores in this book how small machine parts like nuts, bolts, machine screws, etc. have together enabled once-impossible dreams such as space travel, etc. This book reveals the hidden building blocks of our modern world and shows how engineering has fundamentally changed the way we live. Machine screws come with a variety of head types. The choice of the head depends on the applications and the desired appearance.

19. If ‘d’ is the diameter of a vertical round headed screw, then the depth of slot/groove in front view is :

- | | |
|------------|-----------|
| (A) d | (B) 0.4 d |
| (C) 0.25 d | (D) 0.8 d |

20. Identify the type of screw shown in the figure.



Front View

- | | |
|-------------------------------|-----------------------|
| (A) Hexagon socket head screw | (B) Cheese head screw |
| (C) Snap head screw | (D) Square head screw |

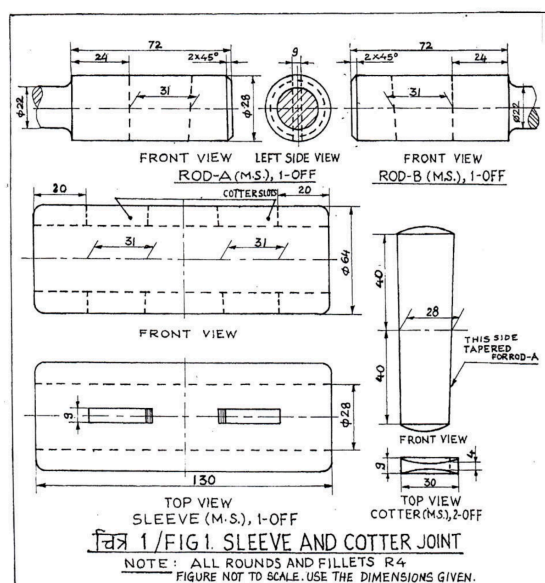
21. Machine screws are threaded fasteners like _____.

- (A) rivet (B) washer
(C) cotter (D) bolt

22. The type of machine screw which does not have a head is :

- (A) Pan screw (B) CSK screw
(C) Flat screw (D) Grub screw

23(a). Fig.1 shows the details of the parts of a **Sleeve and Cotter Joint**. Assemble all these parts correctly, and then draw its following views using scale 1 : 1.



An enlarged drawing is provided in the drawing references at the end of this paper.

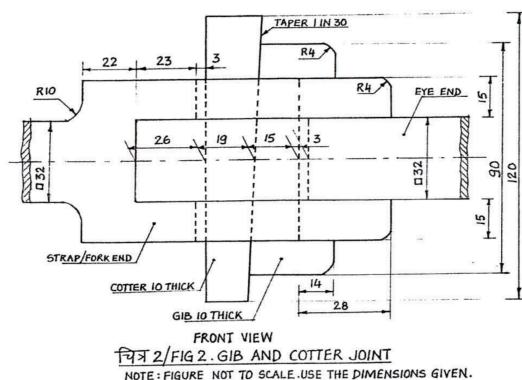
23(a)(i). Front view lower half in section

23(a)(ii). Right side view

23(a)(details). Print the title and scale used. Draw the projection symbol. Give 6 important dimensions.

OR

23(b). Fig. 2 shows the front view of the assembly of a **Gib and Cotter Joint**. Disassemble the parts and then draw the following views of the following parts to scale 1 : 1. Keep the parts in the same position, with respect to H.P. and V.P.



An enlarged drawing is provided in the drawing references at the end of this paper.

23(b)(i)(I). STRAP

Front view upper half in section

23(b)(i)(II). STRAP

Left side view

23(b)(ii)(I). GIB

Front view

23(b)(ii)(II). GIB

Right side view

23(b)(details). Print the titles of both and scale used. Draw the projection symbol. Give 6 important dimensions.

Section C

24(a). Construct an isometric scale.

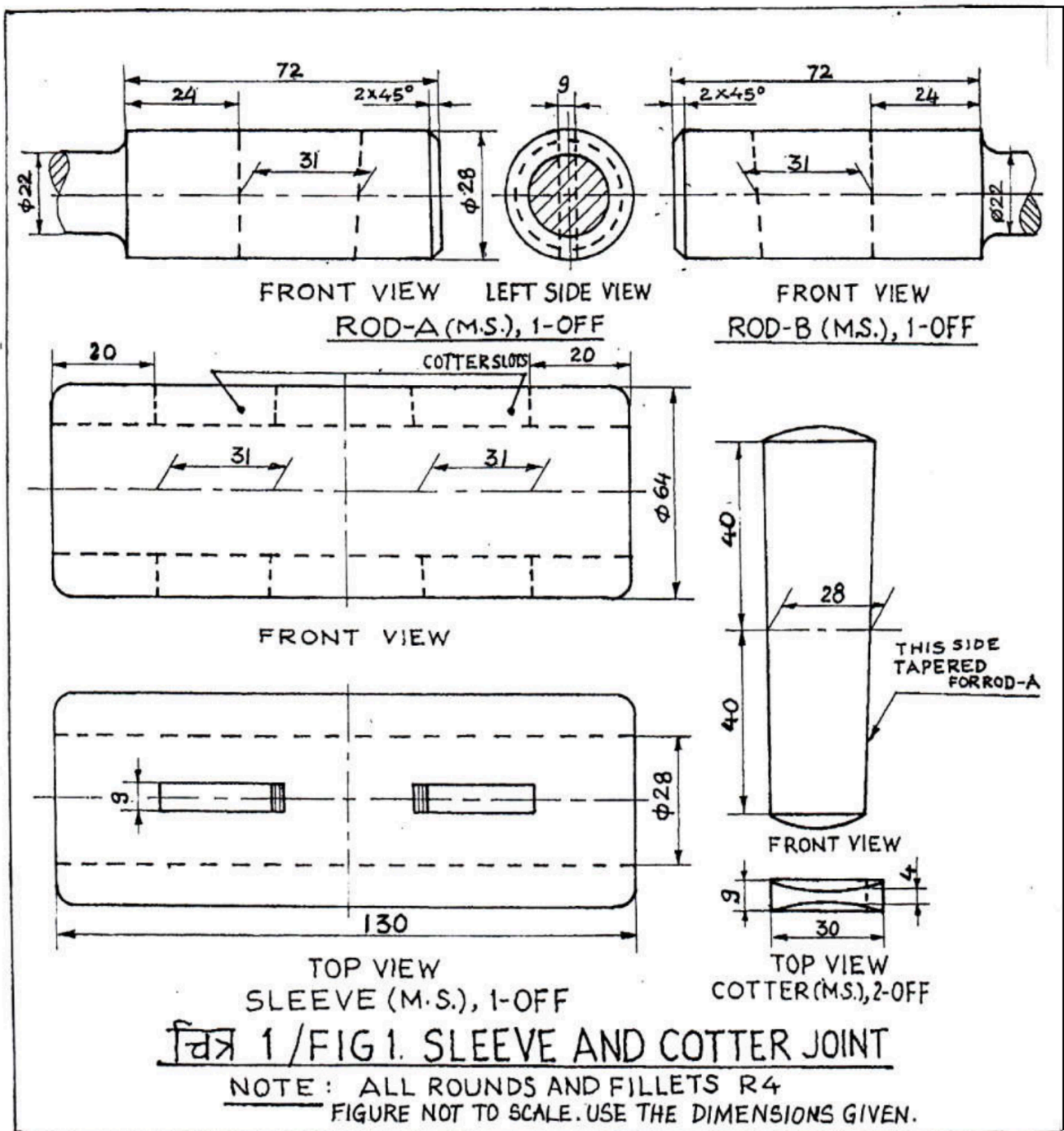
24(b). Draw the isometric projection of a hexagonal prism (base edge 20 and length 60 mm) placed with one of its long edges on H.P. Its axis is perpendicular to V.P. Indicate the direction of viewing. Give all dimensions.

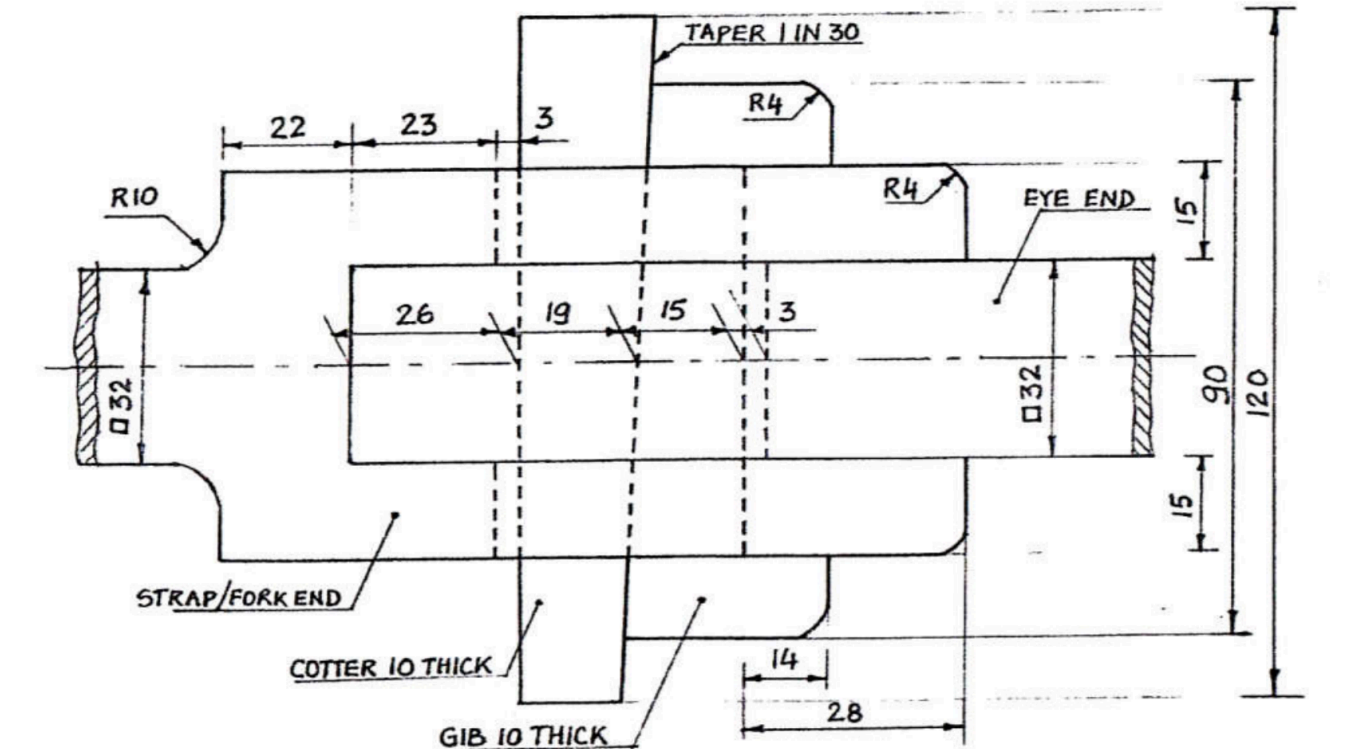
25(a). Draw to scale 1 : 1, the standard profile of **BSW Thread** taking enlarged pitch as 50 mm. Give standard dimensions.

OR

25(b). Draw to scale 1 : 1, the front view and top view of a **Square Nut** for a nominal diameter (d) as 25 mm. Keep its axis perpendicular to H.P. and two sides of the square equally inclined to V.P. Give standard dimensions.

Question 23(a) — Figure 1





FRONT VIEW
चित्र 2/FIG 2. GIB AND COTTER JOINT

NOTE: FIGURE NOT TO SCALE. USE THE DIMENSIONS GIVEN.

- End of Question Paper -