ENGINEERING GRAPHICS – Code No. 046

SAMPLE QUESTION PAPER

CLASS - XII – (2025-26)

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 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 question 23, hidden edges or lines are to be shown in views without section.

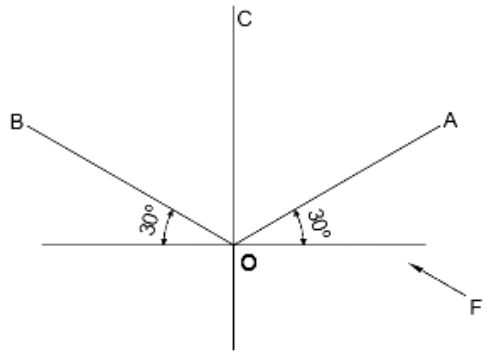
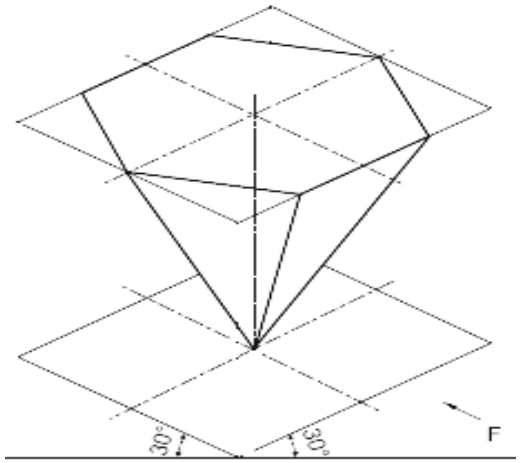
(vii) In question 24, no hidden edges or lines required.

SECTION – A

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

1.	Where is the plan drawn in first angle projection method? (a) Above Elevation (b) Below Elevation (c) Left of the Elevation (d) Right of the Elevation	1
2.	A full scale technical drawing will have a scale factor of _____. (a) 2:1 (b) 1:2 (c) 1:4 (d) 1:1	1
3.	Which isometric axes will be used to draw the isometric projection of a circle lying on HP?	1

Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.

	 (a) OA, OB & OC (b) OB & OC (c) OA & OB (d) OC & OA	
4.	_____thread is a modified form of a Square thread. (a) BSW (b) Metric (c) V-shaped (d) Knuckle	1
5.	Choose the <u>correct statements</u> for the given hexagonal pyramid as seen from F:  (i) Two base sides are perpendicular to VP (ii) Two base sides are parallel to VP (iii) The axis is parallel to VP (iv) The axis is perpendicular to VP (a) (i) & (ii) (b) (ii) & (iii) (c) (i) & (iii) (d) (ii) & (iv)	1

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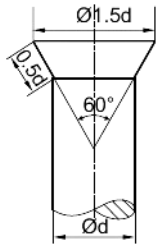
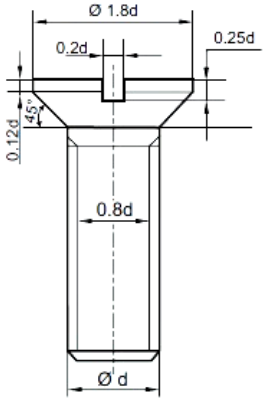
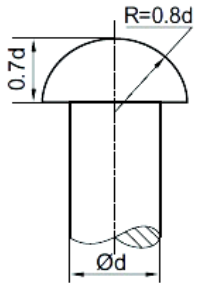
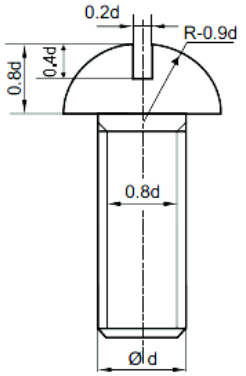
<table>
<tr><td>6.</td><td>Match LIST I with LIST II

<table><tr><th>LIST I (TYPE OF PROJECTION)</th><th>LIST II (FEATURES)</th></tr><tr><td>A. Perspective</td><td>(i) Used by mathematicians</td></tr><tr><td>B. Oblique</td><td>(ii) Gives same shape and size</td></tr><tr><td>C. Isometric</td><td>(iii) Principal axes are equally inclined</td></tr><tr><td>D. Orthographic</td><td>(iv) Appears to converge at a point</td></tr></table>
(a) A-(i) B-(ii) C-(iv) D-(iii)
(b) A-(iv) B-(i) C-(iii) D-(ii)
(c) A-(iv) B-(iii) C-(i) D-(ii)
(d) A-(i) B-(iv) C-(ii) D-(iii)</td><td>1</td></tr>
<tr><td>7.</td><td>Which of the following statements <u>are correct</u> for an external thread?
(i) It is represented as a discontinuous minor diameter circle
(ii) Can be seen in a Hexagonal Nut
(iii) The crests are flattened for a Metric Thread profile(External)
(iv) The thin line represents the Crest and thick line represents the root

(a) (i) & (ii)
(b) (ii) & (iii)
(c) (i) & (iii)
(d) (iv) & (ii)</td><td>1</td></tr>
<tr><td>8.</td><td>In a ‘Stud with square neck’, what will be the length of its square neck, if the nominal diameter is 15 mm?

(a) 6 mm
(b) 30 mm
(c) 15 mm
(d) 45 mm</td><td>1</td></tr>
</table>

9.	Match the **LIST – I** with **LIST – II :**	1

LIST I (FRONT VIEW)	**LIST II (NAME)**
A. 	(i) ROUND HEAD SCREW
B. 	(ii) CSK HEAD SCREW
C. 	(iii) CSK HEAD RIVET
D. 	(iv) SNAP HEAD RIVET

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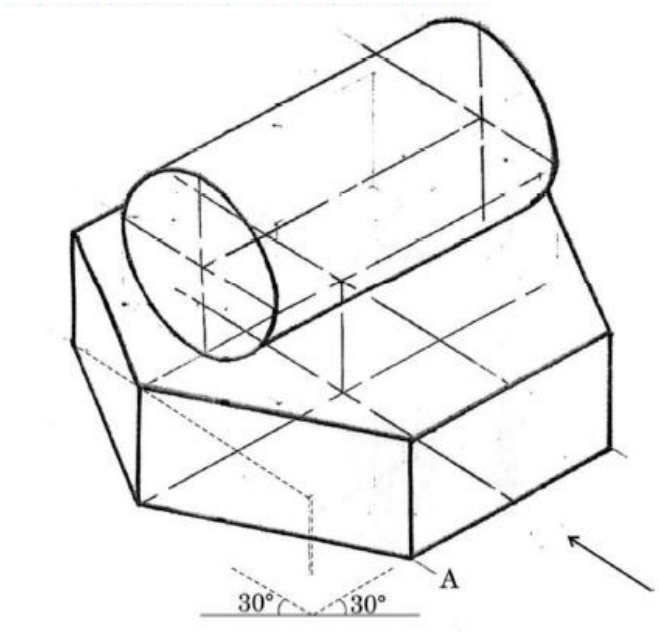
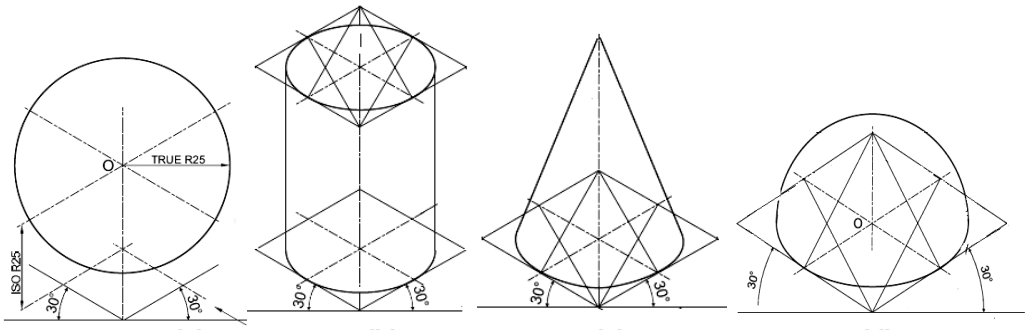
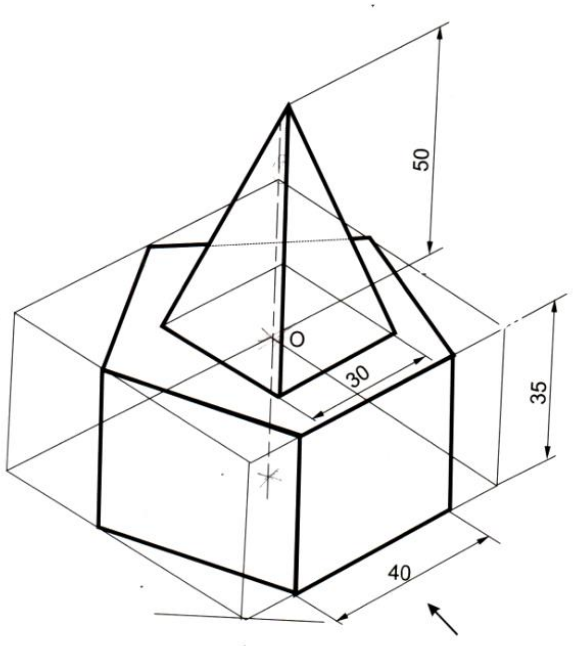
	(a) A-(i) B-(ii) C-(iii) D-(iv) (b) A-(iii) B-(iv) C-(i) D-(ii) (c) A-(ii) B-(iii) C-(i) D-(iv) (d) A-(iii) B-(ii) C-(iv) D-(i)	
10.	Choose the <u>correct statements</u> for the given figure:  (i) The bottom solid is kept horizontal (ii) An inverted cylinder is centrally placed on the rectangular face of a prism. (iii) The axis of the cylinder is parallel to VP & HP (iv) Two rectangular faces are parallel to VP (a) (i) & (iii) (b) (iii) & (iv) (c) (i) & (iv) (d) (ii) & (iii)	1
11.	Which of the following machine joints requires a rubber gasket? (a) Flange Pipe Joint (b) Gib and cotter joint (c) Tie rod joint (d) Sleeve and cotter joint	1

12.	Which figure shows the isometric projection of a solid lying on its curved surface on HP?  **(a)** **(b)** **(c)** **(d)**	1
13.	Which <u>statements are correct</u> for the given figure on isometric projection of combination of solids?  (i) Four base sides are parallel to VP. (ii) There are two triangular faces. (iii) One rectangular face is perpendicular to HP and VP. (iv) There are fifteen vertices including the apex. (a) (i) & (iii) (b) (iii) & (iv) (c) (i) & (iv) (d) (ii) & (iii)	1

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14. Match **LIST – I** with **LIST – II**, according to your understanding of a 'Bush Bearing' — 1

LIST I (FEATURES)	LIST II (USE)
A. Bush	(i) For lubrication
B. Recess	(ii) For lateral adjustment of bolts
C. Oil Hole	(iii) Easily replaceable when worn out
D. Elongated holes	(iv) For better stability on surface

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

SECTION – B

Q.15 to Q.18 : Read the following paragraph and answer the questions given below:

4 X 1 = 4

"Isometric art is a drawing or illustration style that makes two-dimensional figures appear as 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 exactly 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.

Reference:
https://www.adobe.com/creativecloud/photography/discover/isometric-art.html

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15.	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	1
16.	Which are the other types of axonometric projection? (a) Dimetric, Trimetric (b) Perspective, Oblique (c) Perspective, Trimetric (d) Dimetric, Oblique	1

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17.	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	1
18.	What will be 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	1

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

As we enter the building of NSIC (National Small Industries Corporation), an ISO 9001:2015 certified Government of India Enterprise under Ministry of Micro, Small and Medium Enterprises (MSME), Delhi, a structure of its logo welcomes us. Alongside are 3D models of two fasteners highlighting the importance of these components, which though small are inevitable for machines in use in daily life, in automobiles, electronic products, construction structures, aerospace - almost in every industry. They are used to join, assemble or hold single/multiple parts together either permanently or non-permanently. Due to their growing demand and use across diverse fields, the Indian industrial fasteners market which was valued at USD 9,064 million in 2022 is projected to reach USD 17,868 million by 2030, according to a recent report by Straits Research. Some of the industrial fasteners are bolts, screws, nuts, rivets, studs etc. They may be threaded or non-threaded and are available in various standard shapes, designs and sizes and materials, according to their utility.

19.	Models of which two fasteners welcome us at NSIC building? (a) Hexagonal bolt, hexagonal nut (b) Square nut, plain stud (c) Hexagonal socket head screw, rivet (d) Square bolt, plain washer	1
20.	One of the threaded fasteners is _____. (a) Plain washer (b) Pan head rivet (c) Collar Stud (d) Cotter	1
21.	Which among them is a permanent fastener? (a) Snap head rivet (b) Gasket (c) Plain washer (d) Gib	1
22.	The ratio of the dimension of the height/thickness of a hexagonal head in a nut to that of a bolt is _____ (a) 1:1 (b) 10:8 (c) 8:10 (d) 1:8	1

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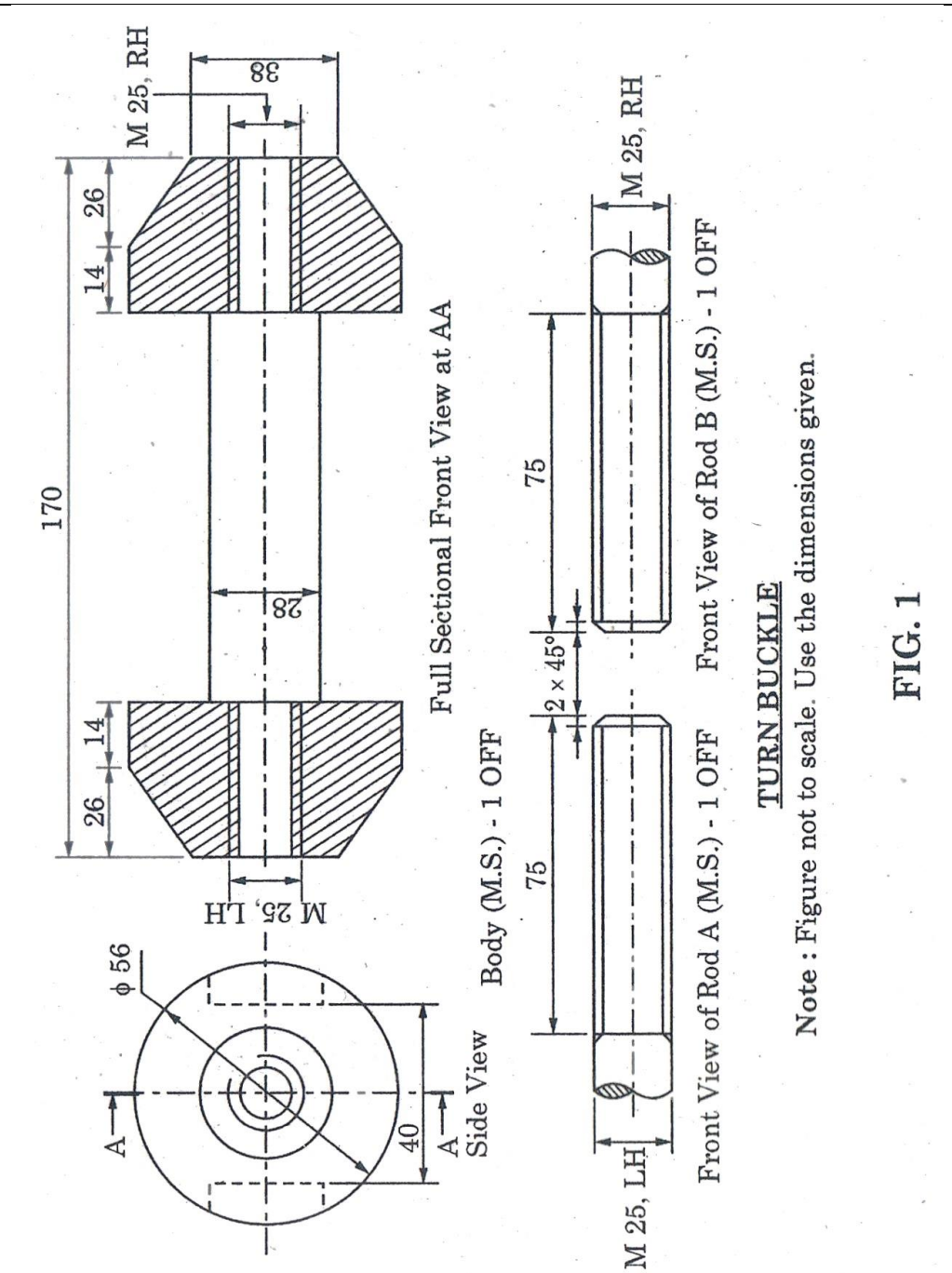
23. A	 FIG. 1 Figure 1 shows the details of parts of a **Turnbuckle**. Assemble all these parts correctly by inserting 60 mm of each rod in the body and then draw to scale 1:1; it's following views:	
	(I) Front View, lower half in section	13
	(II) Top View	8
	(III) Print the title and scale used. Draw projection symbol. Give six important dimensions.	6

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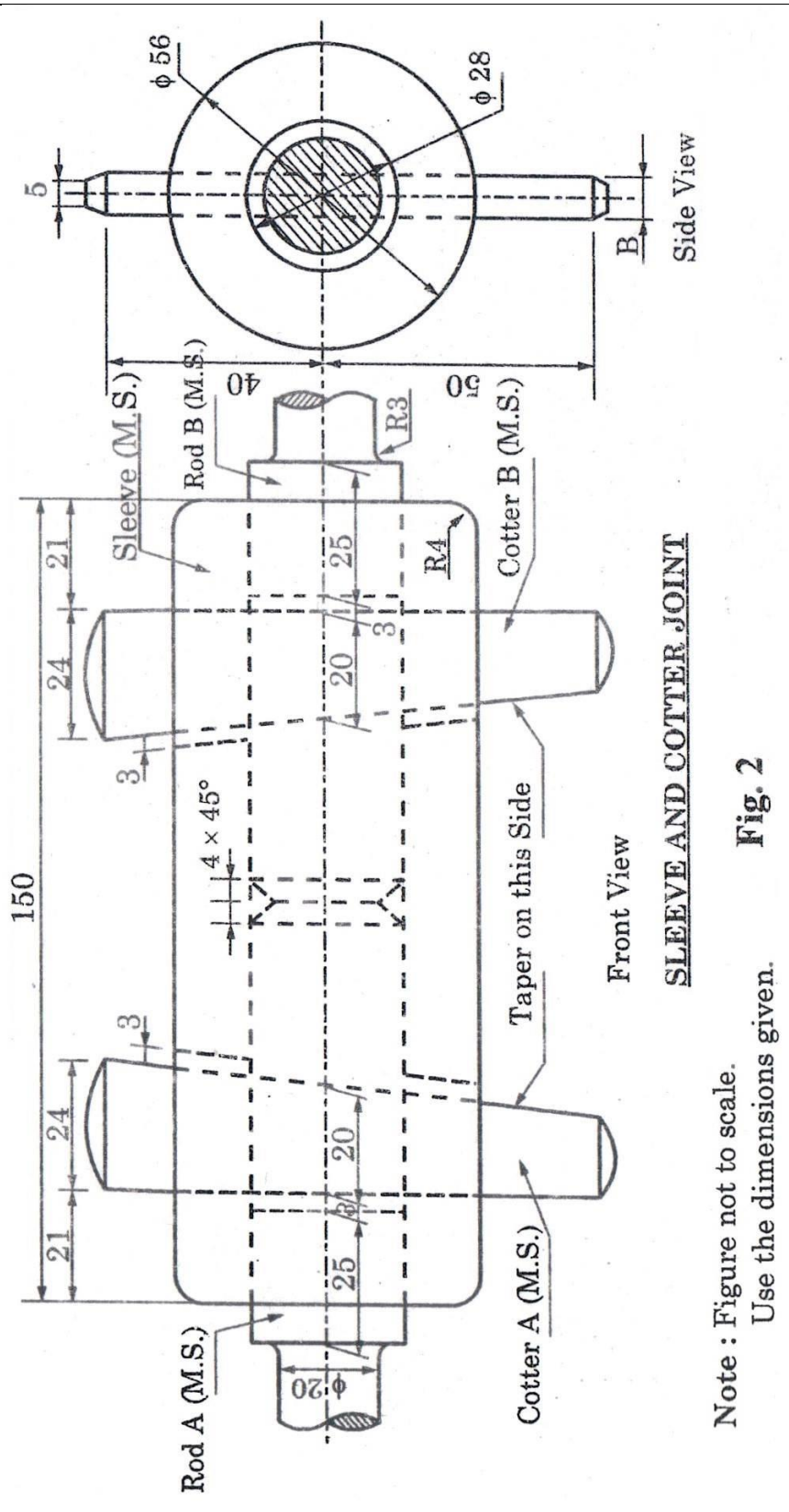
OR

23.B



SLEEVE AND COTTER JOINT

Fig. 2

Note : Figure not to scale.
Use the dimensions given.

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	Figure 2 shows the assembly of a **Sleeve and Cotter Joint**. Disassemble the parts correctly and then draw to scale 1:1 its following views of the following components. Keeping the same position of parts with respect to H.P and V.P. as given:	
	(I) SLEEVE i. Full sectional front View ii. Top View	 8 6
	(II) ROD - A i. Front View upper half in section ii. Left Side View	 4 3
	(III) Print the titles of both and scale used. Draw the projection symbol. Give six important dimensions.	6
	SECTION – C	
24.	(I) Construct an isometric scale.	4
	(II) Draw the isometric projection of a pentagonal prism (base edge 34 mm, axis 80mm) with its axis parallel to both H.P and V.P. and resting on one of its face edge on H.P. in such a way that top face is parallel to the H.P. Indicate the direction of viewing. Give all the dimensions.	9
25. A	Draw to scale 1:1, the standard profile of the **B.S.W. thread** with the enlarged pitch as 50mm. Give standard dimensions.	8
	OR	
25.B	Draw to scale 1:1, the front view and side view of a horizontal **Square Bolt** of nominal diameter 24 mm. Give the standard dimensions.	8

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