

ENGINEERING GRAPHICS – Code No. 046

SAMPLE QUESTION PAPER

CLASS - XII – (2026-27)

Time Allowed: 3 hours

Maximum Marks: 70

General Instructions:

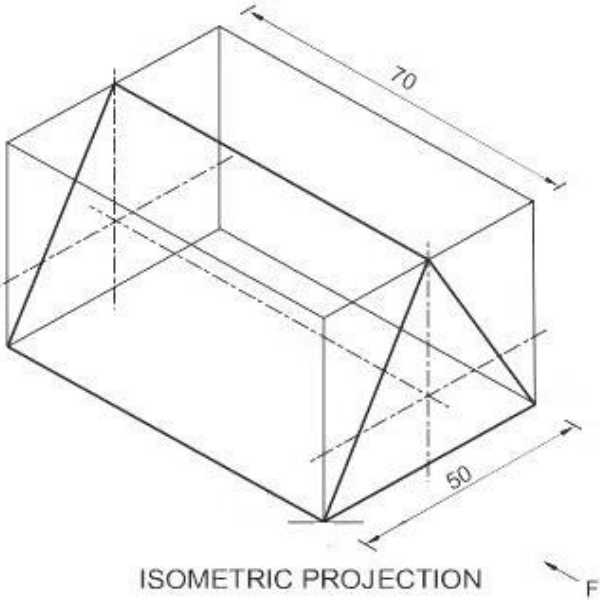
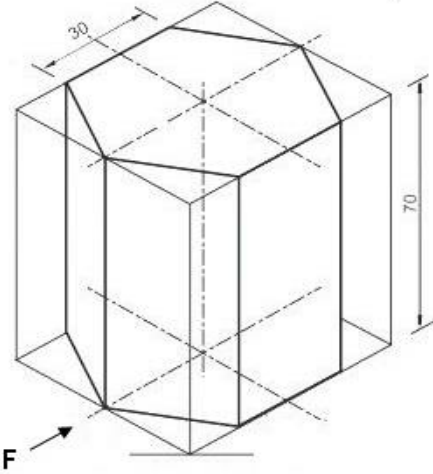
- (i) Attempt all the questions.
- (ii) Use both sides of the drawing sheet, if necessary.
- (iii) All dimensions are in millimetres.
- (iv) Missing and mismatching dimensions, if any, may be suitably assumed.
- (v) Follow the SP: 46 – 2003 revised codes. (with first angle method of projection)
- (vi) 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.

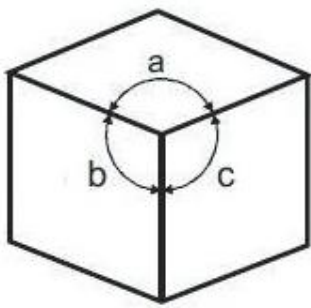
SECTION – A

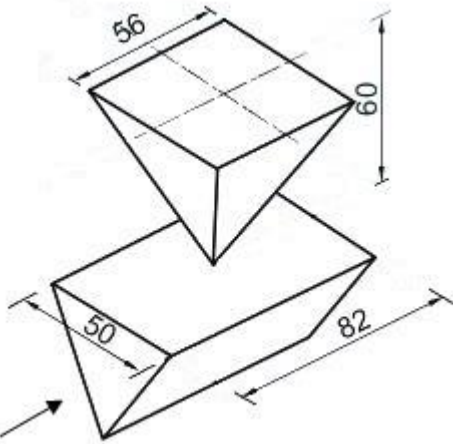
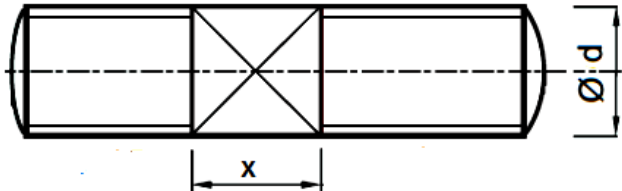
Q.1 to Q.14: Answer the following Multiple Choice Questions. Print the correct choice on your drawing sheet. 14 X 1 = 14

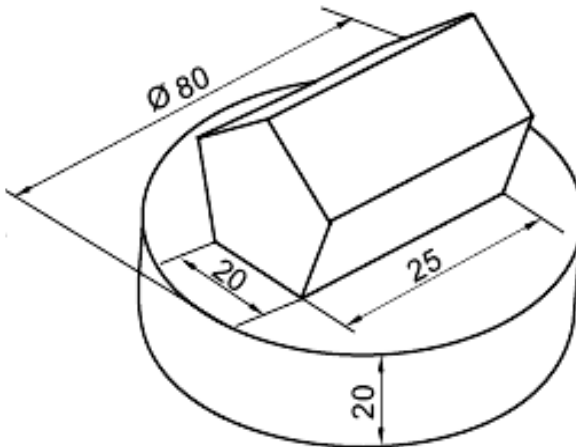
1.	What is the relative position of the plane of projection with respect to the object, when viewed by an observer in the first angle method of projection? (A) In front of the object (B) Behind the object (C) Between the object and the observer (D) Above the object	1
2.	Which of the following lines are used to show that the object is cut and then viewed? (A) Hidden Lines (B) Leader Lines (C) Centre Lines (D) Hatching Lines	1
3.	The ratio of isometric length to true length can be mathematically calculated as: (A) $\sqrt{2} : \sqrt{2}$ (B) $\sqrt{3} : \sqrt{2}$ (C) $\sqrt{2} : \sqrt{3}$ (D) $\sqrt{1} : \sqrt{3}$	1

There is no change in the Question Paper Design and Assessment Pattern for Academic Session 2026-27.

4.	How many non-isometric lines are there in the given isometric projection?  ISOMETRIC PROJECTION (A) 2 (B) 4 (C) 3 (D) 5	1
5.	For a square thread, what is the distance (D) between the Crest and Root when pitch (P) is given? (A) $D = 0.86 P$ (B) $D = 0.50 P$ (C) $D = 0.64 P$ (D) $D = 0.96 P$	1
6.	Choose the <u>correct</u> statements for the given hexagonal prism as seen from direction F: 	1

	(i) It is a horizontal solid (ii) Two rectangular faces are parallel to VP (iii) The hexagonal ends are parallel to HP (iv) The axis is perpendicular to HP (A) (i) & (ii) (B) (ii) & (iii) (C) (iii) & (iv) (D) (ii) & (iv)											
7.	Which of the following statements are <u>correct</u> for a rivet? (i) It is represented as two discontinuous circles in one of its views. (ii) Flat-head is a type of a rivet-head. (iii) It is a non-threaded fastener. (iv) It is used along with a cotter in rod joints. (A) (i) & (ii) (B) (ii) & (iii) (C) (i) & (iii) (D) (iv) & (ii)	1										
8.	The parts used in a “Sleeve and Cotter Joint” are: (A) 1 Sleeve, 2 Rods and 1 Cotter (B) 1 Sleeve, 2 Rods and 2 Cotters (C) 2 Sleeves, 1 Rod and 2 Cotters (D) 2 Sleeves, 2 Rods and 2 Cotters	1										
9.	Match LIST I with LIST II  <table><tr><th>LIST I (Value of angles a, b, c)</th><th>LIST II (Name of Projection)</th></tr><tr><td>A. $\angle a \neq \angle b \neq \angle c$</td><td>(i) Isometric</td></tr><tr><td>B. $\angle a \neq \angle b = \angle c$</td><td>(ii) Oblique</td></tr><tr><td>C. $\angle a = \angle b = \angle c$</td><td>(iii) Dimetric</td></tr><tr><td>D. $\angle a \neq \angle b \neq \angle c$, but $\angle b = 90^0$</td><td>(iv) Trimetric</td></tr></table> (A) A-(i) B-(ii) C-(iv) D-(iii) (B) A-(iv) B-(i) C-(iii) D-(ii) (C) A-(i) B-(iv) C-(ii) D-(iii) (D) A-(iv) B-(iii) C-(i) D-(ii)	LIST I (Value of angles a, b, c)	LIST II (Name of Projection)	A. $\angle a \neq \angle b \neq \angle c$	(i) Isometric	B. $\angle a \neq \angle b = \angle c$	(ii) Oblique	C. $\angle a = \angle b = \angle c$	(iii) Dimetric	D. $\angle a \neq \angle b \neq \angle c$, but $\angle b = 90^0$	(iv) Trimetric	1
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C. $\angle a = \angle b = \angle c$	(iii) Dimetric											
D. $\angle a \neq \angle b \neq \angle c$, but $\angle b = 90^0$	(iv) Trimetric											

10.	Choose the <u>correct</u> statements for the given figure:  (i) There are two pyramids. (ii) An inverted polyhedron is centrally placed on the rectangular face of a prism. (iii) The axis of the prism is parallel to VP & HP (iv) Two triangular faces are parallel to VP (A) (i) & (iii) (B) (iii) & (iv) (C) (ii) & (iv) (D) (i) & (ii)	1										
11.	In the given figure of a square neck stud of diameter $\varnothing d$, what is the value of x?  (A) $0.8d$ (B) $0.5d$ (C) $1.5d$ (D) d	1										
12.	Match LIST I with LIST II for an assembly of a square nut, a square bolt and a washer having nominal diameter = 20 mm <table><thead><tr><th>LIST I (Feature)</th><th>LIST II (Value of its Dimension)</th></tr></thead><tbody><tr><td>A. Thickness of Bolt head</td><td>(i) 16 mm</td></tr><tr><td>B. Length of threaded part of nut</td><td>(ii) 43 mm</td></tr><tr><td>C. Outer diameter of washer</td><td>(iii) 33 mm</td></tr><tr><td>D. Diameter of chamfer circle</td><td>(iv) 20 mm</td></tr></tbody></table>	LIST I (Feature)	LIST II (Value of its Dimension)	A. Thickness of Bolt head	(i) 16 mm	B. Length of threaded part of nut	(ii) 43 mm	C. Outer diameter of washer	(iii) 33 mm	D. Diameter of chamfer circle	(iv) 20 mm	1
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	(A) A-(iv) B-(i) C-(iii) D-(ii) (B) A-(i) B-(iv) C-(ii) D-(iii) (C) A-(ii) B-(iii) C-(i) D-(iv) (D) A-(iii) B-(ii) C-(iv) D-(i)											
13.	Which statements are <u>correct</u> for the given figure on isometric projection of combination of solids?  (i) One of the solids is kept vertical. (ii) There are seven plane surfaces. (iii) The diameter of iso cylinder is less than true 80mm. (iv) There are two curved surfaces. (A) (i) & (iii) (C) (i) & (iv) (B) (iii) & (iv) (D) (ii) & (iii)	1										
14.	Match LIST – I with LIST – II <table><thead><tr><th>LIST I (PARTS)</th><th>LIST II (MACHINE)</th></tr></thead><tbody><tr><td>A. Threaded rods</td><td>(i) Gib and cotter joint</td></tr><tr><td>B. Gasket</td><td>(ii) Bearing</td></tr><tr><td>C. Bush</td><td>(iii) Flange pipe joint</td></tr><tr><td>D. Strap</td><td>(iv) Turnbuckle</td></tr></tbody></table> (A) A-(iv) B-(iii) C-(ii) D-(i) (B) A-(iii) B-(iv) C-(i) D-(ii) (C) A-(iv) B-(ii) C-(i) D-(iii) (D) A-(i) B-(iv) C-(ii) D-(iii)	LIST I (PARTS)	LIST II (MACHINE)	A. Threaded rods	(i) Gib and cotter joint	B. Gasket	(ii) Bearing	C. Bush	(iii) Flange pipe joint	D. Strap	(iv) Turnbuckle	1
LIST I (PARTS)	LIST II (MACHINE)											
A. Threaded rods	(i) Gib and cotter joint											
B. Gasket	(ii) Bearing											
C. Bush	(iii) Flange pipe joint											
D. Strap	(iv) Turnbuckle											

SECTION – B

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

4 X 1= 4



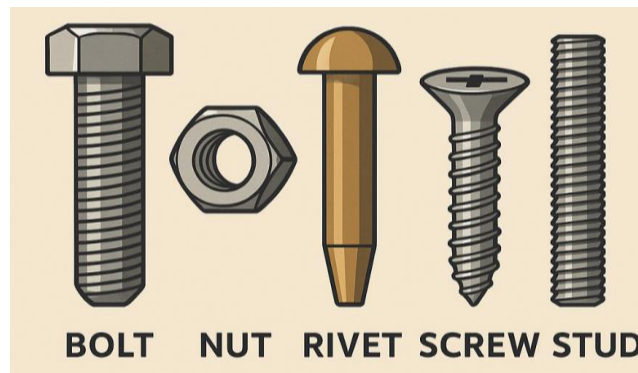
The isometric projection of the given stainless-steel water tank provides a clear three-dimensional representation, enabling engineers to visualize its structure without distortion. The tank consists of an upper cylindrical storage section and a lower inverted conical discharge section, both supported on a rigid steel frame. The isometric view highlights equal foreshortening along all three axes, allowing accurate measurement and proportion checking. This method helps in understanding joint placements, leg alignment, and the visibility of the conical portion. Such a projection is widely used in engineering graphics for fabrication drawings, material estimation, and ensuring that each component fits precisely during construction.

15.	Isometric projection gives _____ foreshortening along all three axes. (A) Unequal (B) Linear (C) Equal (D) Zero	1
16.	The common axis of the tank is: (A) Parallel to HP and perpendicular to VP (B) Perpendicular to HP and parallel to VP (C) Perpendicular to both HP and VP (D) Parallel to both HP and VP	1
17.	In engineering drawing, to understand the detailed interior of the tank, one would require a: (A) Sectional view (B) Freehand sketch (C) Flow chart (D) Isometric view	1
18.	The water tank is a combination of two solids: (A) Cube and Cylinder (B) Sphere and Cone (C) Cylinder and Cone (D) Cylinder and Hemisphere	1

Q.19 to Q.22: Read the following paragraph and answer the questions given below:

4 X 1 = 4

Fasteners are mechanical components used to securely join two or more parts in engineering applications. They provide temporary or permanent connections depending on the requirement. The most widely used fasteners are bolts, nuts, screws, rivets, and studs. A bolt is a threaded cylindrical rod inserted through aligned holes and tightened using a nut to form a strong detachable joint. Nuts are internally threaded components used in combination with bolts and studs to apply clamping force. Screws differ from bolts because they are driven directly into a threaded hole or material, eliminating the need for a nut. Rivets create a permanent joint by deforming the shank after insertion, making them ideal for structures subjected to vibration. Studs are threaded rods with no head, used when access is available from one side only and a firm clamping force is required. Proper selection of fasteners ensures structural reliability and service safety.



19.	Fasteners that allow repeated assembly and disassembly are _____. (A) Rivets (B) Bolts and Nuts (C) Adhesives (D) Welds	1
20.	The head is missing in which fastener? (A) Nut (B) Rivet (C) Stud (D) Bolt	1
21.	Studs are especially useful when access is available from _____. (A) Both sides (B) One side only (C) From all sides (D) No access is available	1
22.	The shank portion of a rivet is made of _____. (A) Plastic (B) Soft metal (C) Wood (D) Glass	1

23.A

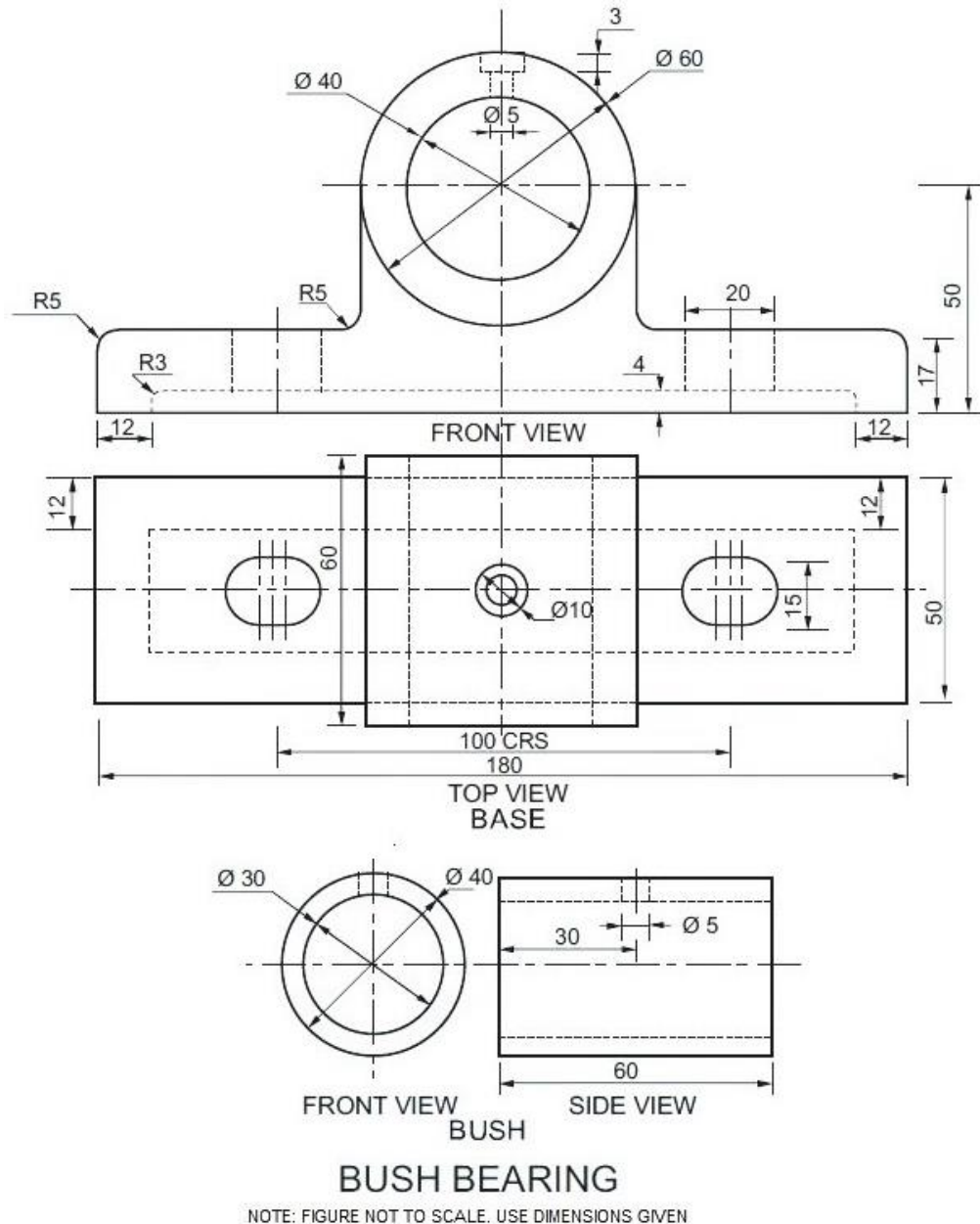


Figure 1

Figure 1 shows the details of parts of a **Bush Bearing**. Assemble all these parts correctly and then draw to scale 1:1; it's following views:

(I) Front View, right half in section

13

(II) Top View

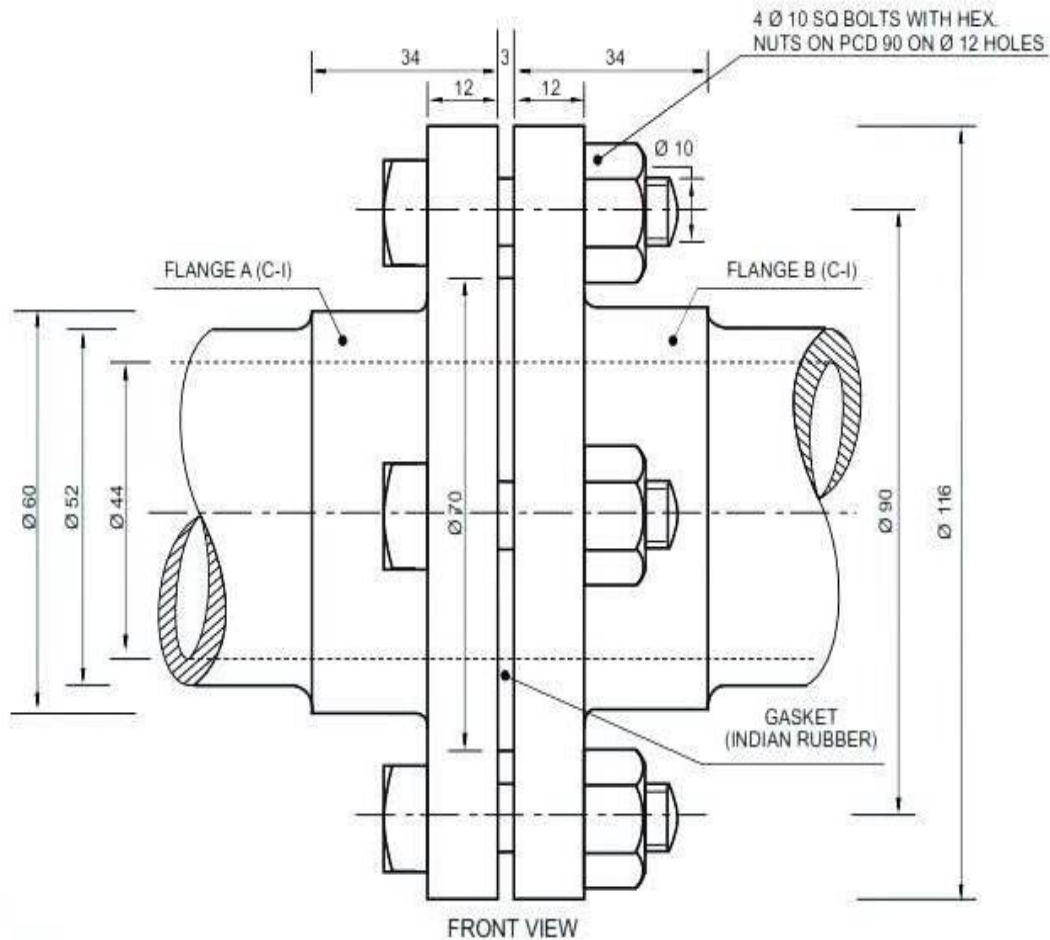
8

(III) Print the title and scale used. Draw projection symbol. Give six important dimensions.

6

OR

23.B



FRONT VIEW

FLANGE PIPE JOINT

Take All Fillets R4

NOTE: FIGURE NOT TO SCALE. USE DIMENSIONS GIVEN

Figure 2

Figure 2 shows the assembly of a **Flange Pipe 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) FLANGE B

(A) Front view, upper half in section

(B) Right side view

(II) GASKET

(A) Full sectional front view

(B) Left side view

(III) Print the titles of both and scale used. Draw the projection symbol. Give six important dimensions.

8

7

3

3

6

<u>SECTION – C</u>		
24.	(I) Construct an isometric scale.	4
	(II) Draw the isometric projection of a pentagonal pyramid (base edge 35 mm, axis 75mm) with its axis perpendicular to H.P and parallel to V.P. and resting on its base on H.P. with one base edge parallel to VP and nearer to the observer. Indicate the direction of viewing. Give all the dimensions.	9
25.A	Draw to scale 1:1, the standard profile of the Knuckle thread with the enlarged pitch as 60mm. Give standard dimensions.	8
OR		
25.B	Draw to scale 1:1, the front view and side view of a horizontal Hexagonal Bolt of nominal diameter 30 mm. Give the standard dimensions.	8

ENGINEERING GRAPHICS – Code No. 046

MARKING SCHEME

CLASS - XII – (2026-27)

Time Allowed: 3 hours

Maximum Marks: 70

SECTION – A

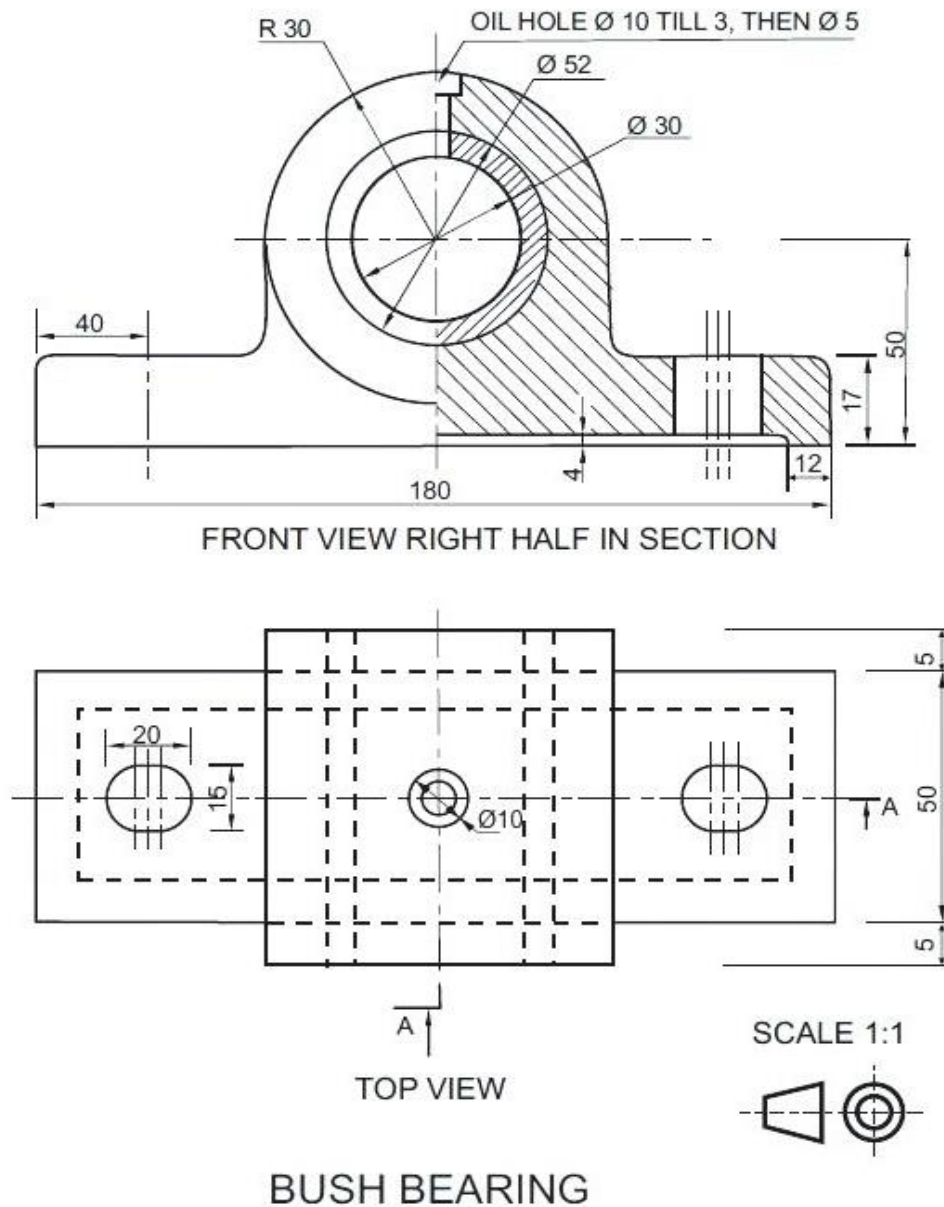
Value Points

- | | |
|--|---|
| 1. (b) or Behind the object | 1 |
| 2. (d) or Hatching Lines | 1 |
| 3. (c) or $\sqrt{2} : \sqrt{3}$ | 1 |
| 4. (c) or 3 | 1 |
| 5. (b) or $D = 0.50 P$ | 1 |
| 6. (c) or (iii) & (iv) | 1 |
| 7. (b) or (ii) & (iii) | 1 |
| 8. (b) or 1 Sleeve, 2 Rods and 2 Cotters | 1 |
| 9. (d) or A-(iv) B-(iii) C-(i) D-(ii) | 1 |
| 10. (c) or (ii) & (iv) | 1 |
| 11. (d) or d | 1 |
| 12. (b) or A-(i) B-(iv) C-(ii) D-(iii) | 1 |
| 13. (a) or (i) & (iii) | 1 |
| 14. (a) or A-(iv) B-(iii) C-(ii) D-(i) | 1 |

SECTION – B

- | | |
|---|---|
| 15. (c) or Equal | 1 |
| 16. (b) or Perpendicular to HP and parallel to VP | 1 |
| 17. (a) or Sectional view | 1 |
| 18. (c) or Cylinder and Cone | 1 |
| 19. (b) or Bolts and Nuts | 1 |
| 20. (c) or Stud | 1 |
| 21. (b) or One side only | 1 |
| 22. (b) or Soft metal | 1 |

23. (A) **ASSEMBLY OF BUSH BEARING**



(I) FRONT VIEW RIGHT HALF IN SECTION

13

- (i) Drawing the left half of base and bush correctly 4
- (ii) Drawing the right half of base correctly including oil hole, mounting hole and recess of 4 mm with section lines 6
- (iii) Drawing right half of bush correctly including oil hole with section lines 3

(II) TOP VIEW **8**

- (i) Drawing base and bush including hidden lines 4
- (ii) Drawing mounting holes, oil hole and cutting plane 4

(III) OTHERS **6**

- (i) Six Important Dimensions 3
- (ii) Printing title, Projection symbol and Scale used 3

OR

23.(B) DIS-ASSEMBLY OF FLANGE PIPE JOINT

(I) FLANGE B

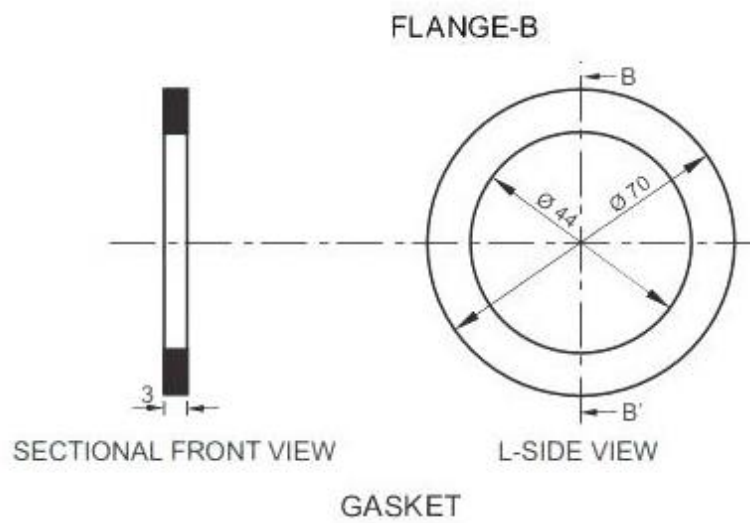
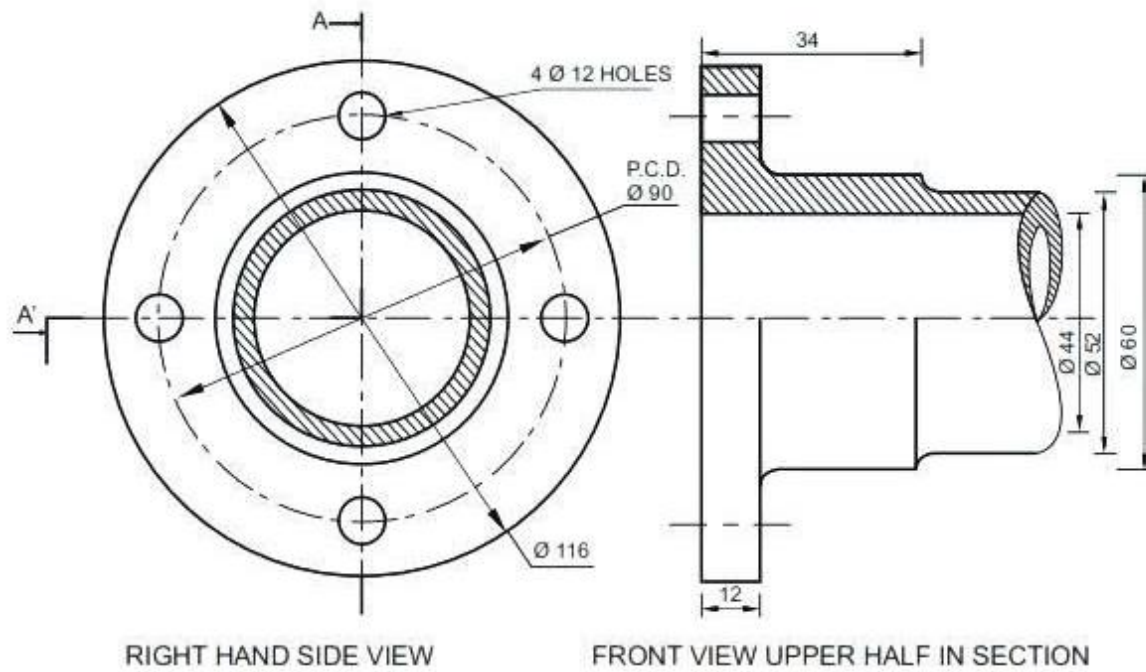
- (i) Front View upper half in section **8**
 - a. Drawing the lower half and conventional end 3
 - b. Drawing the upper half including hole of $\varnothing 12$ mm and conventional end with hatching lines 5
- (ii) Right Side View. **7**
 - a. Drawing the circles of $\varnothing 116$, $\varnothing 60$, $\varnothing 52$, $\varnothing 44$ and four holes of $\varnothing 12$ mm 5
 - b. Drawing the pitch circle of $\varnothing 90$ mm, cutting plane and hatching lines of conventional end of pipe 2

(II) GASKET

- (i) Full sectional front view **3**
 - a. Sectional front view with shading to show rubber 3
- (ii) Left Side View **3**
 - a. Both circles with cutting plane 3

(III) OTHERS **6**

- (i) 6 Important Dimensions. 3
- (ii) Printing titles, Symbol of Projection and Scale used. 3

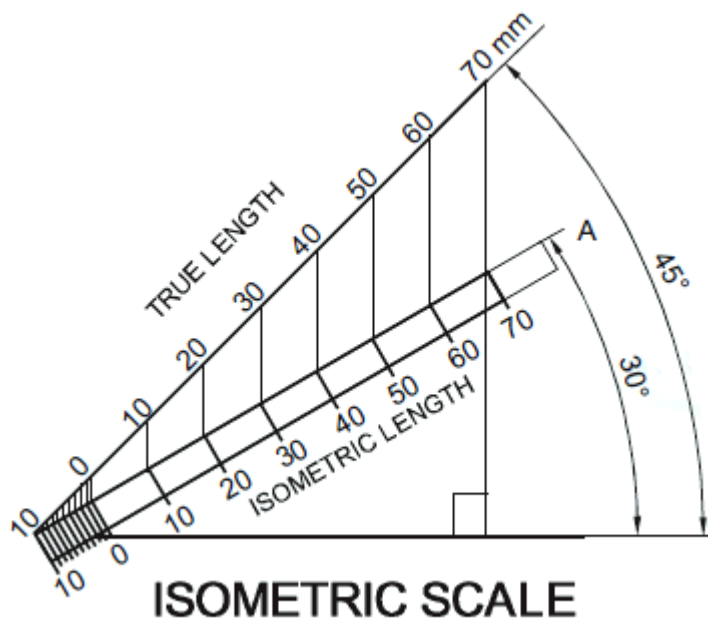


SCALE 1:1

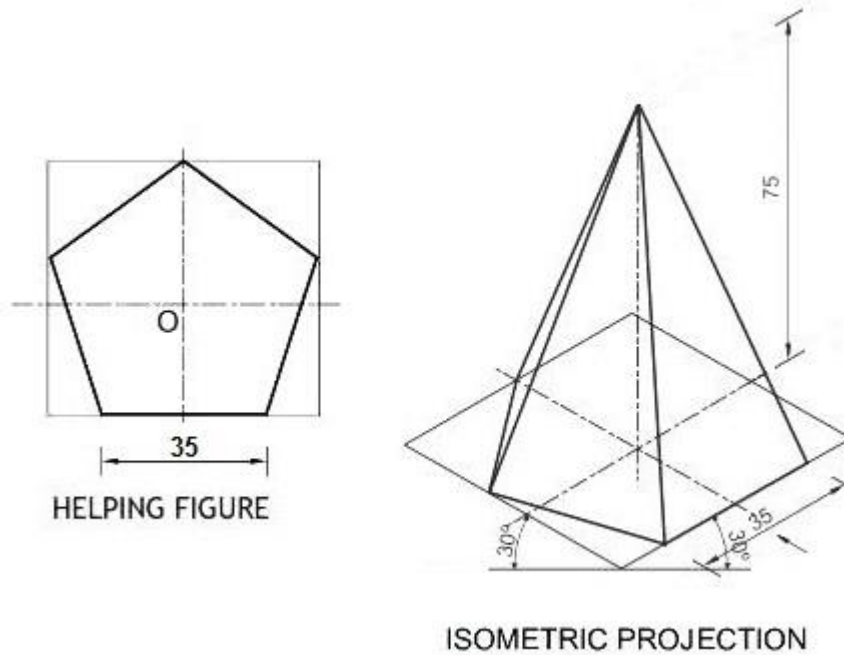
FLANGE PIPE JOINT DIS ASSEMBLY

SECTION – C

24.(I) ISOMETRIC SCALE	4
(i) Drawing 45° inclined line showing true lengths	1
(ii) Projections on 30° inclined line showing isometric length with subdivisions in one part	2
(iii) Writing title, sub titles and angles	1



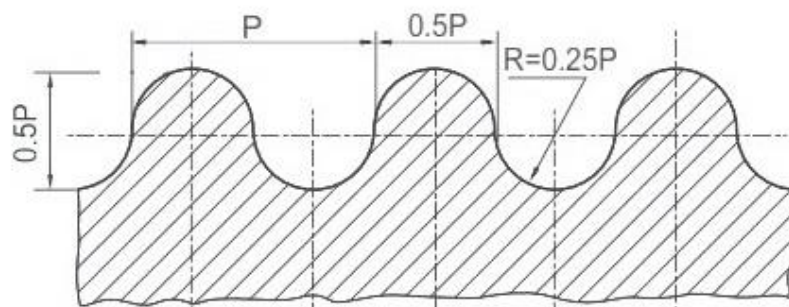
24.(II) ISOMETRIC PROJECTION OF PENTAGONAL PYRAMID	9
(i) Helping figure	1
(ii) Drawing isometric pentagon	4
(iii) Drawing face edges	2
(iv) Dimensions	1
(v) Indicating the axis and direction of viewing	1



25. (A) KNUCKLE THREAD PROFILE

8

- (i) Distance equal to half pitch 2
- (ii) Crest and roots 3
- (iii) Hatching lines with conventional break 1
- (iv) Standard dimensions 2



P	0.5P	0.25P
60	30	15

KNUCKLE THREAD PROFILE

OR

25. (B) HEXAGONAL BOLT

8

(i) Front view

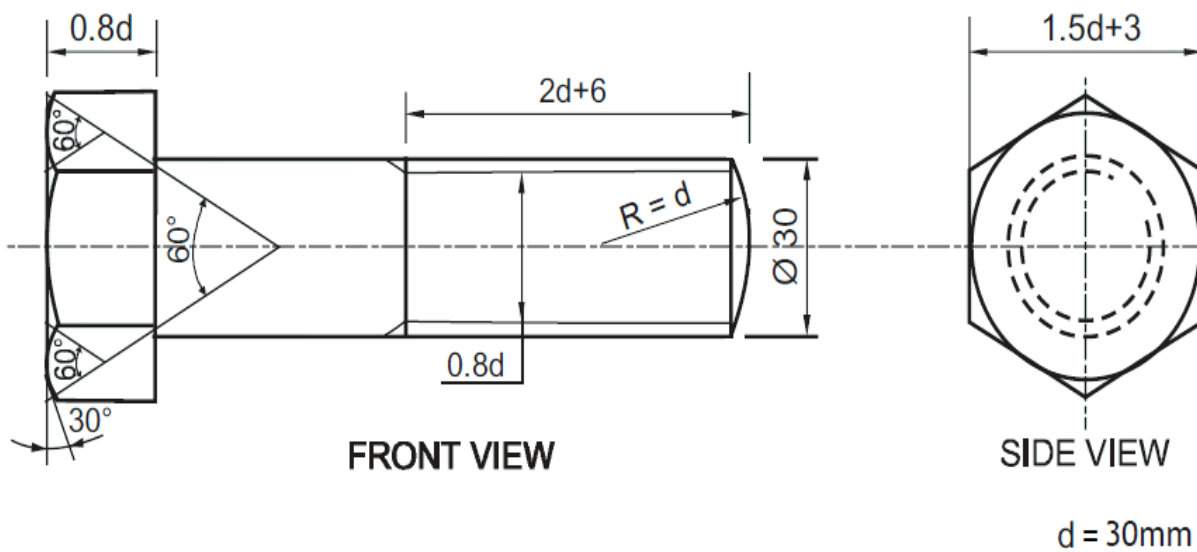
3

(ii) Side view

3

(iii) Standard dimensions

2



HEXAGONAL BOLT