

Question Paper 2011 Delhi set 1
CBSE Class 12 ENGINEERING DRAWING

Note:

- Attempt all the questions.
- Use both sides of the drawing sheet, if necessary.
- All dimensions are in milli metres.
- Missing and mismatching dimensions, if any, may be suitably assumed.
- Follow the SP : 46-1988 codes (with First Angle method of projection).
- In no view of Question 1 and in no sectioned view of question 3, are hidden edges / lines required.

1. (a) Construct an isometric scale, 110 mm long. [4]

(b) Construct the isometric projection, to isometric scale, of a hemisphere (diameter = 70 mm), resting on H.P. with its circular face on it. The axis is parallel to V.P.

Draw the axis, marking the centre of its circular base on H.P. Give dimensions. [7]

(c) A pentagonal pyramid (base edge 30 mm and height 70 mm) is placed, centrally, on the top triangular face of a triangular prism (base side 90 mm and height 30 mm), with its pentagonal base on the prism. One base side of the pyramid, is parallel to V.P. and away from it. One side of the base of the prism, is parallel to V.P. and closer to the observer.

Draw the isometric projection of the solids, placed together, to isometric scale. Draw their common vertical axis and indicate the direction of viewing. Give all dimensions. [14]

Ans. (a): ISOMETRIC SCALE

- (i) Marking of divisions of 10 mm, 1 mm on true scale and marking angles of 30° & 45° .
- (ii) Projections from scale 1:1 to get points on isometric scale, Printing 'Scale 1:1' and 'Isometric Scale'.
- (iii) Construction of isometric scale, 110 mm long, with main divisions of 10 mm each.

(iv) Division of the first part of isometric scale into 10 subdivisions.

(b): ISOMETRIC PROJECTION OF A HEMISPHERE (7)

- (i) Drawing isometric ellipse on H.P. along with center lines.
- (ii) Drawing semicircular portion of hemisphere.
- (iii) Marking the center, vertical axis and diameter of hemisphere

(c): ISOMETRIC PROJECTION OF PENTAGONAL PYRAMID, PLACED CENTRALLY, ON AN EQUILATERAL TRIANGULAR PRISM [14]

TRIANGULAR PRISM

- (i) Drawing a helping figure of a triangle, base edge = 90 mm, with one base edge parallel to V.P. and closer to the observer.
- (ii) Drawing isometric triangles.
- (iii) Drawing face edges, parallel to the vertical axis / V.P.
- (iv) Dimensioning edge of base of prism and its axis, i.e. height.

PENTAGONAL PYRAMID

- (i) Helping figure (using either isometric scale or 1:1 scale) of a pentagon with one side parallel to V.P. and away from it.
- (ii) Drawing isometric pentagon on the top triangular face of the triangular prism, centrally placed, with one side parallel to V.P. and away from it.
- (iii) Drawing slant edges.
- (iv) Marking the common vertical axis and direction of viewing.
- (v) Printing dimensions.

2. (a) Draw to scale 1 : 1, the front view and top view of a Square Nut, for a nominal diameter $d = 30$ mm, keeping its axis perpendicular to H.P. and two sides of the square, parallel to V.P. Give all standard dimensions. [9]

OR

Draw to scale 1 : 1, the front view and top view of a Hook Bolt, taking nominal diameter = 26 mm and keeping its axis perpendicular to H.P. Give standard dimensions.

(b) Sketch freehand the front view and the top view of a Stud with Collar, keeping the axis perpendicular to H.P. Take nominal diameter = 25 mm. Give standard

dimensions. [6]

OR

Sketch freehand the front view and the top view of a Pan Head Rivet (without tapered neck), keeping the axis vertical. Take diameter of the rivet as 25 mm. Give standard dimensions.

Ans. (a): SQUARE NUT

FRONT VIEW :

- (i) Front view of square nut of nominal diameter 30 mm with six vertical lines and two horizontal lines, with a height of $0.8d$ to d .
- (ii) Drawing arc with radius R .

TOP VIEW :

- (i) Draw A/F = chamfer diameter of $1.5d + 3 \text{ mm}$, or $1.5d$.
- (ii) Indication of outer thin and broken circle of diameter 30 mm.
- (iii) Indication of inner thick full circle of diameter $30 \times 0.85 \text{ mm}$.
- (iv) Square, circumscribing chamfer circle.

DETAILS :

Dimensioning (1) and line work (1).

[OR]

HOOK BOLT

FRONT VIEW :

- (i) Threaded and unthreaded portions of cylindrical shank, square neck and center line, including curve of radius R .
- (ii) Head of bolt.

TOP VIEW :

- (i) Thick circle of diameter d and thin broken circle of $0.85d$.
- (ii) Square neck and rest of the portion.

DETAILS :

Dimensioning (1) and line work (1).

(b): STUD WITH COLLAR [6]

- (i) Front view with its axis perpendicular to HP.

- (ii) Top view.
- (iii) Dimensions.

[OR]

PAN HEAD RIVET (without tapered neck)

FRONT VIEW :

- (i) Sketching the head with correct proportions.
- (ii) Sketching cylindrical portion, broken end and hatching.

TOP VIEW :

Two circles.

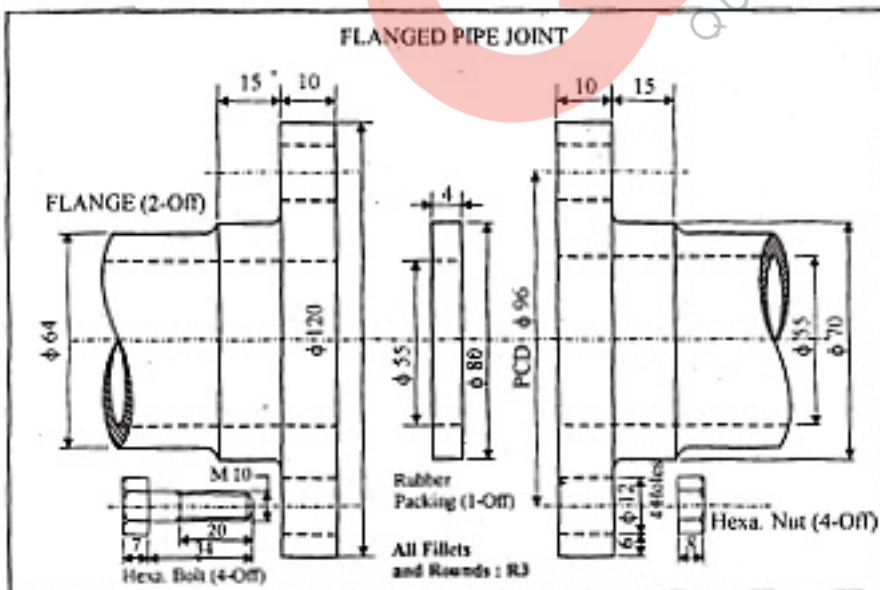
DIMENSIONING :

3. Figure 1 shows the details of the parts of a Flanged Pipe Joint. Assemble these parts, correctly, and draw, to scale 1 : 1, the following views:

(a) Front view, lower-half in section. [15]

(b) Side view, as seen from the right. [9]

Print, title and scale used. Draw the projection symbol. Give 6 important dimensions.



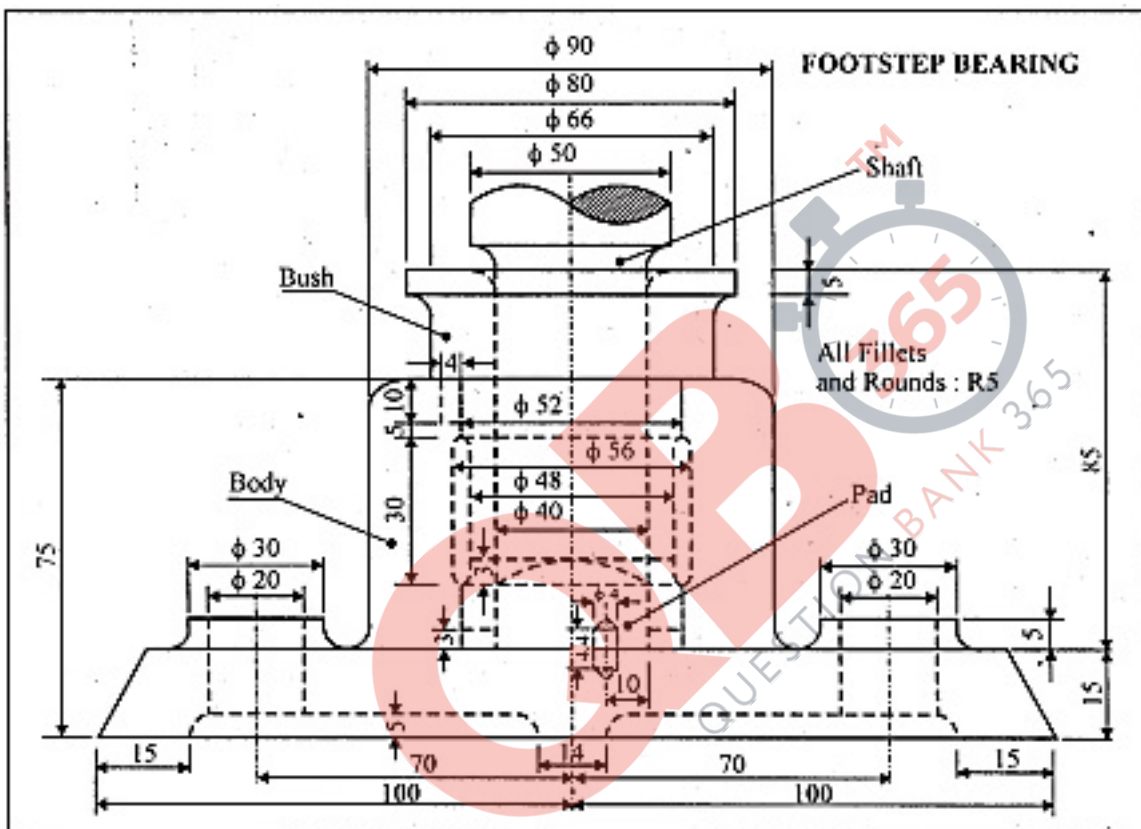
OR

Figure 2 shows the front view of a Footstep Bearing assembly. Dismantle the parts. and draw the following views, to scale 1 : 1. Keep the same position of the parts with respect to H.P. and V.P. :

(a) Front view of the Bush, showing the left half in section. [17]

(b) Front view of the Pad, showing right half in section. [7]

Print titles of both and scale used. Draw the projection symbol. Give 6 important dimensions. [6]



Ans. FLANGED PIPE JOINT(Assembly)

(a) FRONT VIEW (Lower Half in Section) :

- Drawing both flanges and pipes in top half portion (without section), including curves of R3 and hatching lines in broken end of pipe.
- Drawing both flanges and pipes in bottom half portion, including curves of R3 and hatching lines in broken end of pipe.
- Drawing a hole of $\phi 12$ mm on a p.c.d. of 96 mm and hatching lines in pipes and flanges.
- Drawing bolts and nuts of M10 correctly, (Minimum at one location).
- Indicating packing material (gasket) of outer diameter 80 mm and thickness 4 mm with a

line in the upper half and with shading or crosshatching in the bottom half. 1

(b) SIDE VIEW :

- (i) Drawing six circles, including pitch circle for bolts.
- (ii) Drawing hatching lines to indicate the pipe thickness.
- (iii) Drawing chamfer circle, hexagon, M10 circle and 0.85d broken circle for four nuts, bolts and hole dia. on p.c.d. (Minimum at one location)
- (iv) Drawing cutting plane with the direction of viewing.

DETAILS :

Printing title (1), scale used (1), drawing projection symbol (1) and six dimensions (3).

[OR]

FOOTSTEP BEARING (Dis-assembly)

(a) FRONT VIEW OF BUSH (Left Half in Section) :

- (i) Drawing the complete boundary of bush along with curves of proper radius.
- (ii) 4 horizontal lines upto the vertical center line (on the right side)
- (iii) Indicating the vertical line for hole of $\phi 40$ mm, including fillet of proper radius.
- (iv) Hatching lines in the thickness of bush on the left side.

(b) FRONT VIEW OF PAD (Right Half in Section) :

- (i) Drawing two vertical lines of 15 mm height, one horizontal base line of pad and the center line.
- (ii) Drawing the top curve of the pad after locating its center on the center line & a horizontal line up to the center line, at a height of 15 mm.
- (iii) Plotting the center line of the hole, hole with conical top and hatching lines.

DETAILS :

Printing titles of both (1), scale used (1), drawing projection symbol (1) and six dimensions (3).

