CBSE Class 12 Engineering Graphics
Sample Paper 01

Time allowed: 3 hours, Maximum marks: 70

Instructions:

- Attempt all the questions.
- Use both sides of the drawing sheet, if necessary.
- All dimensions are in millimeters.
- Missing and mismatching dimensions, if any, may be suitably assumed.
- Follow the SP: 46-2003 revised codes (with first angle method of projection).
- In no view of question2, are hidden edges or lines required.
- In question 4, hidden edges or lines are to be shown in views without section.
- Number your answers according to questions

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1. Answer the following Multiple Choice Questions. Print the correct choice on your drawing sheet. **(5)**

(i) What is the angle in degree between the main scale and isometric scale in the construction of isometric scale?

a) 30^o

b) 15^o

c) 45^o

d) 90^o

(ii) Which is the modified form of square thread?

a) V-thread

b) Metric thread

c) Knuckle thread

d) B.S.W thread

(iii) What is the width of the Rectangular Sunk Key, if the diameter of the shaft is D?

a) D/2

b) D/8
c) D/4
d) D/6

(iv) Name the joint used for joining two pipes
a) Flanged pipe joint
b) Bushed bearing
c) Turn buckle
d) Cotter joint

(v) Name the portion between the rim and the hub of a cast iron pulley
a) Shaft
b) Gap
c) Bush
d) Web

Ans. Multiple Choice Questions
(i) (b) or 15^{o}
(ii) (c) or knuckle thread
(iii) (c) or D/4
(iv) (a) or flanged pipe joint
(v) (d) or web

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2. (i) Construct an isometric scale. (4)

(ii) A frustum of a pentagonal pyramid (base side 50mm, top side 30mm and axis 70mm) is kept with its axis perpendicular to H.P. One of its base sides parallel to V.P. and away from it. Draw its isometric projection. Show the axis and indicate the direction of viewing. Give all dimensions. (7)

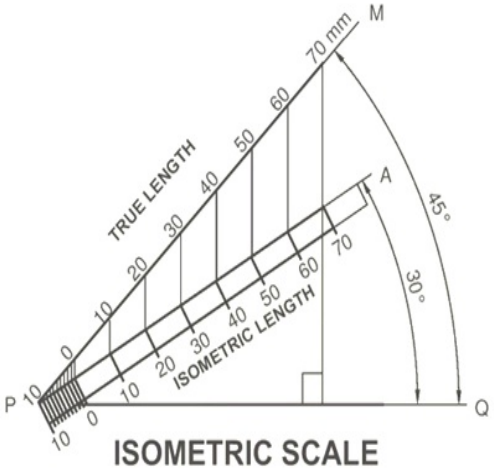
(iii) A hexagonal pyramid (base edge 30mm, axis 50mm), having two of its hexagonal edges parallel to V.P., is placed centrally on the top square face of a square slab (base side 80mm, height 20mm). The common axis is perpendicular to H.P. Draw the isometric projection of the combination of solids. Show the common axis and indicate the direction of viewing. Give all dimensions. (13)

Ans. (i) ISOMETRIC SCALE

i. Marking of divisions of 10mm, including division of first part of 1mm on true length

ii. Projections from scale 1:1 to get points on isometric scale, construction of isometric scale

iii. Printing 'True length / Scale 1:1', Isometric length / Isometric scale' and marking angles of 30^{o} and 45^{o}.



ISOMETRIC SCALE

(ii) ISOMETRIC PROJECTION OF FRUSTUM

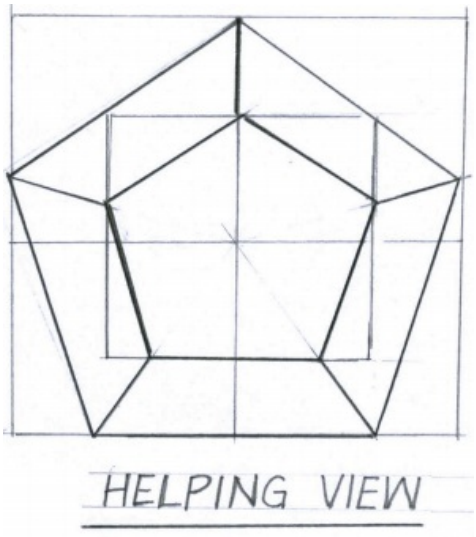
(i) Drawing helping figure

(ii) Drawing isometric pentagon on top and base

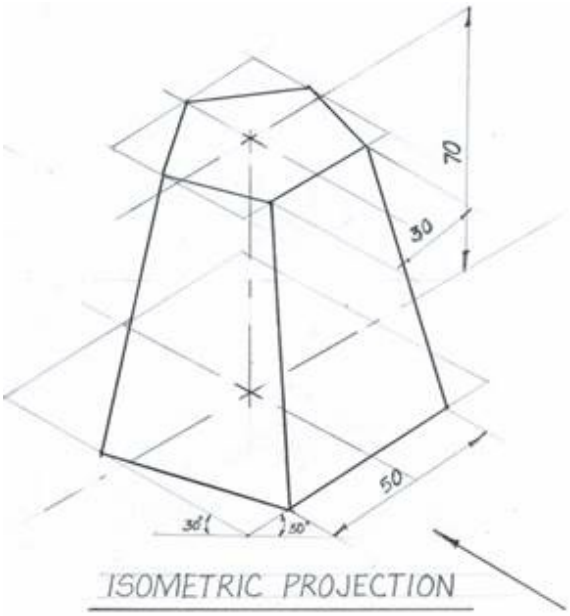
(iii) Drawing the slant edges

(iv) Marking the axis and direction of view

(v) Two dimensions



HELPING VIEW



(iii) ISOMETRIC PROJECTION OF COMBINATION OF SOLIDS

SQUARE SLAB

(i) Drawing isometric squares

(ii) Drawing edges

(iii) Dimensions

HEXAGONAL PYRAMID

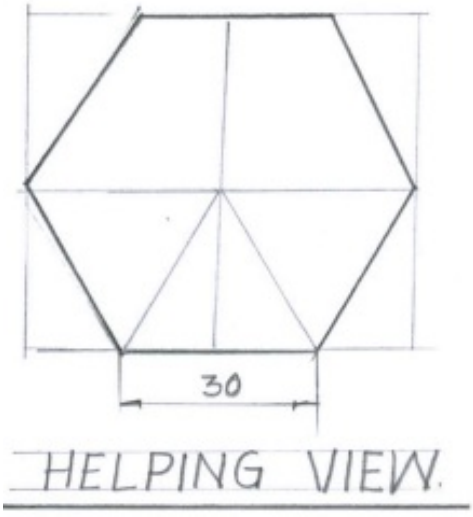
(i) Drawing helping figure

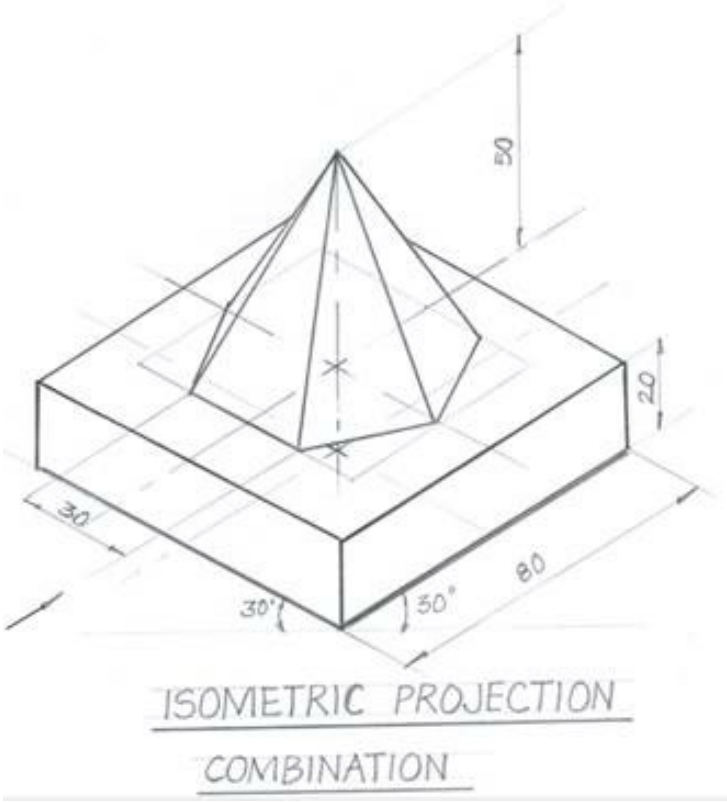
(ii) Drawing isometric hexagon

(iii) Drawing slant edges

(iv) Dimensions

(v) Marking common axis and direction of viewing





3. (i) Draw to scale 1:1 the front view and top view of a hexagonal nut, with vertical axis (diameter 20mm). Give standard dimensions. (8)

OR

Draw to scale 1:1, the front view and side view of a Square headed bolt of diameter 20mm, keeping the axis parallel to V.P and H.P. Give standard dimensions.

(ii) Sketch freehand the front view and top view of a Grub screw of size M25, Keeping the axis vertical. Give standard dimensions. (5)

OR

Sketch freehand the front view and side view of a Plain stud, of diameter 20mm, keeping the axis horizontal. Give standard dimensions.

Ans. (i): HEXAGONAL NUT

a) Front View

b) Side View

c) Standard Dimensions

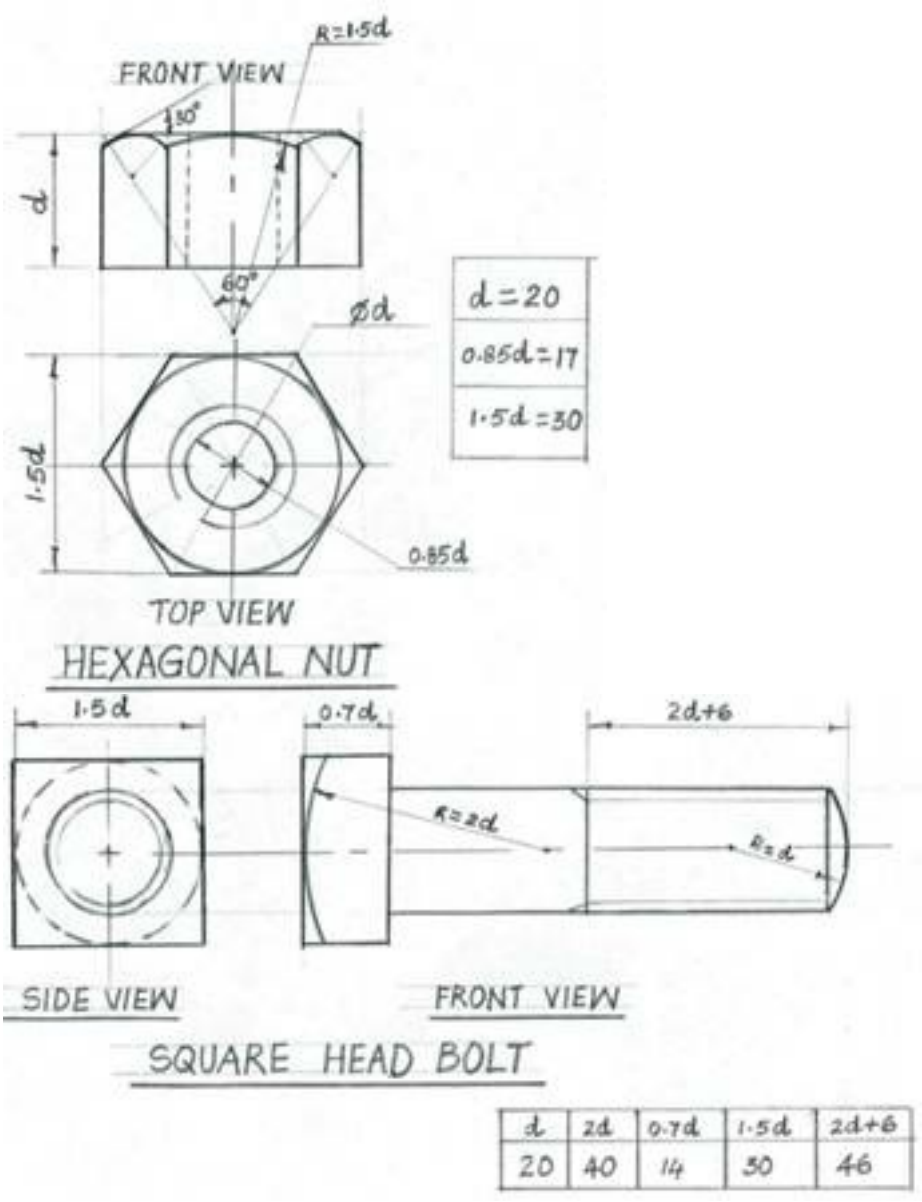
OR

SQUARE HEADED BOLT

a) Front View

b) Side View

c) Standard Dimensions



d	2d	0.7d	1.5d	2d+6
20	40	14	30	46

(ii): GRUB SCREW

(i) Front view

(ii) Top view

(iii) Standard Dimensions

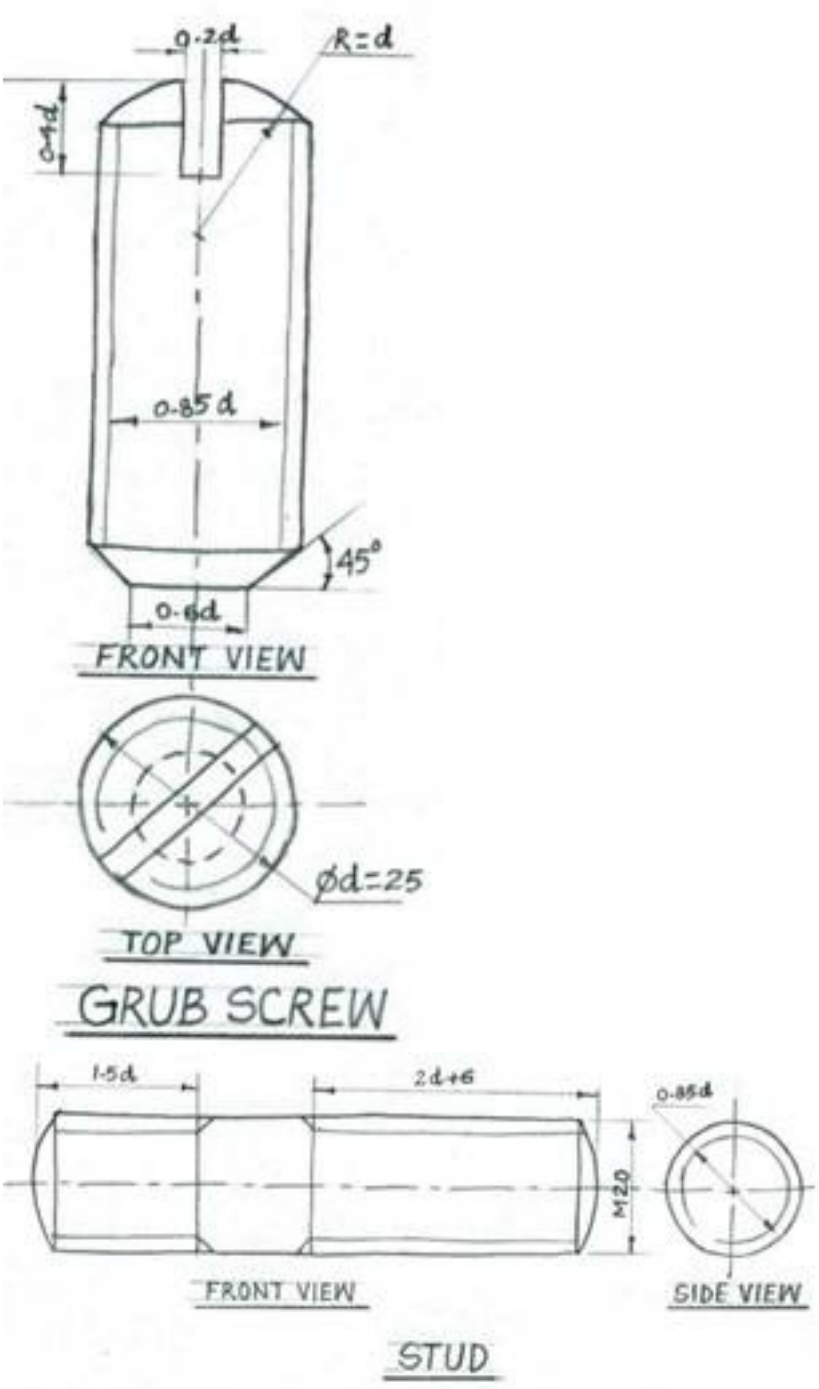
OR

PLAIN STUD

(i) Front view

(ii) Side view

(iii) Standard Dimensions

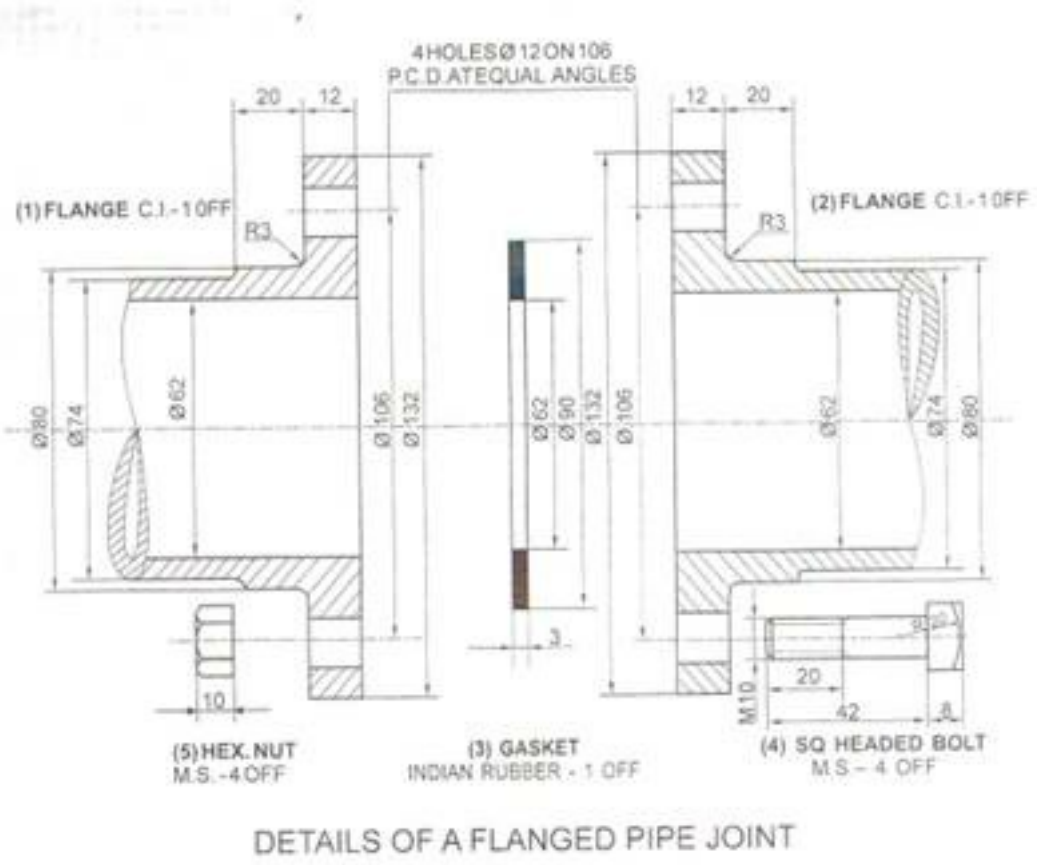


4. Figure 1 shows the details of the parts of a FLANGE PIPE JOINT. Assemble these parts correctly, and then draw the following views using scale 1:1.

(i) Front view, top half in section. (14)

(ii) Left side view. (8)

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



DETAILS OF A FLANGED PIPE JOINT

OR

Figure 2 shows the assembly of a PROTECTED FLANGE COUPLING. Disassemble the parts and then draw the following views of the following components to scale 1:1, keeping their position same with respect to H.P. and V.P.

(i) FLANGE B

a) Front view, upper half in section. (8)

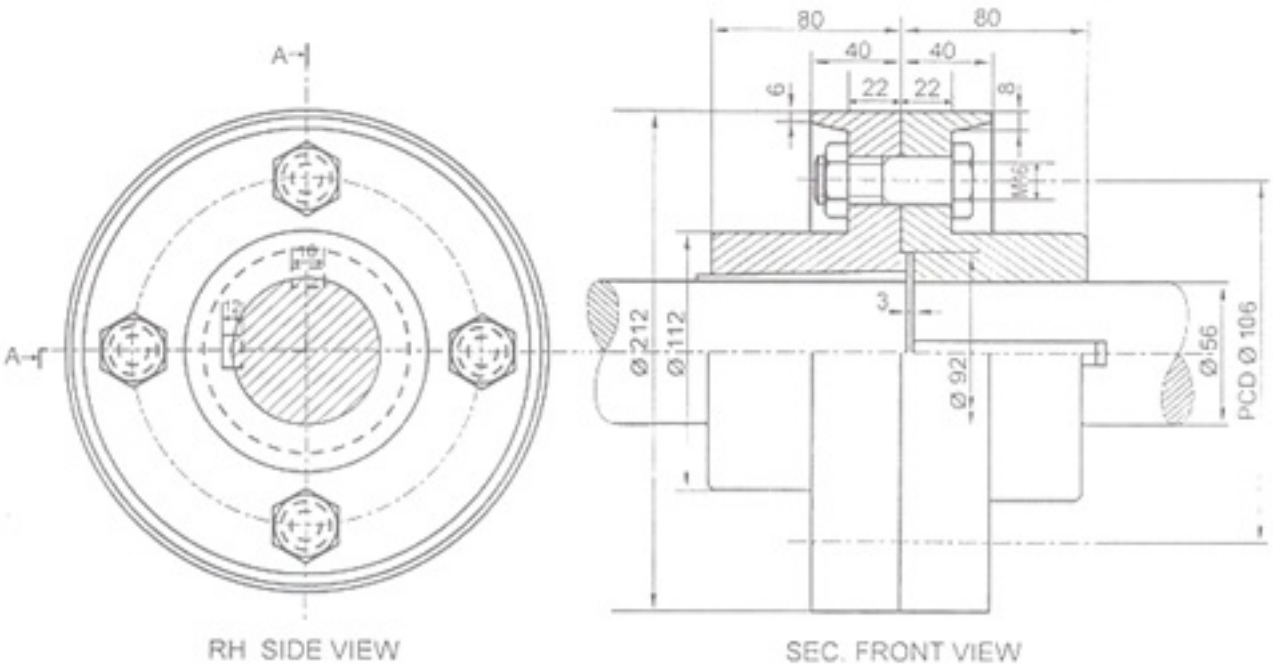
b) Left side view. (8)

(ii) RECTANGULAR SUNK TAPER KEY

a) Front view (3)

a) Top view. (3)

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



A PROTECTED FLANGE COUPLING

Ans. i) FRONT VIEW, TOP HALF IN SECTION

(a) Drawing both flanges and pipes in top half portion, including fillets of R3 and hatching in the broken end of pipe.

(b) Drawing both flanges and pipes in bottom half (without hatching) including fillets of R3 and hatching in the broken end of pipe.

(c) Drawing a hole of dia 12 on a p.c.d. of dia 106 and hatching of flanges

(d) Drawing bolts and nuts of M10.

(e) Indicating gasket in the top half with shading or cross hatching and in bottom half.

(ii) LEFT SIDE VIEW

(a) Drawing 5 circles and pitch circle for bolts.

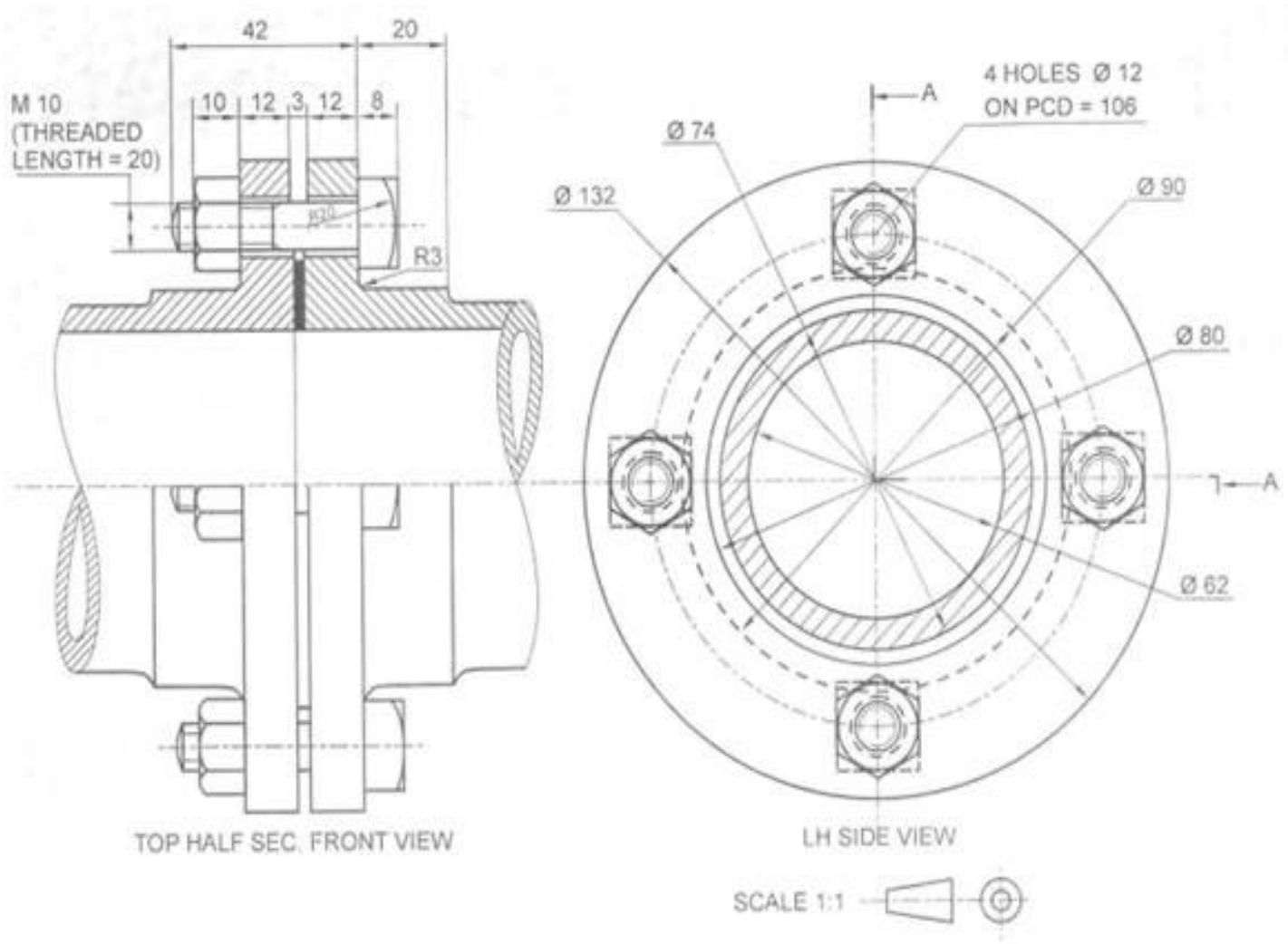
(b) Drawing hatching lines to indicate pipe thickness

(c) Drawing nut and bolt assembly on p.c.d. at one location at least

(d) Drawing cutting plane

DETAILS

Title (1), Scale used (1), Projection symbol (1), 6 important dimensions



ASSEMBLY OF A FLANGED PIPE JOINT

OR

PROTECTED FLANGE COUPLING (DISASSEMBLY)

FLANGE B

(i) FRONT VIEW, UPPER HALF IN SECTION

(a) Drawing the upper half with hatching lines

(b) Drawing the lower half portion

(c) Drawing hole of φ8 mm and 3mm extended portion of φ40 mm

(d) Drawing the key way

(ii) LEFT SIDE VIEW

(a) Drawing six Circles and PCD

(b) Drawing keyway (1) and hole of φ16 mm(1)

(c) Drawing cutting plane

RECTANGULAR SUNK TAPER KEY

(i) Front view drawn correctly

(ii) Top view drawn correctly

DETAILS

Title (1), Scale used (1), Projection symbol (1), 6 important dimensions (3)