21222

4 Hours / 70 Marks   Seat No.

15 minutes extra for each hour

Instructions :   (1)   All Questions are *compulsory.*

(2)   Illustrate your answers with neat sketches wherever necessary.

(3)   Figures to the right indicate full marks.

Marks

1.   **Attempt any FIVE of the following :**   **2 × 5 = 10**

(a)   Draw the conventional representation of the following :

(i)   Short break in pipe

(ii)   Repeated parts

(b)   Draw the actual view and conventional representation of the following :

(i)   Roller bearing

(ii)   External thread

(c)   Draw a conventional representation of the following component :

(i)   Splined shaft

(ii)   Lead spring with eye

(d)   Draw a sketch to represent taper 1:20 on a shaft of diameter 40 mm and length 120 mm.

(e)   Draw the symbol for following features which are controlled in geometric tolerance :

(i)   Flatness

(ii)   Profile of any surface

(iii)   Angularity

(iv)   Straightness

(f)   State the meaning of the symbol in Fig. – 1 :
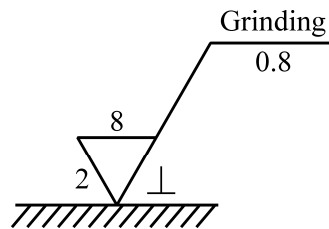

Fig.-1

(g)   Refer figure – 02. What is the meaning of symbols at 'X' and 'Y' ?
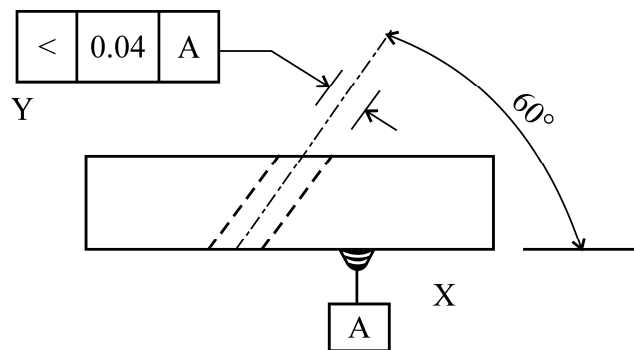

Fig.-2

2.   Attempt any TWO of the following :   **6 × 2 = 12**

(a)   A vertical cylinder of 50 mm diameter is completely penetrated by another cylinder of same size. The axis of penetrating cylinder is parallel to both the HP and VP, and is 8 mm away from axis of vertical cylinder. Draw projections of solid showing curves of intersections. Assume suitable length of cylinder.

(b)   A vertical square prism base 50 mm side and height 90 mm has a face inclined at 30º to VP. It is completely penetrated by another square prism base 40 mm side and axis 100 mm long, faces of which are equally inclined to the VP. The axes of two prism are parallel to VP and bisect each others at right angle. Draw projections of solids showing curves of intersection.

(c) A square prism side of base 60 mm, axis 80 mm, rest on HP on its base with an edge of base inclined at 30° at VP. It is completely penetrated by a cylinder with diameter 60 mm. Axis of cylinder is parallel to HP and VP both and bisects the axis of square prism. Draw the three views showing curves of intersection.

3. **(A) Attempt any ONE of the following :** 4 × 1 = 4

   (a) The shaft has size ϕ27.470 mm and ϕ27.445 mm and hole has size ϕ27.500 mm and 27.523 mm. Determine types of fit between them.

   (b) Determine the tolerance for the basic size in nominal steps of 50 mm to 80 mm for :

      (i) The tolerance grade 8

      (ii) The tolerance grade 12

   (B) Attempt any TWO of the following : 6 × 2 = 12

   (a) Figure – 3 shows development of lateral surface of a hexagonal prism with a semi-circle inscribe on it. Assume the prism to be kept on HP. Vertically with a side of base perpendicular to V.P. Show the effect of semi-circle in elevation and plan.
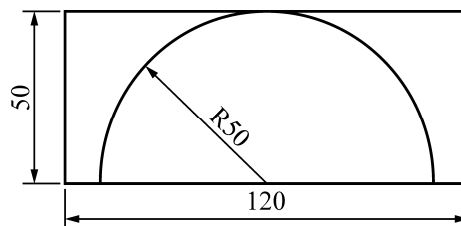

Fig.-3

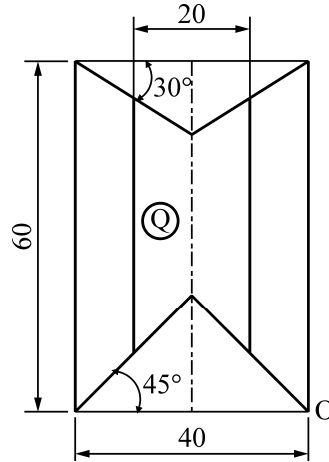(b) Draw a development of part Q of hexagonal prism from Figure – 4.

20

30°

60

Q

45°

40

O

Fig.-4

(c) Figure – 5 shows the F.V. of a square pyramid. Draw its development of lateral surface.
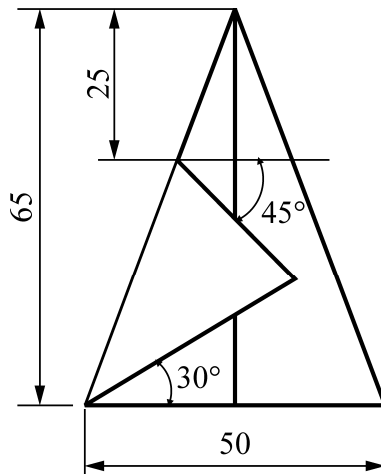
25

65

45°

30°

50

Fig.-5

4. **Attempt the following :** 16

Figure – 6 shows assembly of Non-Return valve. Draw detailed drawing of following :
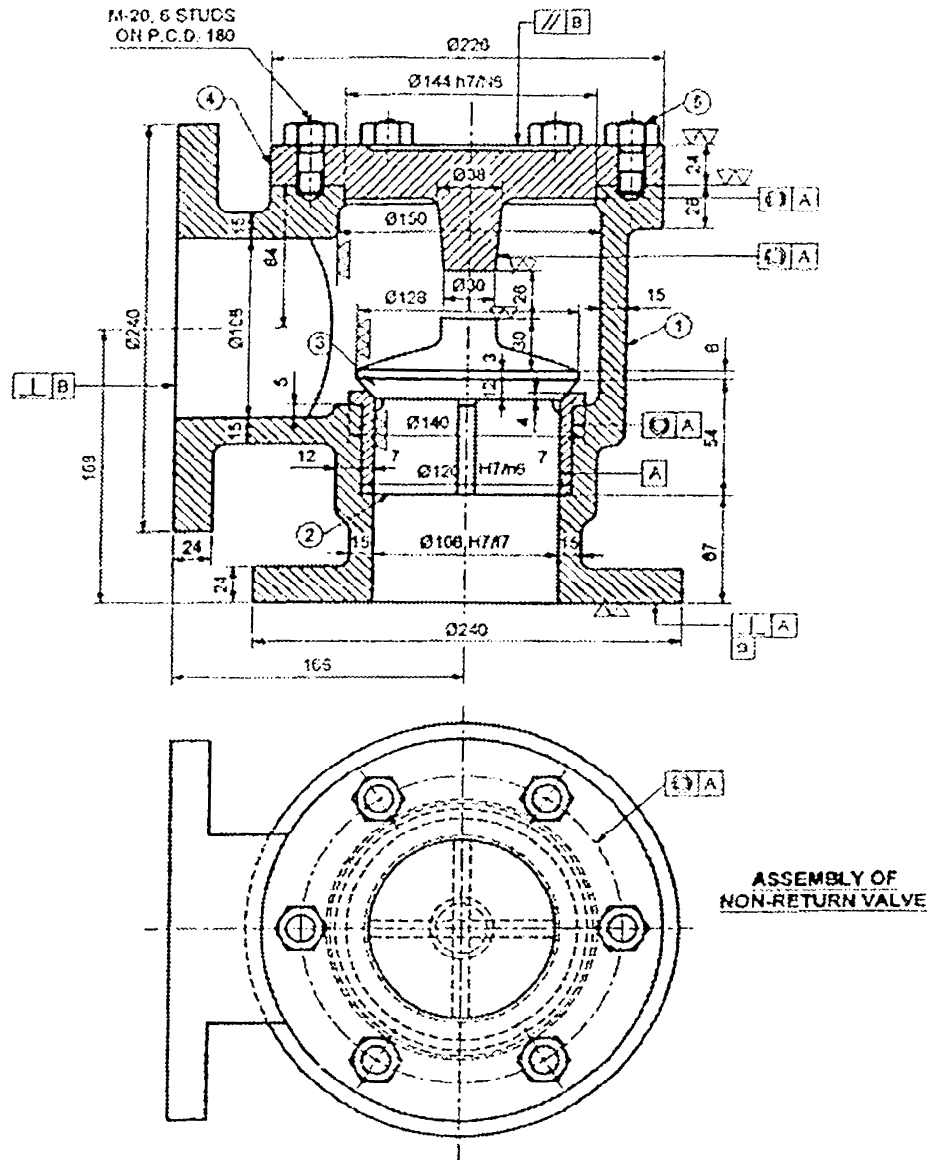
(1) Body-Sect F.V. and T.V. 4

(2) Valve –Front view and T.V. 4

(3) Valve Seat F.V. and T.V.   **4**

(4) Indication of geometrical tolerance.   **4**

ASSEMBLY OF
NON-RETURN VALVE

Fit Chart
100H7&7 = Clearance Fit
144H7&G = Clearance Fit
120H7&6 = Transition Fit

Part List			
Part No.	Part Name	Material	Qty.
1	Body	C.I.	1
2	Valve Set	G.M.	1
3	Valve	G.M.	1
4	Cover	C.I.	1
5	Stud with Nut	M.S.	4

Fig.-6

5. **Attempt any ONE of the following :** 16

    (a) Figure – 7 shows the details of foot step bearing.

        Draw :

        (i) Sectional F.V. of the assembly 6

        (ii) Top view of the assembly 6
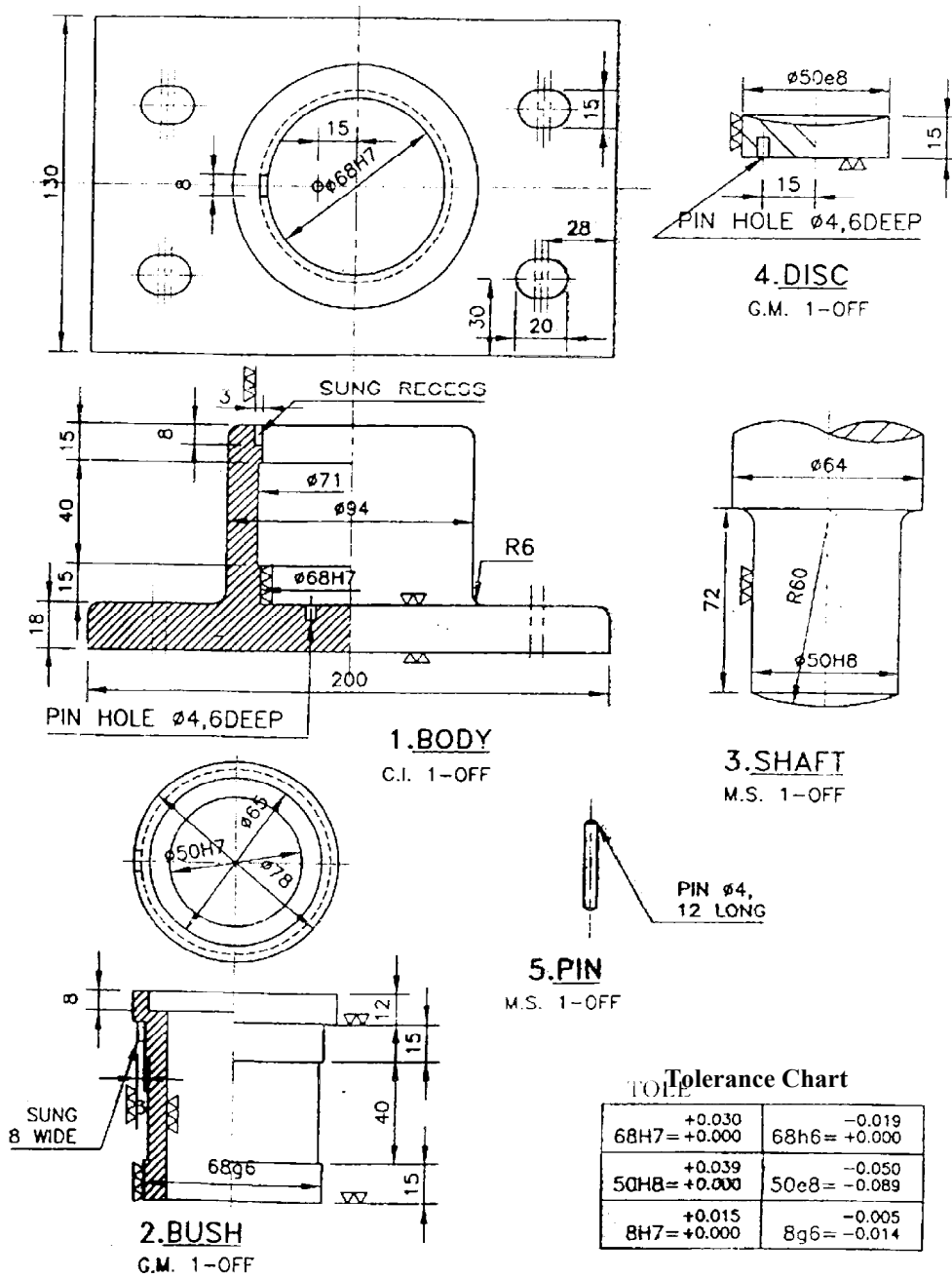
        (iii) Bill of material 4

Tolerance Chart

68H7 = +0.030 / +0.000	68h6 = −0.019 / +0.000
50H8 = +0.039 / +0.000	50c8 = −0.050 / −0.089
8H7 = +0.015 / +0.000	8g6 = −0.005 / −0.014

Fig.-7

(b) Figure – 8 shows details of screw jack :   **16**

    (i)   Draw Sectional F.V. &   **6**

    (ii)   T.V. of the assembly   **6**
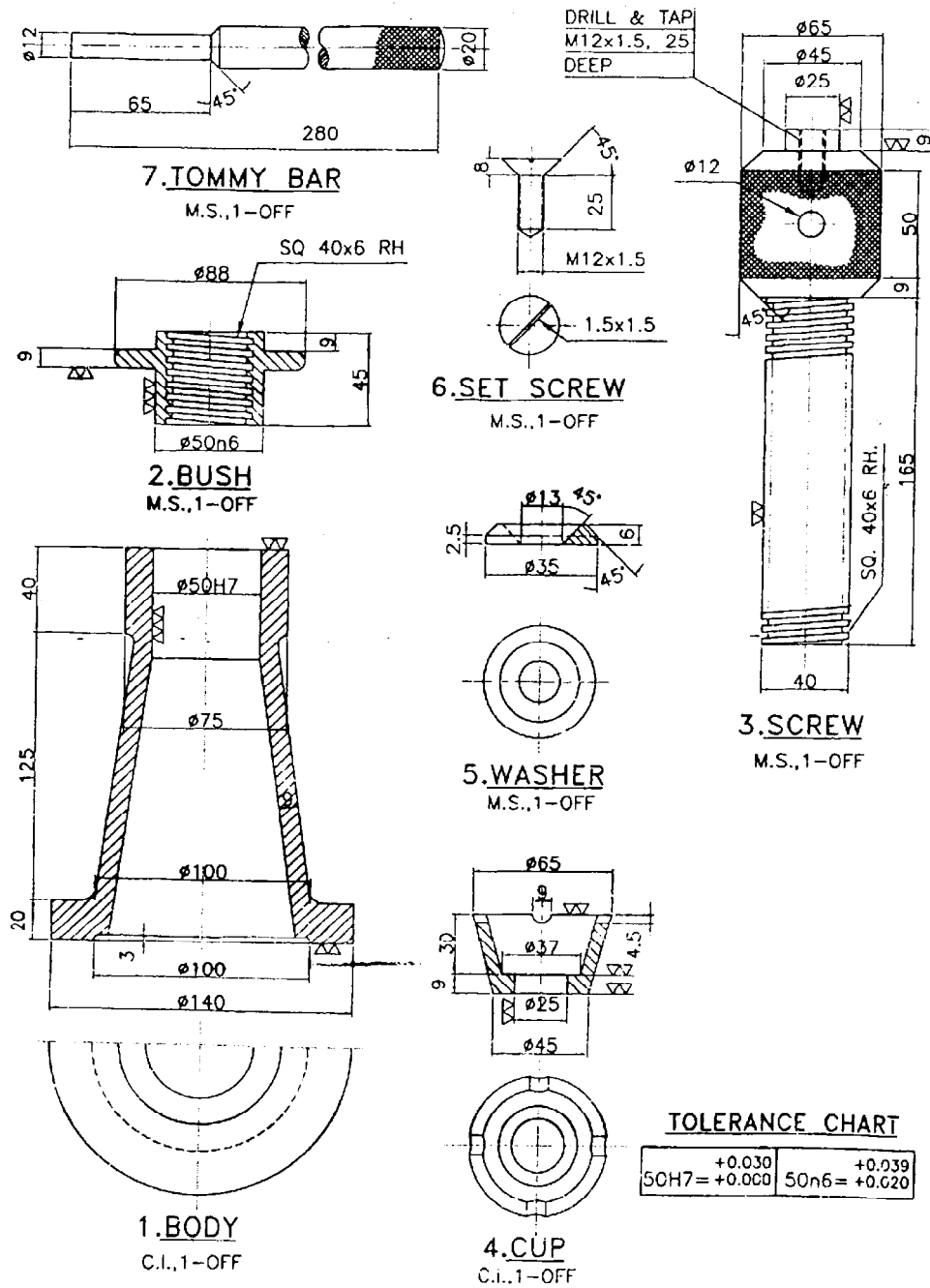
    (iii) Prepare bill of material   **4**

Fig.-8