

## I B.Tech Supplementary Examinations, Aug/Sep 2008

## ENGINEERING GRAPHICS

( Common to Civil Engineering, Mechanical Engineering, Chemical Engineering, Mechatronics, Metallurgy & Material Technology, Production Engineering, Aeronautical Engineering and Automobile Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
All Questions carry equal marks

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1. A straight line AB of length 100 mm, initially tangential at A to a circle of 40 mm diameter, rolls without slipping on the circle, till the end B touches the circle. Show the paths of the ends A and B of the line and name the curves. [16]
2. The distance between the end projectors of a line AB is 50 mm. Point A is 15 mm above HP and 10 mm in front of VP. Point B is 40 mm above HP and 40 mm in front of VP. Find the true length of the line AB, the inclinations of the line AB with HP and VP. Locate HT and VT of the line by trapezoidal method. [16]
3. A hexagonal pyramid of base edge 20 mm and height 40 mm rests on one of the corners of the base in HP with its axis is inclined at  $30^\circ$  to HP and parallel to VP. A vertical section plane inclined at  $30^\circ$  to VP cuts the pyramid removing 15 mm length of the axis from apex. Draw the projections of the pyramid and find the true shape of the section. [16]
4. A vertical cylinder of base diameter 30 mm and axis 45 mm long is sectioned such that its front view appears as isosceles triangle of 30 mm and height 45 mm. Develop its surface. [16]
5. A vertical cone of 80 mm diameter and axis 100 mm long, is penetrated by horizontal cylinder of 60 mm diameter and 90 mm long such that, its axis is 5 mm behind the axis of the cone, at a height of 40 mm above its base. show the lines of intersection, when the axes of both solids are parallel to V.P. [16]
6. Draw the isometric view of the object whose orthographic projections are given in figure 6. All dimensions are in mm. [16]

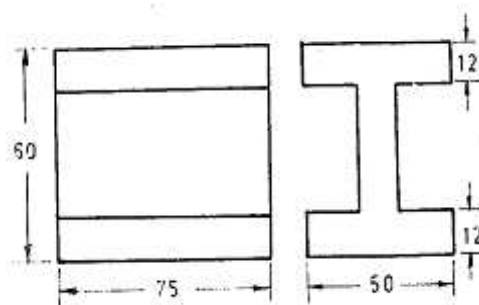


Figure 6

7. Draw the following views of the dove tail stop given in figure 7. All dimensions are in mm.

- (a) Front View  
 (b) Top View and  
 (c) Side View.

[16]

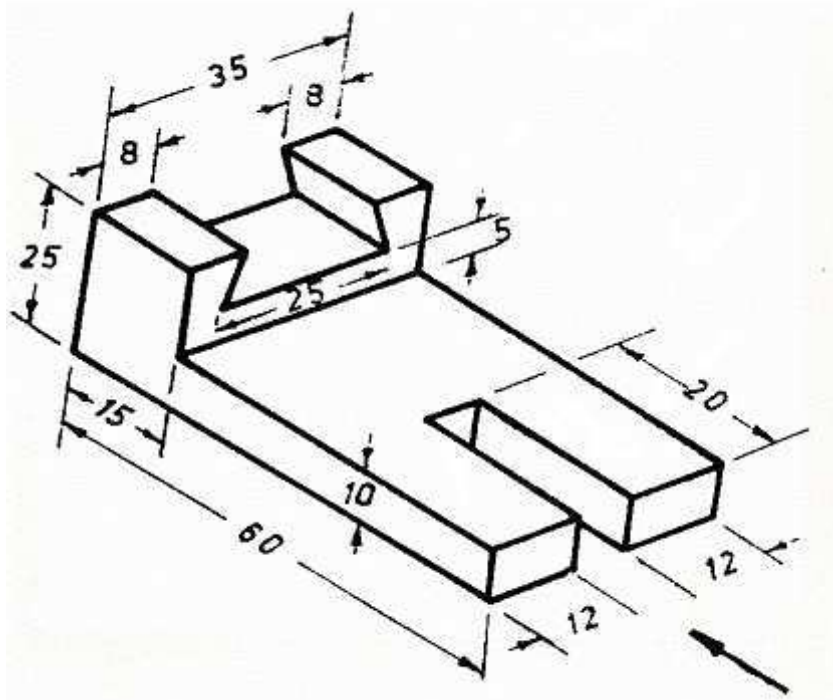


Figure 7

8. Draw the perspective view of a rectangular plane of  $40 \times 30$  mm which lies on the ground plane. One of the corners is touching the picture plane and an edge is inclined at  $55^\circ$  to picture plane. The station point is 30 mm in front of picture plane, 65 mm above the ground plane and lies in central plane which is at a distance of 30 mm to the right of the corner touching the picture plane. [16]

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1. A circle of diameter 30 mm rolls on a flat surface without slipping. Trace the path of a point lying on its circumference for one and a half revolution of the circle. Draw a normal and tangent to the curve at a point 20 mm above the directing line. [16]
2. (a) The end A of a line AB is in the H.P. and 25 mm in front of the V.P. The end B is in the V.P. and 50 mm above the H.P. The distance between the end projectors is 65 mm. Draw the projections of AB and determine its true length.  
(b) A straight line is parallel to both VP and HP. Its one end is 25 mm behind VP and 15mm above HP. Length of the line is 10m. Draw its projection. [10+6]
3. A regular hexagonal lamina with its edge 50 mm has its plane inclined at  $45^{\circ}$  to HP and lying with one of its edges in HP. The plan of one of its diagonals is inclined at  $45^{\circ}$  to XY. The corner nearest to VP is 15 mm in front of it. Draw its projections. [16]
4. A cube of 40 mm edge stands on one of its faces on HP with a vertical face making  $45^{\circ}$  to VP. A hole of 30 mm diameter and whose axis is perpendicular to VP and parallel to HP is drilled centrally through the cube such that the hole passes through the opposite vertical edges of the cube. Obtain the development of the lateral surface of the cube with the hole. [16]
5. A cylinder of 75 mm diameter, standing on its base on H.P, is completely penetrated by another cylinder of 55 mm diameter, with their axes intersecting at right angle. Draw the projections, showing the lines of intersection, assuming that the axis of the smaller cylinder is parallel to V.P. [16]
6. Draw the isometric view of the object whose orthographic projections are shown in figure 6. All dimensions are in mm. [16]

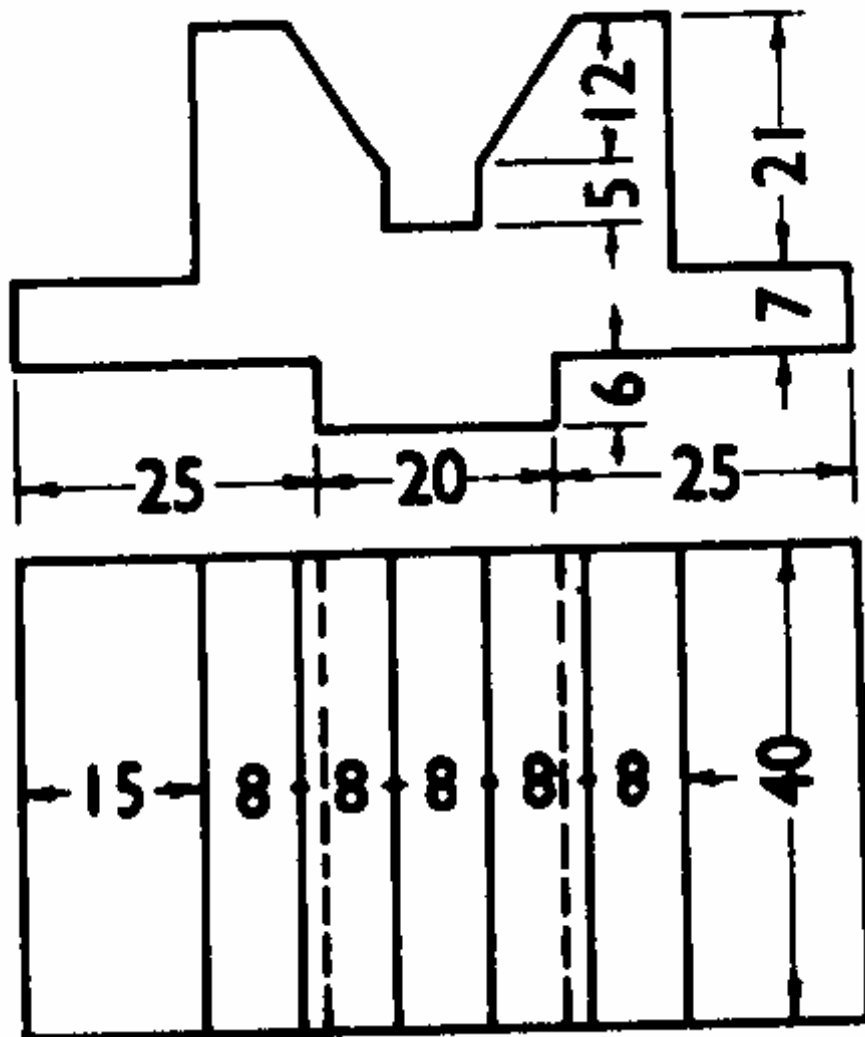


Figure 6

7. Draw the following views of the object given in figure 7. All dimensions are in mm.

- (a) Front View
- (b) Top View and
- (c) Side View from the right.

[16]

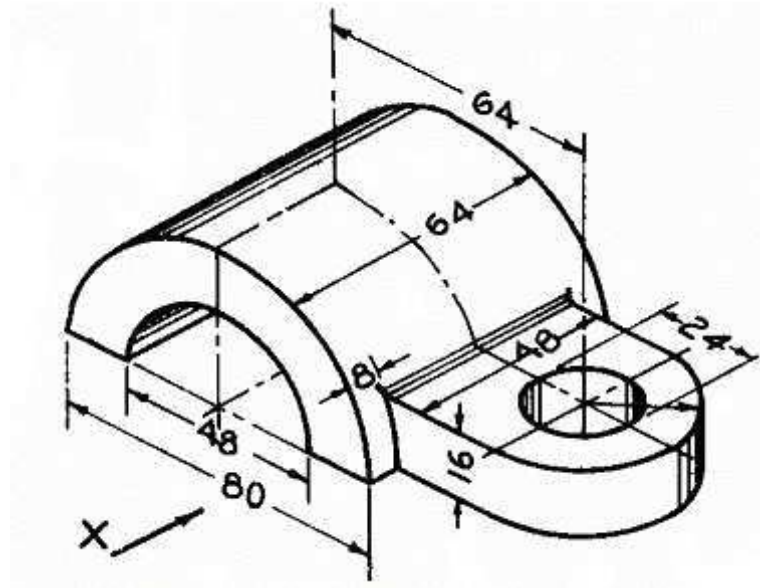


Figure 7

8. A pentagonal prism, side of base 25 mm and axis 60 mm long, lies with one of its rectangular faces on the ground plane such that a pentagonal face is touching the picture plane. The station point is 20 mm in front of the picture plane, 55 mm above the ground plane and lies in a central plane which is at 80 mm to the right of the center of the prism. Draw the perspective view. [16]

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1. The diameter of a directing circle is twice that of a generating circle. Show that the hypocycloid is a straight line. Select diameter of generating circle as 50 mm. [16]
2. Three points A, B and C are 7 m above the ground level, on the ground level and 7 m below the ground level respectively. A and B & B and C are connected by roads which are seen at angles of depression of  $20^{\circ}$  and  $30^{\circ}$  respectively from a point O on a hill, 30 m above the ground level. A is due north-east, B is due north and C is due south-east of O. Find the lengths of the connecting roads. [16]
3. Draw the projections of an equilateral triangle of side 60 mm, when one of its corners is in HP. Other corners of the triangle are 20 mm and 40 mm above HP. [16]
4. A cube of 40 mm edge stands on one of its faces on HP with a vertical face making  $45^{\circ}$  to VP. A hole of 30 mm diameter and whose axis is perpendicular to VP and parallel to HP is drilled centrally through the cube such that the hole passes through the opposite vertical edges of the cube. Obtain the development of the lateral surface of the cube with the hole. [16]
5. A horizontal steam boiler of 3m diameter is surmounted by a dome of the shape of a vertical cylinder of 1.4m diameter. Draw the projections showing the curves of intersection, when their axes intersect each other at right angles. [16]
6. Draw the isometric view of the object whose orthographic projections are shown in figure 6. All dimensions are in mm. [16]

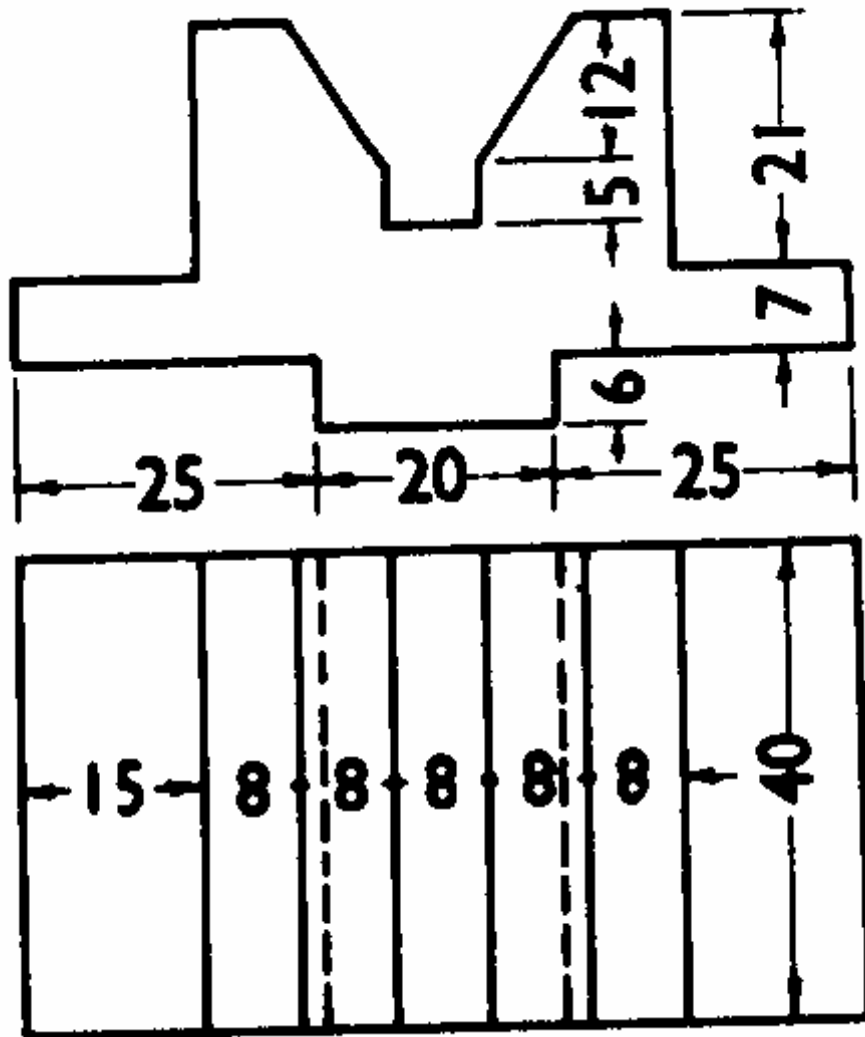


Figure 6

7. Draw the following views of the V-Block with circular rod given in figure 7. All dimensions are in mm.

- (a) Front View
- (b) Top View and
- (c) Side View.

[16]

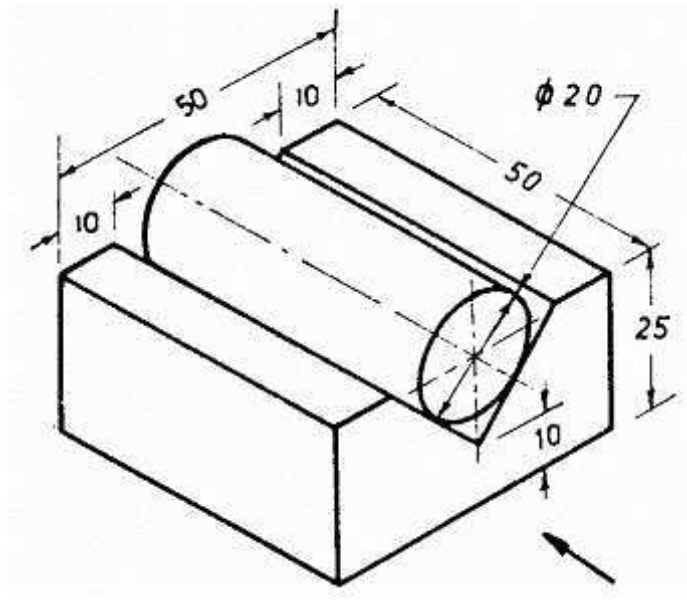


Figure 7

8. A square pyramid of side of base 40 mm and axis 50 mm long, rests with its base on the ground plane such that all the edges of the base are equally inclined to the PP. One of the corners of the base is touching the PP. The station point is 60 mm in front of the PP, 80 mm above the ground plane and lies in a central plane which passes through the axis of the pyramid. Draw the perspective view. [16]

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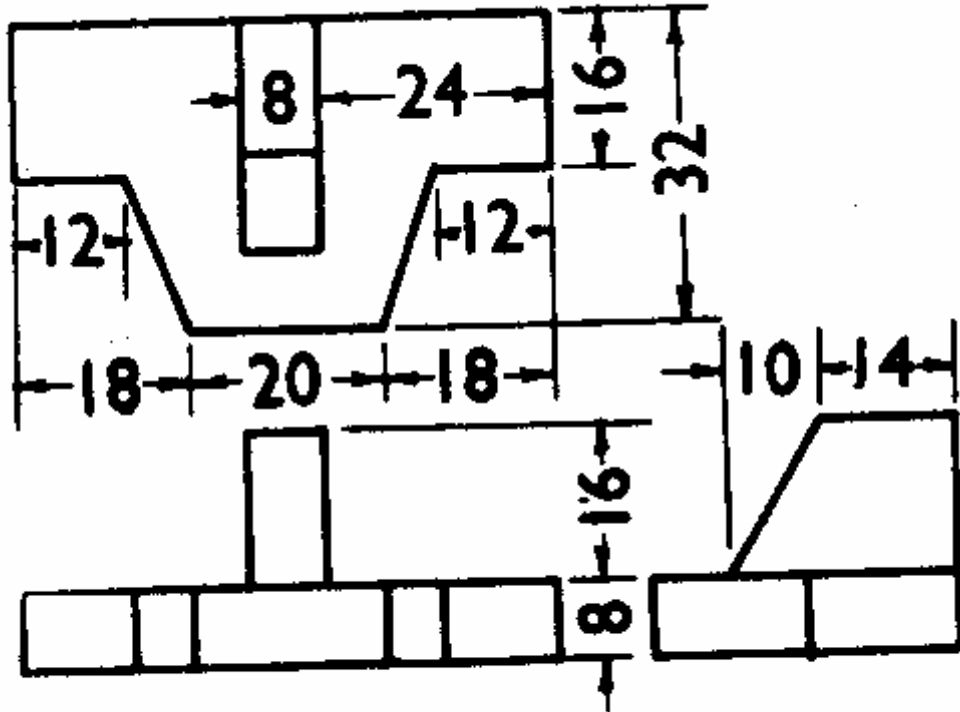
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1. A fixed point is at 50 mm from a fixed straight line. Draw the curves when eccentricity is
  - (a) 1 and
  - (b)  $3/2$Name the curves. Draw tangents and normals to the curves through a point P, 60 mm from the straight line. [16]
2. Front view of a line PQ is inclined at  $30^\circ$  to xy-line and measures 60 mm. The line is inclined at  $45^\circ$  to VP. The end P is in HP and VT of the line is 20 mm below HP. Draw the projections of the line and find its true length and inclinations with the reference planes. Also locate HT. [16]
3. A pentagonal plane of side 40 mm is inclined at  $30^\circ$  to HP and an edge of the base is inclined at  $45^\circ$  to VP. Draw the projections. [16]
4. A cube of 40 mm edge stands on one of its faces on HP with a vertical face making  $45^\circ$  to VP. A hole of 30 mm diameter and whose axis is perpendicular to VP and parallel to HP is drilled centrally through the cube such that the hole passes through the opposite vertical edges of the cube. Obtain the development of the lateral surface of the cube with the hole. [16]
5. A square pyramid with edge of base 40 mm and height 80 mm, is resting on H.P such that, all of its base edges are equally inclined to V.P. A horizontal cylinder of 30 diameter, meets the pyramid on one side such that, the axes of both the solids intersect each other at a height of 45 mm from the base of the pyramid. The axis of the cylinder is parallel to V.P. Draw the projections of the solids, showing the lines of intersection. [16]
6. Draw the isometric view of the object whose orthographic projections are given in figure 6. All dimensions are in mm. [16]



**(Third-angle projection)**

Figure 6

7. Draw the following views of the flange given in figure 7. All dimensions are in mm.

- (a) Front View
- (b) Top View and
- (c) Side View.

[16]

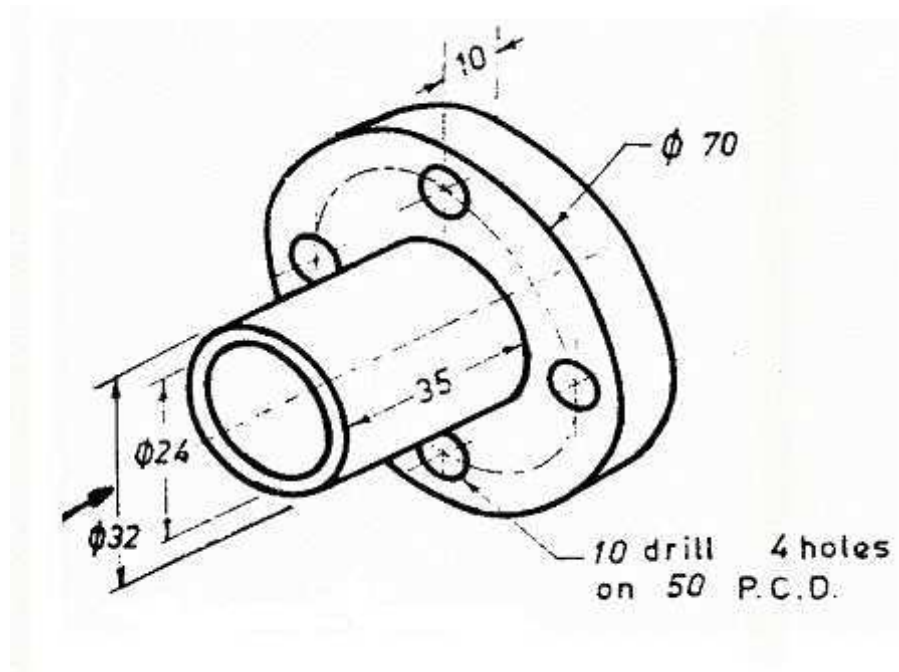


Figure 7

8. A straight line AB, 40 mm long, which is parallel to the picture plane and 20 mm behind it inclined at  $45^{\circ}$  to the ground plane. End A is 10 mm behind the ground plane. Central plane is 10 mm left of A. The station point is 25 mm in front of picture plane, 35 mm above the ground plane and lies in central plane. Draw the perspective view. [16]

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