W'11:4FN : AN 207 (1407)

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,**
ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. (*a*) Explain the principle of construction of Vernier scale
with a neat sketch. 5

   (*b*) Draw a full-size diagonal scale to show 0·1 mm and
long enough to measure up to 5 cm. Show on this scale
the following distances : (*i*) 0·1 mm; (*ii*) 2·35 cm; and
(*iii*) 4·89 cm. 15

2. (*a*) A pentagon of 40 mm side is resting on one of its
corners on the V.P. The edge opposite to the corner
makes an angle of 30° to the H.P. The surface of the
pentagon is inclined at 45° to the V.P. Draw the
projections. 10

   (*b*) A line CD, inclined at 25° to the H.P., measures
80 mm in T.V. The end *C* is in the first quadrant and
24 mm and 14 mm from the H.P. and the V.P.,

respectively. The end D is at equal distances from both the reference planes. Draw the projections and find the true length and true inclination of the line with V.P. Locate the traces. 10

3. A pentagonal pyramid of edge of base 30 mm and length of axis 65 mm is resting on a corner of the base on the H.P. The triangular face opposite to the corner on the H.P. is inclined to the H.P. at an angle of 45° with it shorter edge inclined to the V.P. at 60°. Draw its projections. 20

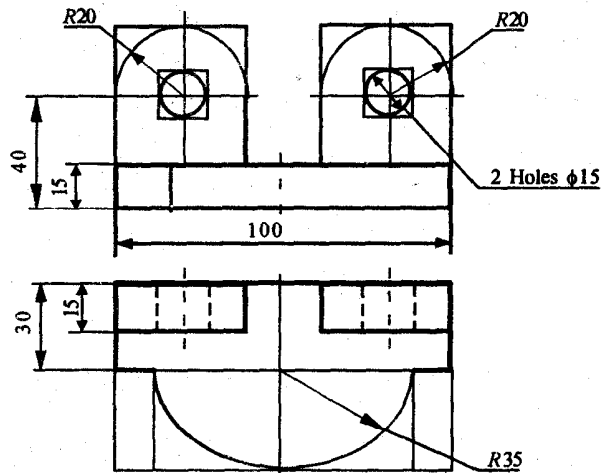4. Figure 1 shows the orthographic views of an object. Draw the isometric projection of the object. 20

Fig. 1

Group B

5. (*a*) Draw the necessary views (including sectional views) to show the details of the following joints :

   (*i*) A double rivetted zig-zag type lap joint to connect two plates of 18 mm thickness. Indicate dimensions on simple top view and sectional front view. 7

(*ii*) Flat saddle key fitted on a shaft of 50 mm. 5

(*iii*) A hexagonal headed nut, bolt and washer assembly to connect two plates of 24 mm thickness, if the diameter of the bolt is 16 mm. 8

6. A horizontal cylinder of 45 mm diameter and 90 mm long penetrates centrally a vertical hexagonal prism of 30 mm side and 90 mm long. The axis of the cylinder is parallel to V.P. Draw the top view and front view of the intersecting solids showing the curves of intersection. 20

7. Draw the front view, top view and the left-hand side view of the object shown in Fig. 2. Consider the view from the arrow X as front view. 20
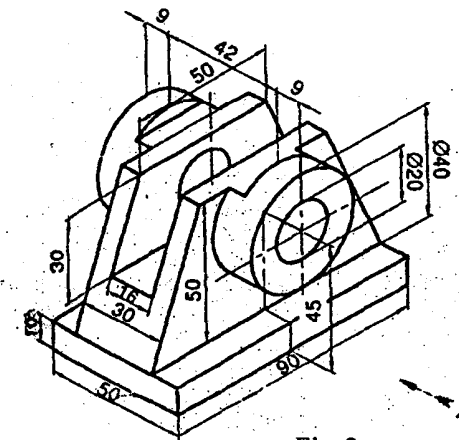

Fig. 2

8. A cylinder is standing on its base on the H.P. A pentagonal hole is cut through the cylinder. The axis of the hole is perpendicular to the V.P. and bisects the axis of the cylinder. The base diameter and the height of cylinder are 70 mm and 90 mm, respectively. The hole has a face width of 30 mm. Draw the development of cylinder. Assume a flat surface of hole perpendicular to H.P. 20

Group C

9. Fill-in the blank appropriate word(s)/choose the *correct* answer/answer the following as applicable : 20 × 1

(i)   For drawing small instruments, watch parts, _____ scale is used.

(ii) The main scale of a vernier scale is a _____ scale.

(iii) The surface of an object appears in its true shape when it is _____ to the plane of projection.

(iv) The side view of an object is obtained as a projection on the _____ plane by looking the object _____ to its _____ surface.

(v)   When a line is inclined to V.P. and parallel to H.P., its front view is _____ to *xy*.

(vi) When a line is parallel to both H.P. and V.P., it has

(a) only H.T.
(b) only V.T.
(c) both H.T. and V.T.
(d) No HT and VT.

(vii) When will the traces of an oblique plane will be parallel to *xy* ?

(viii) When a plane is perpendicular to both the reference planes, its traces are

(a) inclined to *xy*.
(b) perpendicular to *xy*.
(c) parallel to *xy*.

(ix) The true shape of the section produced is _____, when a cone is cut by a plane parallel to the axis, but not passing through the apex.

(x)   The intersection between a section plane and the lateral surface of any _____ is a smooth curve.

(xi) Solids having similar end bases will be developed by _____ method.

(xii) The intersection between a solid resting on H.P. and a plane inclined to H.P. and perpendicular to V.P. is a _____ in the front view.

(xiii) What is the difference between isometric projection and isometric drawing ?

(xiv) If in a scale, 1 cm represents 1 metre, the R.F. of scale is

(a) 1/1000
(b) 1/100
(c) 1/10
(d) 1/10,000

(xv) To draw a small gear in wrist watch, the R.F. would be

(a) 1 : 20
(b) 20 : 1
(c) 1 : 1
(d) None of the above.

(xvi) The information needed to construct any scale (except the scale of chords) is

(a) R.F. of the scale.
(b) unit of measurement.
(c) maximum distance to be shown.
(d) All of the above.

(*xvii*) If an edge of an oblique pentagonal plane is parallel to both H.P. and V.P., then which one of the following sentences is wrong ?

    (*a*) F.V. will show the T.L. of the edge.

    (*b*) T.V. will show the T.L. of the edge.

    (*c*) F.V. will show the T.L. of the plane.

    (*d*) Side view will show the edge view.

(*xviii*) If a horizontal cylinder penetrates a vertical cylinder, the curves of intersection will be seen in _____.

(*xix*) Whenever a prism and a pyramid intersects, the curve seen at their intersection is a

    (*a*) smooth curve.

    (*b*) segmented-line curve.

    (*c*) either smooth curve or segmented line curve.

    (*d*) None of the above.

(*xx*) Compared to the actual diameter, the isometric diameter of a sphere is

    (*a*) equal.

    (*b*) smaller.

    (*c*) greater.

    (*d*) None of the above.

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,**
ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. (*a*) Explain the principle of vernier scale with a neat
        sketch.   5

    (*b*) The distance between two points on a map is 2·1 cm.
        The points are actually 1 km apart. Construct a
        diagonal scale to measure up to 7 km and read in
        kilometer, hectameter and decameter. Show it on a
        length of 4·37 km.   15

2. (*a*) The top view '*abc*' of a triangle *ABC* is an
        equilateral triangle of side 50 mm, '*ab*' being
        inclined at 45° to *xy*. The point *A* is in the *VP*
        and 35 mm above the ground and the points *B*
        and *C* are on the ground. Draw the projections of
        the triangle and determine the true shape.   10

(b) Two mangoes on a tree are 5 m and 3 m above the ground and 1·5 m and 2·5 m from the central plane of a wall, but on opposite sides of the wall, respectively. The distance between the mangoes measured along the ground and parallel to the wall is 2·5 m. Determine the true distance between the mangoes and the angle of inclination of the line joining the mangoes with the ground and also with the wall.   10

3. A pentagonal pyramid of base, 40 mm side and height 75 mm, stands with its base on the ground such that one of the base edges is parallel to VP. It is cut by a section plane perpendicular to the VP and inclined at $30°$ to the HP bisecting its axis. Draw the true shape of the cut section. Also, draw the development of the lateral surface of the remaining solid containing base.   20

4. (a) Show that dimension in the isometric projection is $\sqrt{2/3}$ times the true size along isometric axes.   5

(b) A hemisphere is resting on the top of a hexagonal prism of side 35 mm and axis 70 mm long. Draw the isometric scale and isometric projection of the arrangement when the hemisphere is touching all the edges of the top base.   15

Group B

5. Draw the necessary views (including necessary sectional views) to show details of the following :

(i) A double riveted zig-zag lap joint to connect to plates of 18 mm thickness.   7

(ii) A woodruff key fitted on to a shaft of 40 mm diameter.   5

(iii) A stud bolt assembly to connect two blocks of 50 mm thickness, if the major dia of stud bolt is 20 mm.   8

6. (a) Distinguish between third angle projection and first angle projection with the aid of proper presentation.   5

(b) Draw the front view, top view and left-hand end view of the object as shown in Fig. 1 using third angle method of projection.   15
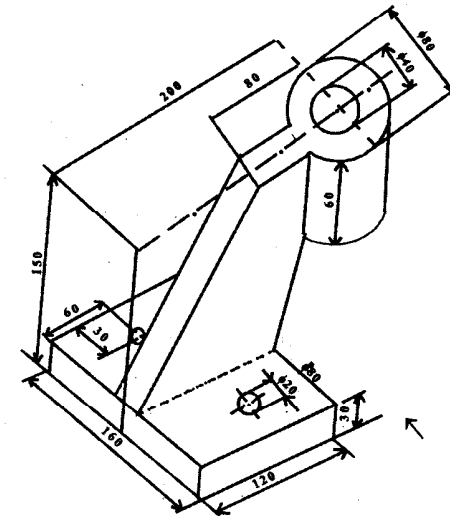

Fig. 1

7. A vertical square prism, with base side 50 mm, has one of its vertical faces inclined at $30°$ to the VP. It is completely penetrated by a cylinder of diameter 30 mm, the axis of which is parallel to both HP and VP and is 8 mm away from the axis of the prism. Draw the projections of solids showing the lines of intersection. Take the length of each solid as 70 mm.   20

8. A cone of 70 mm diameter base and axis length 90 mm rests on HP on its base. Draw the projection of the cone and show on it the shortest path traced by a point starting from a point on the circumference of the base of the cone, moving around it and reaching the same point. 20

Group C

9. Answer the following in brief: 10 × 2

   (i) An area of 144 cm² on a map represents an area of 36 km² on a field. Find the scale factor for the map.

   (ii) What is the name of method of surface development of a cylinder ?

   (iii) What is the symbol of run out tolerance ?

   (iv) What is the relation between dia of rivet and plate thickness when both are in mm.

   (v) What is the type of thread profile used in screw jack ?

   (vi) How do you represent an enlarged scale ?

   (vii) What do you understand by basic shaft, h ?

   (viii) Name the method of drawing isometric projection of a circle.

   (ix) What is the relation between helix angle, lead and major diameter in a multistart lead screw ?

   (x) Name *two* software for drawing.

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,**
ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. (*a*) Explain the principle of construction of diagonal
    scale with a neat sketch.   5

   (*b*) Construct a backward vernier scale having a least
    count of 0·005 cm and long enough to measure
    5 cm. Show the following distances on the scale :
    (*i*) 3·15 cm, and (*ii*) 1·95 cm. Select a scale of 2 : 1.   15

2. (*a*) A pentagonal plane lamina of edges 20 mm is
    resting on H.P. with one of its corners touching it
    such that the plane surface makes an angle of 60°
    with H.P. Two of the base edges, containing the
    corner, on which the lamina rests, make equal

inclinations with H.P. If the edge opposite to this corner makes an angle of 45° with V.P., draw the top and front views of the lamina in this position.   10

(b) A line PQ has its end, P, 15 mm above H.P. and 10 mm in front of V.P. The end Q is 55 mm above H.P. and the line is inclined at 30° to H.P. The distance between the end projectors of the line when measured parallel to the line of intersection of H.P. and V.P. is 50 mm. Draw the projections of the line and find its inclination with V.P.   10

3. A hexagonal pyramid, base 30 mm side and axis 60 mm long, has one of its slant edges on H.P. such that two of its triangular faces containing the slant edge on which it rests are equally inclined to H.P. The top view of the axis appears to be inclined at 45° to V.P. Draw its projections when its base is nearer to the observer than its apex.   20

4. Figure 1 shows the orthographic views of an object. Draw the isometric projection of the object.   20
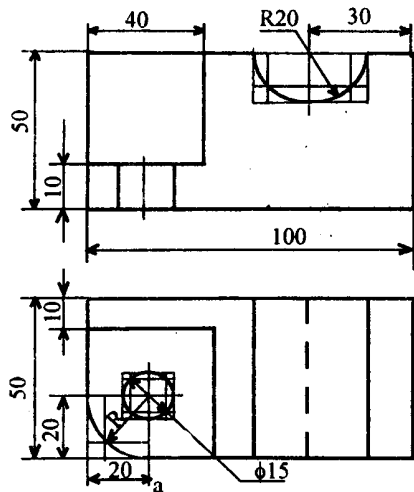

Fig. 1

Group B

5. Draw the necessary views (including sectional views) to show the details of following joints :

   (i) A single rivetted double cover plate butt joint to conneet two plates of 20 mm thickness. Indicate dimensions as simple top view and sectional front view.   7

   (ii) A jib head key fitted on to a shaft of 50 mm.   5

   (iii) A square headed nut, bolt and washer assembly to connect two plates of 20 mm thickness, if diameter of the bolt is 20 mm.   8

6. Draw the front view, top view and left-hand side view of the object shown in Fig. 2. Consider view from arrow F as front view.   20
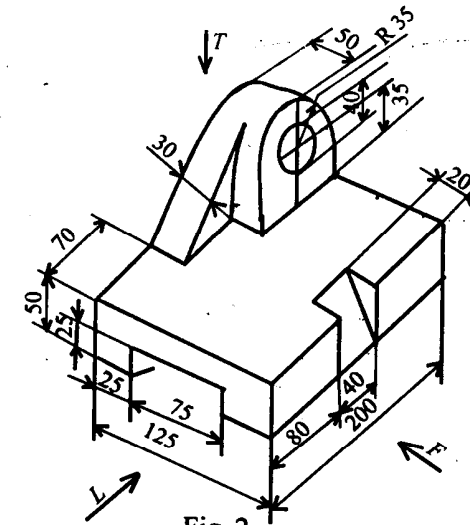

Fig. 2

7. A vertical cone, 80 mm diameter and axis 100 mm long, is penetrated by a 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. The axes of both the solids are parallel to V.P. Show the intersection curves in the top and front views. 20

8. A cone diameter of base 80 mm and height 80 mm stands vertically with its base on H.P. A semi-circular hole of radius 25 mm is cut through the cone. The axis of the hole is perpendicular to V.P. and parallel to H.P. and intersects the axis of the cone 30 mm above the base. The flat surface of the hole contains the axis of the cone and perpendicular to V.P. and H.P. Draw the complete development of the cone showing the shape of the hole on it.   20

Group C

9. Choose the *correct* answer for the following :   20 × 1

(*i*) The size of the drawing drawn to a scale of 2 : 1 will be .... the actual size of the object.

(*a*) same as

(*b*) twice of

(*c*) half of

(*d*) cannot be predicted

(*ii*) The information needed to construct any scale (except the scale of chords) is

(*a*) R.F. of the scale.

(*b*) unit of measurement.

(*c*) maximum distance to be represented.

(*d*) All of the above.

(*iii*) Which one of the following is *not* a reduction scale ?

(*a*) 1 : 200

(*b*) 5 : 6

(*c*) 1 : 1

(*d*) 3/250

(*iv*) Which one of the following is *not* a principal plane of projection ?

(*a*) H.P.

(*b*) V.P.

(*c*) P.P.

(*d*) Auxiliary plane.

(*v*) In the first angle projection method, the view seen from the left is placed on

(*a*) left of front view.

(*b*) right of front view.

(*c*) above front view.

(*d*) below front view.

(*vi*) If an object is cut by an AVP, then it will show

(*a*) sectional front view.

(*b*) sectional top view.

(*c*) sectional front view and side view.

(*d*) sectional side view.

(*vii*) To obtain the point view of a line, the auxiliary plane is set

(*a*) perpendicular to true length.

(*b*) parallel to true length.

(c) inclined at an angle $\phi°$ to true length.

(d) inclined at an angle $\theta°$ to true length.

(viii) If $\theta + \phi = 90°$, then which one of the following statement is correct ?

(a) $\alpha = \beta = 90°$

(b) side view = true length

(c) Front view is perpendicular to XY.

(d) All of the above.

(ix) If a line is parallel to both the reference planes, then which one of the following statement is wrong ?

(a) True length = Plan length

(b) True length = Elevation length

(c) True length > Elevation length

(d) $\alpha = \beta$

(x) Which one of the following is *not* a section of a tetrahedron ?

(a) Isosceles triangle

(b) Equilateral triangle

(c) Trapezium

(d) Pentagon

(xi) If the cutting plane includes the axis of a cylinder, then the section obtained is a

(a) rectangle.

(b) circle.

(c) ellipse.

(d) any one of the above.

(xii) Parallel line development method is *not* suitable for the development of a

(a) tetrahedron

(b) hexahedron

(c) pentagonal prism

(d) cylinder.

(xiii) If a thread is wound around a cone starting from a point on the base and brought back to the same point, then the shortest possible length of thread is equal to the

(a) slant height of the cone.

(b) diameter of the base of cone.

(c) longest chord of the development sector.

(d) length of the perpendicular from a corner of the development sector to the opposite edge.

(xiv) Whenever a prism and pyramid intersect, the curve seen at their intersection is a

(a) smooth curve.

(b) segmented-line curve.

(c) either smooth curve or segmented line curve.

(d) None of the above.

(xv) The theory of development is used in the manufacturing of

(a) plastic moulded parts.

(b) cast iron parts.

(c) sheet metal parts.

(d) electronic components.

(*xvi*) Which one of the following is *not* an output device ?

(*a*) Printer

(*b*) Plotter

(*c*) Joystick

(*d*) Monitor.

(*xvii*) A free-hand vertical line should always be drawn from

(*a*) bottom to top.

(*b*) top to bottom.

(*c*) mid-point to top.

(*d*) mid-point to bottom.

(*xviii*)The command used to erase the object partly is

(*a*) ERASE

(*b*) EXPLODE

(*c*) TRIM

(*d*) EXTEND.

(*xix*) The most effective command used to draw symmetrical objects is

(*a*) copy

(*b*) array

(*c*) lengthen

(*d*) mirror.

(*xx*) A hexahedron consists of

(*a*) four equal square faces.

(*b*) six equal square faces.

(*c*) four equal triangular faces.

(*d*) six equal triangular faces.

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,**
ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

*All parts of a question (a,b,etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. (*a*) Explain the principle of construction of vernier scale
        with a neat sketch.   5

    (*b*) An area of 144 cm² on a map represents an area of
        36 km² on a field. Find the scale factor for this map
        and draw a diagonal scale and mark on it a distance
        of 7·56 km.   15

2. (*a*) A regular pentagon of 30 mm side is resting on one of
        its edges on the HP which is inclined at 45° to the VP.
        Its surface is inclined at 30° to the HP. Draw its
        projections.   10

(*b*) The view from above of a line, *AB*, inclined at $60°$ to *xy* line, measures 85 mm while the length of the view from the front is 65 mm. Its one end *A* is in the HP and 15 mm in front of the VP. Draw the projections of line *AB* and determine its true length and true inclinations of it with HP and VP. Find the shortest distance of the mid-point of the line *AB* from *xy* line.   10

3. A right regular pentagonal pyramid base, 35 mm side and axis 80 mm long, has a triangular face on HP and vertical plane containing the axis makes an angle of $45°$ with VP. Draw its projections.   20

4. Draw the isometric scale and isometric projection of the arrangement of solids when a hemisphere of 60 mm diameter is placed centrally touching the flat face on the top of a frustum of a square pyramid. The base of frustum is 60 mm square, top 40 mm square and its height 50 mm.   20

Group B

5. Draw the necessary views (including sectional views) to show the details of the following joints :

(*i*) A double riveted zig-zag lap joint to connect two plates of 25 mm thickness;   7

(*ii*) A Woodruff key fitted on to a shaft of diameter 40 mm;   5

(*iii*) A hexagonal headed nut bolt and washer assembly to connect two blocks of each thickness 20 mm, if the major dia of bolt is 25 mm.   8

6. Draw the front view, top view and left-hand side view of the object shown in *Fig*. 1. Use third angle projection method.   20

Fig. 1
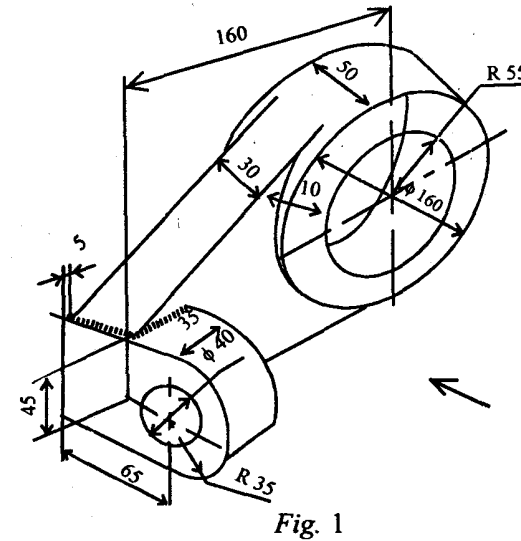
7. A cone of base diameter 60 mm and axis 90 mm is resting on HP on its base. A horizontal triangular prism, with its edge of base 25 mm, penetrates the cone such that the axes of both the solids intersect each other at a height of 40 mm from the base on the cone. The axis of the prism is also parallel to VP and one of its rectangular faces makes $30°$ with HP. Draw the projections of the solids, showing the lines of intersection.   20

8. Draw the surface development of a cylinder of 50 mm diameter and 75 mm height containing a square hole of 25 mm side. The sides of the hole are equally inclined to base and the axis of the hole bisects the axis of the cylinder. Also, draw the projection of solid.   20

Group C

9. Answer the following: 1 × 20

(i) Name two most commonly used curves for tooth profile of gears.

(ii) Write relation of isometric length and actual length of an object in isometric scale.

(iii) What is the scale factor while 10 cm drawing length represents 10 km actual length?

(iv) Write two examples of temporary joints.

(v) Write two examples of permanent joints.

(vi) What is the relation of margin and rivet dia for riveted joint?

(vii) What is the value of thread angle for BSW thread?

(viii) What is the symbolic representation of flatness tolerance?

(ix) What do you understand by symbol '↙↗'?

(x) Name the method of surface development of a cone.

(xi) Name two softwares for drawing.

(xii) Name the command used for scaling the object.

(xiii) What do you understand by basic hole, H?

(xiv) How many points are required to draw a circle, if radius is not known?

(xv) What is the position of right side view to be drawn according to first angle projection method?

(xvi) When a line is perpendicular to VP, which view will be the true length of the line?

(xvii) When a right regular cone is completely cut by an inclined plane, which is inclined to HP and perpendicular to VP, then what will be true shape of the section?

(xviii) When a line is parallel to HP and perpendicular to VP, then which trace will be obtained?

(xix) Name two solids generated by method of revolution.

(xx) Name two methods of dimensioning.

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,**
ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

*All parts of a question (a,b,etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. (*a*) Classify different types of scales.   1

    (*b*) Define the following :   2 × 2

    (*i*) Representative fraction of a scale

    (*ii*) Least count of a scale.

    (*c*) Construct a forward vernier scale to read distances
    correct to a decametre on a map in which the actual

distances are reduced in the ratio of 1 : 40000. The scale should be long enough to measure 6 km. Mark on the scale the length of 3·34 km and 0·57 km. 15

2. (a) The top view of a line is 75 mm long and inclined to XY at 45°. One end is 20 mm above H.P. and 10 mm in front of V.P. The other end is 65 mm above H.P. and is in fornt of V.P. What is the true length of the line and its inclination with H.P. and V.P. ? Also, show its traces. 10

(b) A circular plate of 60 mm diameter has a hexagonal hole of 20 mm sides centrally punched. Draw the projections of the circular plate resting on H.P. with its surface inclined at 30° to the H.P. and the diameter through the point on which the circular plate rests on H.P. is inclined at 50° to V.P. Any two parallel sides of the hexagonal hole are perpendicular to the diameter of the circular plate passing through the point on which it rests. Draw the projection. 10

3. Draw the top and front views of a right circular cylinder of base 45 mm diameter and axis 60 mm long when it lies on H.P. such that its axis is inclined at 30° to H.P. and the axis appears to be perpendicular to the V.P. in the top view. Follow auxiliary plane method. 20

4. Figure 1 shows the front view and top view of a casting. Draw the isometric projection using the isometric scale. All dimensions are in mm. 20
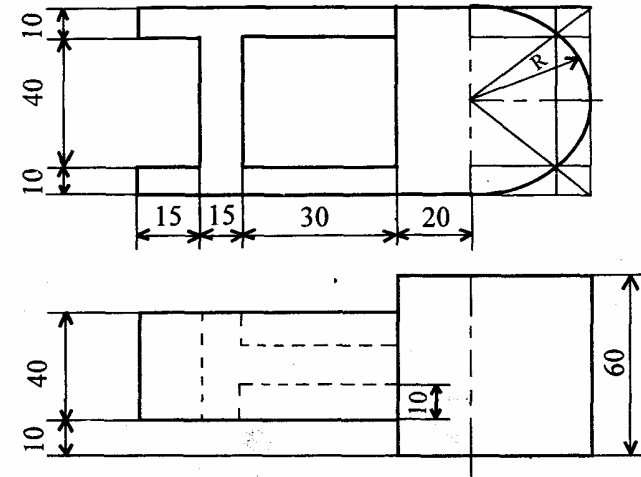

Fig. 1

Group B

5. A cone, base 60 mm diameter and axis 70 mm long, is resting on H.P. on its base. It is cut by a section plane perpendicular to V.P. and inclined at 75° to H.P. so as to cut the axis of the cone at a point 20 mm above the base. Draw its front view, sectional top view and the true shape of section. Name the shape of the curve. 20

6. Draw the front view, top view and right-hand side view of the object as shown in *Fig.* 2. Draw the front view

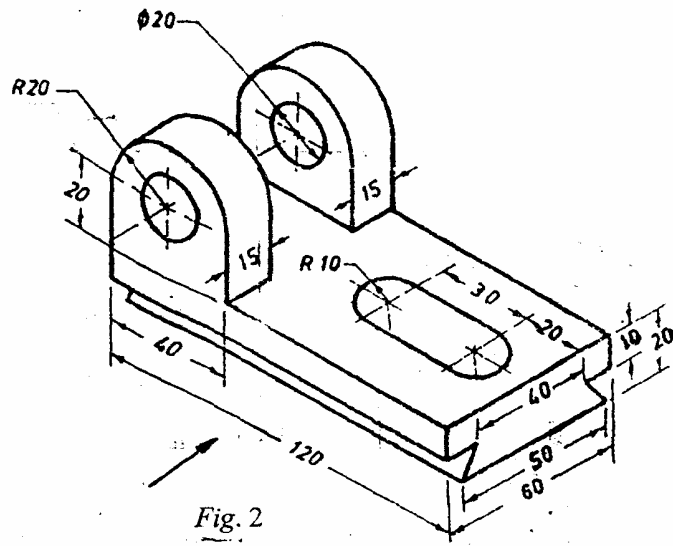looking in the direction of the arrow. Use the first angle projection method. All dimensions are in mm.   20

Fig. 2

Draw the development of the lateral surface of the object shown in *Fig* 3. Take a suitable scale. All dimensions are in mm.   20
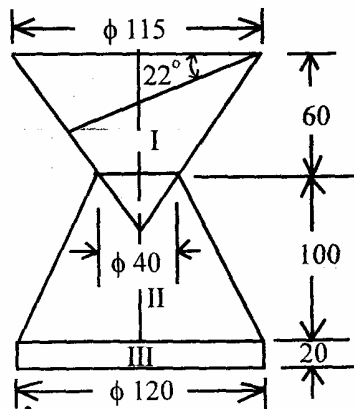

8. A vertical cylinder of 60 mm diameter is penetrated by a horizontal cylinder of 40 mm diameter. The axis of penetrating cylinder is parallel to V.P. and 6 mm in front of the axis of vertical cylinder. Draw the projections and show the intersection curves.   20

Group C

9. Choose the *correct* answer for the following :   1 × 20

(*i*) The eccentricity of a hyperbola is

(*a*) less than 1

(*b*) equal to 1

(*c*) greater than 1.

(*ii*) A spiral, in which the ratio of the length of successive vectors enclosing equal angles is constant, is called

(*a*) Archimedian spiral

(*b*) Logarithmic spiral

(*c*) None of the above.

(*iii*) The ratio of the true length to the isometric is given by

(*a*) 1/1·224

(*b*) 1/2

(*c*) 1/3.

(*iv*) When both the views coincide with *xy*, the line is lying

(*a*) in the H.P.

(*b*) in the V.P.

(*c*) both in H.P. and V.P.

(v) When a point lies in the H.P., its view from the front will lie

(a) below xy

(b) above xy

(c) on xy.

(vi) In computer, 1 kilobyte equals to

(a) 1024 Bytes

(b) 1024 kB

(c) 1024 MB.

(vii) When axis of a solid is perpendicular to the H.P., its relation with the V.P. is

(a) parallel

(b) perpendicular

(c) inclined.

(viii) The major input device used in the computer is

(a) plotter

(b) joystick

(c) light pen.

(ix) Mouse in a computer is

(a) an output device

(b) a storage device

(c) an input device.

(x) When a line is parallel to both the H.P. and V.P., it has

(a) only the H.T.

(b) only the V.T.

(c) neither H.T. nor V.T.

(xi) Temporary fastenings is

(a) rivet

(b) journal bearing

(c) bolt and nut.

(xii) To draw either horizontal or vertical lines, the command used in Autocad is

(a) SNAP

(b) GRID

(c) ORTHO.

(xiii) When a plane perpendicular to both the reference planes, its traces are

(a) inclined to xy

(b) perpendicular to xy

(c) parallel to xy.

(xiv) The line of intersection between prism and pyramid is a

(a) straight line

(b) curve

(c) dotted line.

(xv) When a sphere is cut by a section plane, the true shape of the section is

(a) ellipse

(b) circle

(c) parabola.

(*xvi*) To enlarge or reduce the apparent size of objects, the command used in Autocad is

(*a*) SNAP

(*b*) ZOOM

(*c*) UNDO.

(*xvii*) If the top view and front view of a point are respectively 60 mm above and 50 mm below the *xy* line, the point will be located in

(*a*) first quadrant

(*b*) fourth quadrant

(*c*) third quadrant.

(*xviii*) Motion can be transmitted from one shaft to another by means of

(*a*) journal bearing

(*b*) gear

(*c*) key.

(*xix*) Following views are generally drawn to give sufficient information about the building :

(*a*) Plan

(*b*) Isometric view

(*c*) Section.

(*xx*) When two planes intersect each other, their intersection is a

(*a*) point

(*b*) line

(*c*) curve.

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A**,
ANY TWO *from* **Group B** *and* ALL *from* **Group C**.

All parts of a question (*a, b, etc.*) *should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks .

Group A

1. (*a*) Explain the principle of construction of diagonal scale
   with a neat sketch.   5

   (*b*) The distance between two stations is 600 km. It is
   represented on a railway map by a line 15 cm long.
   Construct a diagonal scale to measure up to 1 km
   and find its R.F. Indicate a distance of 346 km on
   the scale.   15

2. (a) A room measures 8 m long, 5 m wide and 4 m high. An electric bulb hangs in the centre of the ceiling and 1m below it. A thin straight wire connects the bulb to a switch kept in one of the corners of the room and 1.25 m above the floor. Draw the projections of the wire and determine its true length and slope with the floor.   10

(b) A line PQ, 100 mm long, is inclined at 30° to the HP and 45° to the VP. Its mid-point M is in the VP and 20 mm above HP. Draw its projections when its end P is in the first quadrant and Q in the third quadrant.   10

3. (a) A right regular hexagonal thin plate of 40 mm side has a circular hole of 40 mm diameter in its centre. It is resting on one of its corners in HP. Draw the projections when the plate surface is vertical and inclined at 30° to VP.   10

(b) Draw the isometric projection of the arrangement of solids when a sphere of 40 mm diameter rests centrally on the top of a cube of 40 mm side.   10

4. A right regular pentagonal prism, side of base 25 mm and axis 50 mm long, lies on HP on one of its rectangular faces, such that its axis is parallel to HP and inclined at 30° to VP. Draw the projections of the solid.   20

Group B

5. Draw the necessary views (including sectional views) to show the details of any *two* joints :   10×2

(i) A single riveted double strap butt joint to connect two plates of 25 mm thickness.

(ii) A stud joint to connect a 25 mm plate to a casting block, if the major diameter of stud is 25 mm.

(iii) A parallel rectangular sunk key fitted on to a shaft of 50 mm diameter with the hub of a pulley.

6. Draw the front view, top view and right-hand side view of the object as shown in Fig.1. Use the first angle projection method.   20
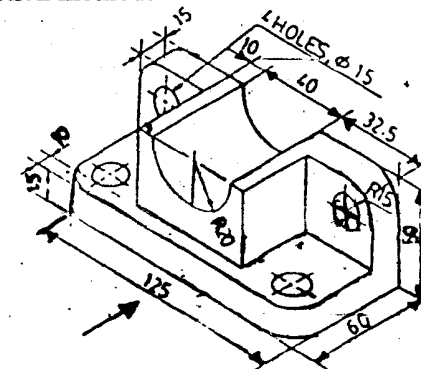

Fig. 1

7. A right regular cone of 40 mm base diameter and 50 mm height rests on its base on HP. A section plane, perpendicular to VP and inclined to HP at 45°, cuts the cone bisecting its axis. Draw the projections of the truncated cone and develop its lateral surface. Also, draw the true shape of the section.   20

8. A square prism, edge of base 30 mm and height 60 mm, resting on its base on HP is completely penetrated by another square prism of 20 mm base edge and 60 mm length such that the axis of the penetrating prism is perpendicular to and 5 mm in front of the axis of vertical prism. The rectangular faces of two prisms are equally inclined to VP. Draw the projections of the solids showing the lines of intersections. 20

Group C

9. Choose the *correct* answer for the following : 1 x 20

(*i*) A curve generated by a point on the circumference of a circle, which rolls along a straight line without slipping, is called

(*a*) cycloid

(*b*) involute

(*c*) epicycloid

(*d*) hypocycloid.

(*ii*) The helix angle (α) of multistart thread is expressed as

(*a*) $\tan \alpha = \text{Lead}/(\pi \times \text{major dia})$

(*b*) $\tan \alpha = \text{Pitch}/(\pi \times \text{major dia})$

(*c*) $\tan \alpha = (\pi \times \text{major dia})/\text{Lead}$

(*d*) $\tan \alpha = (\pi \times \text{major dia})/\text{Pitch}$.

(*iii*) The relation between the diameter (*d*) of rivet (in mm) and the thickness (*t* in mm) of plate to be joined is

(*a*) $d = 6\sqrt{t}$

(*b*) $d = 1\cdot9 \sqrt{t}$

(*c*) $t = 6\sqrt{d}$

(*d*) $t = 1\cdot9 \sqrt{d}$.

(*iv*) In isometric drawing, the ratio of isometric length and actual length is

(*a*) 0·72

(*b*) 0·82

(*c*) 1·0

(*d*) 0·92.

(*v*) Temporary joint is

(*a*) rivetted joint

(*b*) welded joint

(*c*) nut and bolt joint

(*d*) lap joint.

(*vi*) Symbol ⊕ represents

(*a*) circularity tolerance

(*b*) cylindricity tolerance

(*c*) positional tolerance

(*d*) concentricity tolerance.

(*vii*) A basic shaft has

    (*a*) zero lower deviation

    (*b*) zero upper deviation

    (*c*) zero tolerance

    (*d*) lower deviation is equal to upper deviation.

(*viii*) The name of method of development of lateral surface of a pyramid is

    (*a*) Gore and Zone method

    (*b*) parallel line method

    (*c*) radial line method

    (*d*) triangulation method.

(*ix*) If D is the diameter of a sphere, in isometric projection, its value will be equal to

    (*a*) $\sqrt{3/2}\,D$

    (*b*) $\sqrt{2/3}\,D$

    (*c*) D

    (*d*) $(3/2)\,D$.

(*x*) The thread angle for BSW thread is

    (*a*) 60°

    (*b*) 45°

    (*c*) 55°

    (*d*) 30°.

(*xi*) When a right regular cone is cut by a section plane containing the axis of the cone and perpendicular to the base, then the true shape of the section is

    (*a*) triangle

    (*b*) ellipse

    (*c*) parabola

    (*d*) circle.

(*xii*) To enlarge or reduce the size of objects, the command used in autocad is

    (*a*) SNAP

    (*b*) ZOOM

    (*c*) UNDO

    (*d*) GRID.

(*xiii*) The input device used in the computer for drawing

    (*a*) mouse

    (*b*) plotter

    (*c*) printer

    (*d*) monitor.

(*xiv*) When the axis of a solid is parallel to both HP and VP, the true shape of the base is shown by

    (*a*) front view

    (*b*) top view

    (*c*) side view

    (*d*) bottom view.

(*xv*) When a line is perpendicular to HP and parallel to VP, it has

    (*a*) only H.T.

    (*b*) only V.T.

    (*c*) no H.T.

    (*d*) no H.T. and V.T.

(*xvi*) In first angle projection, left side view is drawn on

    (*a*) left side of front view

    (*b*) right side of front view

    (*c*) left side of top view

    (*d*) right side of top view .

(*xvii*) The line of intersection between prism and pyramid is

    (*a*) straight line

    (*b*) curve line

    (*c*) dotted line

    (*d*) broken line .

(*xviii*) In isometric projection, isometric axes are equally inclined at

    (*a*) 60°

    (*b*) 90°

    (*c*) 120°

    (*d*) 30°.

In third angle projection method, the object is placed

    a) between the projection plane and observer

    b) below the projection plane

    c) above the projection plane.

When a point lies in the VP, its view from top will be

    a) on *xy*

    b) below *xy*

    c) above *xy* .

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A** ,
ANY TWO *from* **Group B** *and* ALL *from* **Group C**.

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. (a) Divide a line *AB* of 12·66 cm into five equal
    parts.   5

    (b) An area of 144 cm² on a map represents an area of
    36 km² on a field. Find the R.F. of the scale for this
    map. Use this R.F. to construct a diagonal scale up
    to 10 km and mark on this scale 7·56 km .   15

2. (a) The top view of a circular lamina standing on a point on its rim appears as an ellipse of major axis 50 mm and minor axis 30 mm. Draw the projection of the circular lamina when its minor axis is inclined at 30° to XY. 10

(b) The left profile view of a line AB, 80 mm long, makes an angle of 40° to the XY line. Draw the top and front views of the line when length of the left profile view is 50 mm. Take the point A to be 15 mm above H.P. and 60 mm in front of V.P. and the point B being nearer to V.P. 10

3. A right circular cone, with base diameter of 50 mm and axis 80 mm long, is resting on the H.P. with its axis inclined to the H.P. in such a way that the apex of the cone is 70 mm above H.P. If the axis of the cone is parallel to the profile plane, draw its projections by auxiliary plane method. 20

4. A vertical cylinder of 50 mm diameter and 75 mm long is completely penetrated by a horizontal cylinder of 40 mm diameter and 75 mm long such that their axis bisect each other at right angles. The axis of both the cylinders are parallel to V.P. Draw the intersection curve. 20

Group B

5. A cylinder, base 40 mm diameter and axis 58 mm long, rests with a point of its base circle on H.P. Its axis is inclined at 45° to H.P. and parallel to V.P. A section plane, perpendicular to both the H.P. and the V.P., bisects the axis of the cylinder. Draw its front view, top view and sectional side view. 20

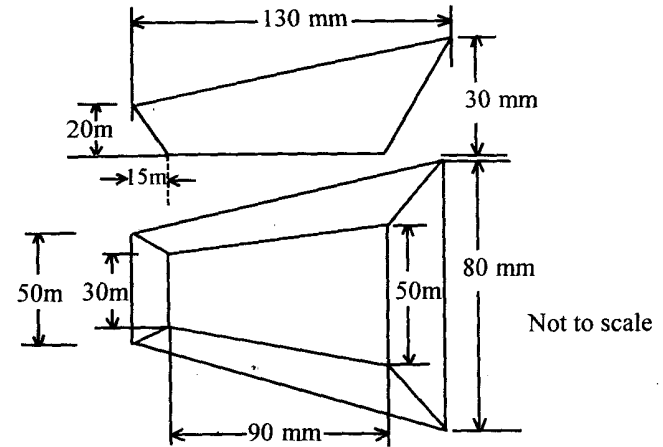6. Draw the development of the tray shown in Fig.1 by triangulation method. 20

Fig. 1

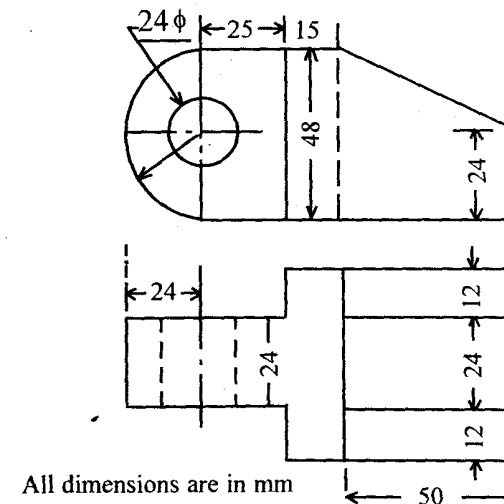7. Draw the isometric projection of the component whose plan and elevations are shown in Fig.2 : 20

Fig. 2

All dimensions are in mm

8. Draw the orthographic views of the part shown in *Fig* .3 : 20
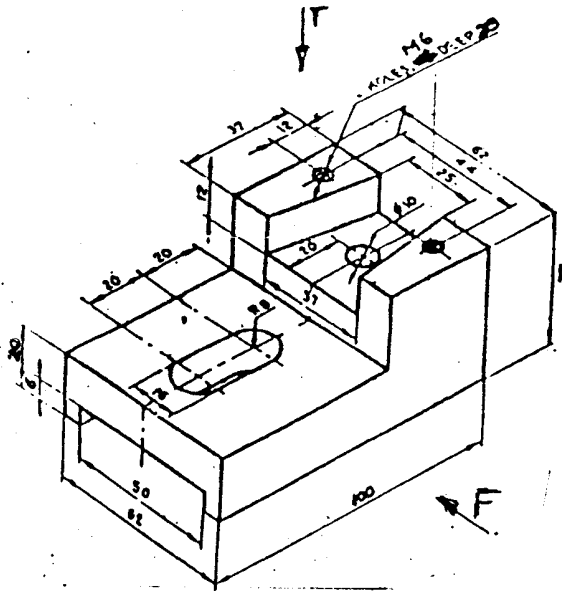

All dimensions in mm

Fig. 3

(*i*) Front view in the direction of arrow *F*; and

(*ii*) Top view in the direction of arrow *T*.

Group C

9. Choose the *correct* answer for the following :   1 x 20

(*i*) A curve, generated by a point on the circumference of a circle, which rolls on the outside of another circle without sliding is called

(*a*) cycloid

(*b*) epicycloid

(*c*) hypocycloid.

(*ii*) The eccentricity of a hyperbola is

(*a*) less than 1

(*b*) equal to 1

(*c*) greater than 1.

(*iii*) A round rod threaded on both ends is called

(*a*) bolt

(*b*) stud

(*c*) screw.

(*iv*) Sphere in isometric view appears as

(*a*) ellipse

(*b*) circle

(*c*) sphere.

(*v*) The base of an oblique cylinder is

(*a*) circle

(*b*) an ellipse

(*c*) parabola.

(*vi*) Universal coupling is used to connect shafts whose axis are

(*a*) parallel

(*b*) co-axial

(*c*) intersecting.

(*vii*) Motion can be transmitted from one shaft to another by means of

(*a*) journal bearing

(*b*) gear

(*c*) flange coupling.

(*viii*) The command VPOINT is used in auto CAD to

(*a*) move an object on the screen

(*b*) split the screen into more than one view

(*c*) view a three-dimensional object in the screen.

(*ix*) Tolerance on dimensions are indicated in

(*a*) machine drawing

(*b*) isometric projection drawing

(*c*) orthographic projection drawing.

(*x*) The angle between the isometric axis is

(*a*) 90°

(*b*) 120°

(*c*) 60°.

(*xi*) The ratio between the isometric and true lengths is

(*a*) $2/\sqrt{3}$

(*b*) $\sqrt{2}/3$

(*c*) $\sqrt{2/3}$.

(*xii*) When both views coincide with *xy*, the line is lying

(*a*) in the H.P.

(*b*) in the V.P.

(*c*) both in the H.P. and V.P.

(*xiii*) In computer, 1 kilo byte equals to

(*a*) 1024 bytes

(*b*) 1024 KB

(*c*) 1024 MB.

(xiv) In computer, the mouse is

(a) an output device

(b) a storage device

(c) an input device.

(xv) The major input device used in the computer is

(a) plotter

(b) joystick

(c) light pen.

(xvi) To enlarge or reduce the apparent size of objects, the command used in autocad is

(a) SNAP

(b) ZOOM

(c) UNDO.

(xvii) Temporary fastenings is

(a) rivet

(b) bolt and nut

(c) journal bearing.

(xviii) A line consisting of short dashes throughout its length represents

(a) invisible edge of a solid

(b) axis of a solid

(c) trace of a cutting plane.

(xix) When a plane is perpendicular to both the reference planes, its traces are

(a) inclined to xy

(b) perpendicular to xy

(c) parallel to xy.

(xx) If a quick acting thread is required, the lead must be

(a) small

(b) very small

(c) large.

S'08 : 4 FN : AN 207 (1407)

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A**,
ANY TWO *from* **Group B** *and* ALL *from* **Group C**.

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answer may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*
Figures on the right-hand side margin indicate full marks.

Group A

1. (a) Compare first angle projection and third angle
projection methods with sketches.   6

(b) A line *AB*, inclined at 30° to the H.P., has its ends
A and *B*, 25 mm and 60 mm in front of the V.P.,
respectively. The length of the view from above is
65 mm and its V.T. is 15 mm above the H.P. Draw
the projection of the line *AB* and locate its H.T.   14

2. (a) Explain the principle of construction of isometric
scale with a neat sketch.   5

(b) A rectangle of 500 cm × 50 cm represents an area of
6250 square kilometre. Construct a diagonal scale to
measure kilometre, hectametre and decametre.
Indicate a distance of 3·47 km on this scale.   15

3 (a) A regular pentagon of 30 mm side is resting on one of its edges on the H.P., which is inclined at 45° to the V.P. Its surface is inclined at 30° to the H.P. Draw its projections.   10

(b) Draw the projection of a circle of 40 mm diameter resting on the H.P. on a point on the circumference. Its plane is inclined at 30° to the H.P. and perpendicular to the V.P. Its centre is 35 mm in front of the V.P. Also, show its traces.   10

4. A right regular hexagonal pyramid, side of base 25 mm and height 50 mm, lies on one of its triangular faces on H.P. and the edge of the base contained by the triangular face makes an angle of 30° to V.P. Draw its projections.   20

Group B

5. Draw the front view, top view and right-hand side view of the object as shown in *Fig*.1. Use the third angle method of projection.   20
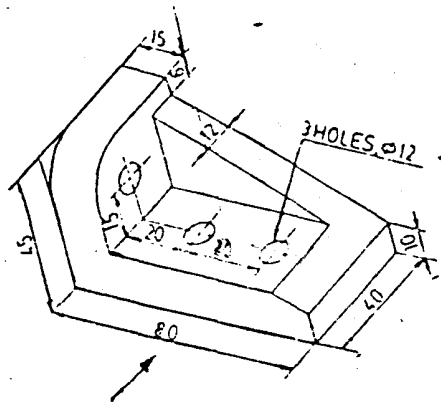

Fig 1.

6. (a) Draw the isometric projection of a cone of base circle radius, 25 mm, and axis is 50 mm long and horizontal.   6

(b) A sphere of 60 mm diameter is placed centrally on the top of a frustum of a square pyramid. The sides of base and top face are 60 mm and 40 mm, respectively. The height of the frustum is 50 mm. Draw the projection of the arrangement.   14

7. A pentagonal pyramid, with edge of base 25 mm and axis 65 mm long, is resting on H.P. on its base, with an edge of it parallel to V.P. It is cut by a section plane inclined at 60° to the V.P. and at a distance 5 mm from the axis. Draw the sectional front view and true shape of the section. 20

8. A cone of 70 mm diameter base and axis length 100 mm rests on the HP on its base. Draw the projection of the cone and show on it the shortest path traced by a point starting from a point on the circumference of the base of the cone moving around it and reaching the same point.   20

Group C

9. Choose the *correct* answer for the following :   1 x 20

(i) In third angle projection, the left side view is drawn on the

(a) left side of front view

(b) right side of front view

(c) left side of top view

(d) right side of top view.

(*ii*) According to unidirectional system of dimensioning, the values of dimensions are so placed that these can be read from

(*a*) bottom edge of drawing

(*b*) top edge of drawing

(*c*) both from bottom and right hand edge of drawing

(*d*) both bottom and left edge of drawing.

(*iii*) In isometric drawing, the ratio of isometric length and actual length is

(*a*) 0·72

(*b*) 0·82

(*c*) 1·0

(*d*) 0·92.

(*iv*) A basic hole has

(*a*) zero lower deviation

(*b*) zero upper deviation

(*c*) lower deviation is equal to upper deviation

(*d*) zero tolerance.

(*v*) Symbol $\oplus$ represents

(*a*) circularity tolerance

(*b*) cylindricity tolerance

(*c*) position tolerance

(*d*) concentricity tolerance.

(*vi*) When a plane is perpendicular to both the reference planes, its traces are

(*a*) inclined to $x - y$.

(*b*) perpendicular to $x - y$

(*c*) parallel to xy

(*d*) None of the above.

(*vii*) When a line is parallel to both the H.P. and V.P., it has

(*a*) only H.T.

(*b*) only V.T.

(*c*) both H.T. and V.T.

(*d*) no H.T. and V.T.

(*viii*) When a line is contained by a profile plane, the sum of the angles of the inclination with H.P. and V.P. is

(*a*) equal to 90°

(*b*) less than 90°

(c) greater than 90°

(d) None of the above.

(ix) Tetrahedron is a regular solid which has

(a) four equal faces, each has equilateral triangle

(b) six equal faces, each a square

(c) eight equal faces, each an equilateral triangle

(d) twelve equal faces, each an equilateral triangle.

(x) When the axis of a right regular solid is perpendicular to H.P., the true shape of the base is exactly

(a) front view

(b) top view

(c) side view

(d) None of the above.

(xi) When a sphere is cut by a section plane, the true shape of section is

(a) ellipse

(b) circle

(c) parabola

(d) hyperbola.

(xii) The intersection between a polyhedron and a section plane consists of

(a) straight lines

(b) curved lines

(c) both straight and curved lines

(d) ellipse.

(xiii) The name of method of development of lateral surfaces of a cone is

(a) Gore and zone method

(b) parallel line development

(c) radial line development

(d) triangulation method.

(xiv) The helix angle (α) of multistart screw thread is expressed as

(a) $\tan^{-1}$ (lead/circumferential length)

(b) $\tan^{-1}$ (lead/diameter)

(c) $\tan^{-1}$ (pitch/circumferential length)

(d) $\tan^{-1}$ (pitch/diameter).

(*xv*) Input-output device of the computer is

   (*a*) CPU

   (*b*) CRT

   (*c*) LCD

   (*d*) pen drive.

(*xvi*) The computer screen is specified by the length of

   (*a*) diagonal of screen

   (*b*) pixel

   (*c*) height of screen

   (*d*) width of screen.

(*xvii*) Software used for drawing is

   (*a*) Auto CAD

   (*b*) FORTRAN

   (*c*) BASIC

   (*d*) C++.

(*xviii*) When drawing polygon, the last side can be drawn by using

   (*a*) LINE command

   (*b*) CLOSE command

   (*c*) SIDE command

   (*d*) CIRCLE command.

(*xix*) An arc can be drawn using

   (*a*) three points on arc

   (*b*) start point, centre and end point

   (*c*) start point, end point and radius

   (*d*) All of the above.

(*xx*) If a section plane parallel to the axis passes through the cone such that the apex is contained by the plane, the section is

   (*a*) a right angled triangle

   (*b*) an isosceles triangle

   (*c*) parabola

   (*d*) circle.

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A**,
ANY TWO *from* **Group B** *and* ALL *from* **Group C**.

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving
proper justification.*
Figures on the right-hand side margin indicate full marks .

Group A

1. (*a*) Write about scales and their significance.   5

    (*b*) Construct a vernier scale of 1 : 50 , showing metres ,
    decimetres , and centimetres and long enough to
    measure 5 m. Mark on the scale the distances of
    2·435 m and 3·275 m on the scale.   15

2. (*a*) A line *AB* of 70 mm long has its end *A* at 10 mm
    above H.P. and 15 mm in front of V.P. Its front view
    and top view measure 50 mm and 60 mm,
    respectively. Draw the projections of the line and
    determine its true inclinations with H.P. and V.P.   10

    (*b*) A rhombus has its diagonals 100 mm and 60 mm long.
    Draw the projections of the rhombus , when it is so
    placed that its top view appears to be a square of
    diagonal 60 mm long and the vertical plane through
    the longer diagonal makes 30° with V.P.   10

3. A pentagonal pyramid of edge of base 25 mm and height 60 mm, is resting on a corner of its base on H.P. and the slant edge containing that corner is inclined at 45° with H.P. Draw the projections of the solid when it makes an angle 30° with V.P. Follow auxiliary plane method.   20

4. (a) State different types of lines with illustration and give their general applications as specified by Bureau of Indian Standards.   5

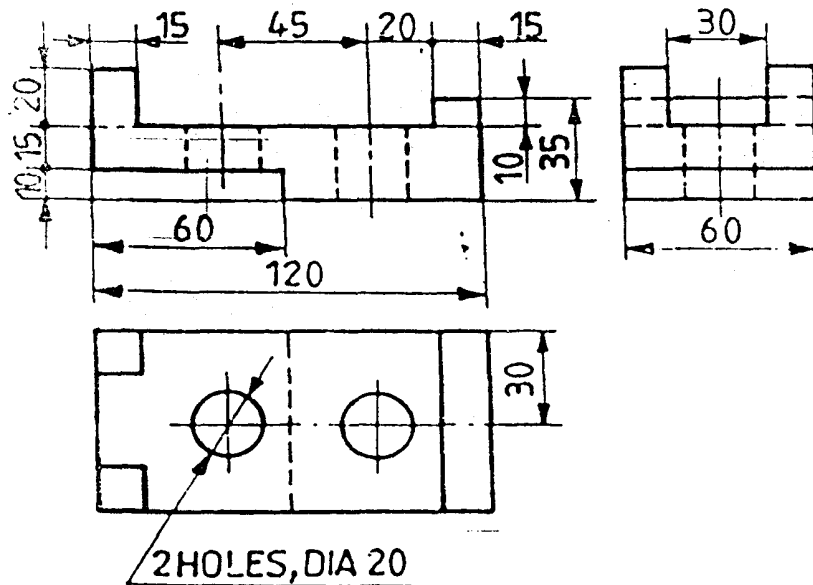   (b) Figure 1 shows three views of a machine block. Draw its isometric projection.   15

2 HOLES, DIA 20

Fig. 1

Group B

5. A square pyramid of base 40 mm side and axis 70 mm long rests with its base on H.P. with all the edges of the base equally inclined to V.P. It is cut by a section plane inclined at 60° to H.P. and passing through a point on the axis at 30 mm from the apex. Draw three views of the cut solid.   20

6. Figure 2 shows the isometric projection of a machine component. Draw three orthographic views of the object. Draw the front view looking in the direction of the arrow.   20
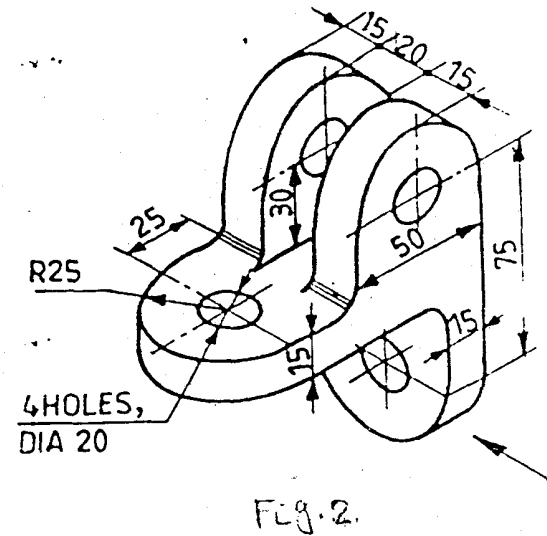

R25

4 HOLES, DIA 20

Fig. 2

7. A vertical cylinder of 60 mm diameter has a square hole of 30 mm side, cut through it. The axis of the hole is horizontal and 8 mm away from the axis of the cylinder. The edges of the square hole are equally inclined to H.P. Draw the projections of the cylinder showing the curves of intersection.   20

8. (a) What is the difference between a lap and a butt riveted joint and state the need for beveling of overlapping plates. 5

(b) Draw, to a full size scale, a double riveted butt joint with double cover plates, showing the zig-zag arrangement of rivets in the rows. Take the thickness of the butting plates as 12 mm and the nominal diameter of the rivet as 20 mm. Fully dimension the drawing very clearly, indicating also the dimensions of the cover plates. 15

Group C

9. (A) Choose the *correct* answer for the following: 1 x 10

(i) In a tripple riveted butt joint, the total number of row of rivets for the whole joint is

(a) 3

(b) 4

(c) 6.

(ii) A curve generated by a point moving on the surface of a cylinder in circumferential direction, at a constant angular speed, and with a simultaneous uniform rate of advance in an axial direction is called

(a) ellipse

(b) cycloid

(c) helix.

(iii) If a quick acting thread is required, the lead must be

(a) small

(b) very small

(c) large.

(iv) For a gear, the product of circular pitch and diametral pitch is

(a) π

(b) module

(c) addendum

(v) The locus of a point which moves such that the sum of its distances from two fixed points remains constant is called

(a) parabola

(b) hyperbola

(c) ellipse.

(vi) The true shape of the section surface obtained by cutting a cone parallel to one of its end generators is

(a) ellipse

(b) parabola

(c) hyperbola

(*vii*) A point is 20 mm in front of V.P. and 15 mm above H.P. Its shortest distance from the reference line is

(*a*) 25 mm

(*b*) 35 mm

(*c*) 5 mm

(*viii*) A straight line is parallel to V.P. and 50 mm in front of it. End of the line nearest to H.P. is 30 mm from it. Which trace of the line can be located on the reference planes ?

(*a*) H.T.

(*b*) V.T.

(*c*) Both H.T and V.T.

(*ix*) An elliptical lamina of major axis 100 mm and minor axis 50 mm is inclined to H.P. such that the top view appears as a circle. The inclination of the lamina with H.P. is

(*a*) 30°

(*b*) 45°

(*c*) 60°.

(*x*) A hexagonal pyramid is resting on one of its corners on H.P. such that the plane passing through the axis of the pyramid and the slant edge passing through this corner, makes an angle of 30° with V.P. Its inclination with H.P. is

(*a*) 45°

(*b*) 60°

(*c*) 90°.

(*B*) Fill in the blanks for the following : 1 × 10

(*i*) The isometric view of an object with irregular curved edges is most easily drawn by ——— method in combination with offset measurement method.

(*ii*) When a solid completely penetrates another solid, there will be ——— lines of intersection.

(*iii*) Every line on the development of surfaces must be the ——— length of the corresponding edge on the surface.

(*iv*) A solid generated by the revolution of a rectangle about one of its sides which remains fixed is known as ———.

(*v*) When a straight line is inclined to one reference plane and parallel to the other, its projection on the plane to which it is inclined is a line shorter than its true length but ——— to the reference line.

(*vi*) The curve traced out by a moving point along the line continuously in one direction as the line rotates in a plane about one of its ends is called ———.

(*vii*) Square threads are ideal for power transmission as they offer ———.

(*viii*) Control unit in a computer is a ———
component.

(*ix*) ——— is an external memory device used
through USB port of a computer.

(*x*) The process of combined transformation
employed on a graphic model during the editing
process is called ———— .

W'05 : 4 FN : AN 207 (1407)

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,** ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

All parts of a question (a, b, etc) should be answered at one place.

Answer should be brief and to-the-point and be supplemented with neat sketches. Unnecessary long answers may result in loss of marks.

Any missing data or wrong data may be assumed suitably giving proper justification.

Figures on the right-hand side margin indicate full marks.

Group A

1. A pentagonal pyramid of 30 mm side of base and height 60 mm rests on its base such that two of its base edges makes equal inclinations with V.P and nearer to the observer. Draw its views as per the following projection principles :

   (*i*) orthographic   8

   (*ii*) isometric   6

   (*iii*) oblique projection by the Cavalier method when the receding axis is inclined at 45°.   6

2. (a) Define: 6

   (i) Reducing scale

   (ii) Enlarging scale

   (iii) Representative fraction.

   (b) The distance between two cities is 250 kilometers. On inspection of the Railway map, its equivalent distance measures only 5 cm. What is the R.F. of the scale? Draw a diagonal scale showing to a single kilometre and indicate on it the following distances: 14

   (i) 725 km

   (ii) 512 km

   (iii) 268 km.

3. (a) One end of a line of length 60 mm lies at a distance of 20 mm in front of V.P. and 10 mm above H.P. The line makes 30° with H.P. and the side view measures 45 mm. Draw the projections of the line and determine the inclination with V.P. 10

   (b) A circular plate of 60 mm diameter has a hexagonal hole of 20 mm sides centrally punched. Draw the projections of the circular plate resting on H.P. with its surface inclined at 30° to the H.P. and the diameter through the point on which the lamina rests on H.P is inclined at 50° to V.P. The parallel sides of hexagonal hole are perpendicular to the diameter of the circular plate passing through the point on which it rests. 10

4. A rectangular pyramid of base 30 mm × 20 mm and height 35 mm rests in V.P. such that the front view of the base is a square of sides 20 mm. Front view of the axis makes 30° with H.P. The apex lies to the right and 30 mm from H.P. Draw the projections. 20

Group B

5. A pentagonal pyramid of 30 mm edge of base and 55 mm high vertically rests with one of its base edges parallel to V.P. and nearer to it. It is cut by two section planes, both being perpendicular to V.P. One of the section planes is horizontal and cuts the portion of the pyramid on the left of the axis at a height of 20 mm above the base of the pyramid. The other section plane inclined at 45° to H.P. cuts the portion of the pyramid to the right of the axis passing through a point on it 20 mm above the base and leans upwards. Draw the development of the lateral surfaces of the lower portion of the pyramid. 20

6. Orthographic views of a simple machine part are shown in the *Fig. 1*. Draw the isometric projection of the part, using isometric scale. 20
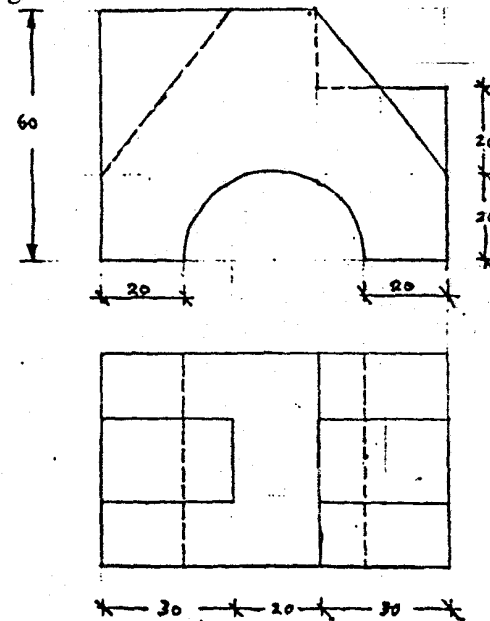

Fig. 1
All dimensions are in mm.

7. A cylinder of 50 mm diameter and 70 mm long is lying with one of its generators on H.P. such that its axis is parallel to both H.P. and V.P. A section plane perpendicular to V.P. and inclined at 30° to H.P. passes through a point on the axis 30 mm from one of its ends. Draw the sectional top view and true shape of section. 20

8. Draw the following orthographic views of the machine part shown in *Fig. 2* :

(*i*) Front view, looking along the direction of the arrowhead. 8
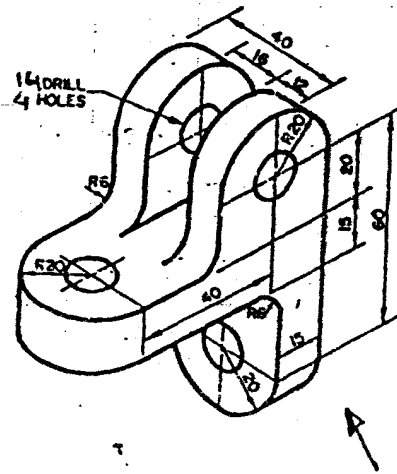
(*ii*) Top view. 6

(*iii*) Left end view. 6

Fig. 2
All dimensions are in mm.

Group C

9. (*A*) Choose the *correct* answer among the three answers suggested for each question : 1 × 10

(*i*) When a point lies in the H.P. its view from the front will lie

(*a*) on *xy*

(*b*) below *xy*

(*c*) above *xy*

(*ii*) The distance of a point from the H.P. is marked from *xy* to the

(*a*) view from above

(*b*) view from the front

(*c*) side view

(*iii*) When both the views coincide with *xy*, the line is lying

(*a*) in the H.P.

(*b*) in the V.P.

(*c*) both in the H.P. and V.P.

(*iv*) When a plane is perpendicular to both the reference planes, its traces are

(*a*) inclined to *xy*

(b) perpendicular to *xy*

(c) parallel to *xy*

(v) When the axis of a solid is perpendicular to the H.P. its relation with the V.P. is

    (a) parallel

    (b) perpendicular

    (c) inclined

(vi) When a sphere is cut by a section plane, the true shape of the section is

    (a) ellipse

    (b) circle

    (c) parabola

(vii) The angle between the isometric axes is

    (a) 90°

    (b) 120°

    (c) 60°

(viii) Compass is used for

    (a) transferring dimensions

    (b) measuring length

    (c) drawing circles and arcs

(ix) When a line is parallel to both the H.P. and V.P. it has

    (a) only H.T.

    (b) both H.T. and V.T.

    (c) no H.T. and V.T.

(x) When both the projection of a point lie below *xy*, the point is situated in the

    (a) first quadrant

    (b) second quadrant

    (c) fourth quadrant

(B) Choose the *correct* answer among the three answers suggested for each question :   1 × 10

(i) 1 Kilobyte means

    (a) 1024 Bytes

    (b) 1024 KB

    (c) 1024 MB

(ii) Hardware of a computer consists of

    (a) only input unit

    (b) only input and output unit

    (c) input, processor and output unit

W'05 : 4 FN : AN 207 (1407)

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,**
ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

*All parts of a question (a, b, etc) should be
answered at one place.*

*Answer should be brief and to-the-point and be supple-
mented with neat sketches. Unnecessary long answers
may result in loss of marks.*

*Any missing data or wrong data may be assumed suitably
giving proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. A pentagonal pyramid of 30 mm side of base and height
   60 mm rests on its base such that two of its base edges
   makes equal inclinations with V.P and nearer to the
   observer. Draw its views as per the following projection
   principles:

   (*i*) orthographic   8

   (*ii*) isometric   6

   (*iii*) oblique projection by the Cavalier method when the
   receding axis is inclined at 45°.   6

2. (*a*) Define: 6

    (*i*) Reducing scale

    (*ii*) Enlarging scale

    (*iii*) Representative fraction.

  (*b*) The distance between two cities is 250 kilometers. On inspection of the Railway map, its equivalent distance measures only 5 cm. What is the R.F. of the scale? Draw a diagonal scale showing to a single kilometre and indicate on it the following distances : 14

    (*i*) 725 km

    (*ii*) 512 km

    (*iii*) 268 km.

3. (*a*) One end of a line of length 60 mm lies at a distance of 20 mm in front of V.P. and 10 mm above H.P. The line makes 30° with H.P. and the side view measures 45 mm. Draw the projections of the line and determine the inclination with V.P. 10

  (*b*) A circular plate of 60 mm diameter has a hexagonal hole of 20 mm sides centrally punched. Draw the projections of the circular plate resting on H.P. with its surface inclined at 30° to the H.P. and the diameter through the point on which the lamina rests on H.P is inclined at 50° to V.P. The parallel sides of hexagonal hole are perpendicular to the diameter of the circular plate passing through the point on which it rests. 10

4. A rectangular pyramid of base 30 mm × 20 mm and height 35 mm rests in V.P. such that the front view of the base is a square of sides 20 mm. Front view of the axis makes 30° with H.P. The apex lies to the right and 30 mm from H.P. Draw the projections. 20

Group B

5. A pentagonal pyramid of 30 mm edge of base and 55 mm high vertically rests with one of its base edges parallel to V.P. and nearer to it. It is cut by two section planes, both being perpendicular to V.P. One of the section planes is horizontal and cuts the portion of the pyramid on the left of the axis at a height of 20 mm above the base of the pyramid. The other section plane inclined at 45° to H.P. cuts the portion of the pyramid to the right of the axis passing through a point on it 20 mm above the base and leans upwards. Draw the development of the lateral surfaces of the lower portion of the pyramid. 20

6. Orthographic views of a simple machine part are shown in the *Fig. 1*. Draw the isometric projection of the part, using isometric scale. 20
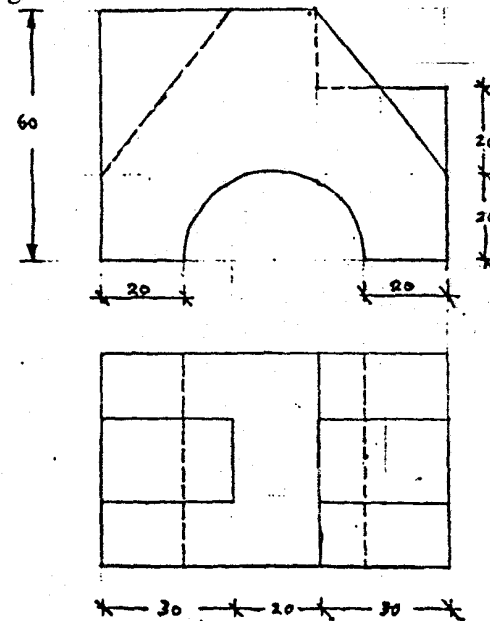

Fig. 1
All dimensions are in mm.

7. A cylinder of 50 mm diameter and 70 mm long is lying with one of its generators on H.P. such that its axis is parallel to both H.P. and V.P. A section plane perpendicular to V.P. and inclined at 30° to H.P. passes through a point on the axis 30 mm from one of its ends. Draw the sectional top view and true shape of section.   20

8. Draw the following orthographic views of the machine part shown in *Fig. 2* :

   (*i*) Front view, looking along the direction of the arrowhead.   8

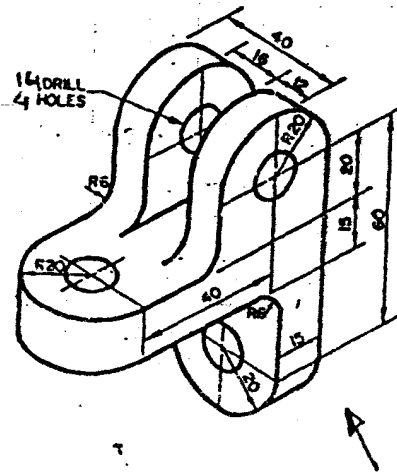   (*ii*) Top view.   6

   (*iii*) Left end view.   6

Fig. 2
All dimensions are in mm.

Group C

9. (*A*) Choose the *correct* answer among the three answers suggested for each question :   1 × 10

   (*i*) When a point lies in the H.P. its view from the front will lie

   (*a*) on *xy*

   (*b*) below *xy*

   (*c*) above *xy*

   (*ii*) The distance of a point from the H.P. is marked from *xy* to the

   (*a*) view from above

   (*b*) view from the front

   (*c*) side view

   (*iii*) When both the views coincide with *xy*, the line is lying

   (*a*) in the H.P.

   (*b*) in the V.P.

   (*c*) both in the H.P. and V.P.

   (*iv*) When a plane is perpendicular to both the reference planes, its traces are

   (*a*) inclined to *xy*

(b) perpendicular to xy

(c) parallel to xy

(v) When the axis of a solid is perpendicular to the H.P. its relation with the V.P. is

(a) parallel

(b) perpendicular

(c) inclined

(vi) When a sphere is cut by a section plane, the true shape of the section is

(a) ellipse

(b) circle

(c) parabola

(vii) The angle between the isometric axes is

(a) 90°

(b) 120°

(c) 60°

(viii) Compass is used for

(a) transferring dimensions

(b) measuring length

(c) drawing circles and arcs

(ix) When a line is parallel to both the H.P. and V.P. it has

(a) only H.T.

(b) both H.T. and V.T.

(c) no H.T. and V.T.

(x) When both the projection of a point lie below xy, the point is situated in the

(a) first quadrant

(b) second quadrant

(c) fourth quadrant

(B) Choose the *correct* answer among the three answers suggested for each question : 1 × 10

(i) 1 Kilobyte means

(a) 1024 Bytes

(b) 1024 KB

(c) 1024 MB

(ii) Hardware of a computer consists of

(a) only input unit

(b) only input and output unit

(c) input, processor and output unit

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A**,
ANY TWO *from* **Group B** *and* ALL *from* **Group C**.

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing data or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks .

Group A

1. (a) What is the principle of construction of vernier scale ?   5

   (b) On a building plan a line 22 cm long represents a
   distance of 440 metres. Construct a diagonal scale
   for the plan to read up to 300 metres showing single
   metre by diagonal division. Calculate its R.F.
   Indicate clearly on the scale the lengths of 157, 143
   and 8 metres.   15

2. (a) A line AB, 60 mm long and inclined at 30° to the ground, has its end A on the ground at 15 mm behind V.P. Its front view measures 45 mm. Draw the top view of the line AB and determine its inclination with the V.P. The H.P is 45 mm above the ground.　　10

(b) A rectangle ABCD of 50 mm x 20 mm has its corner A, 10 mm below the H.P and 25 mm behind V.P. Its plane is inclined at 45° to the H.P and the diagonal AC is parallel to the V.P. Draw its projections.　　10

3. A triangular pyramid, base 25 mm side, axis 60 mm long is resting on H.P on one of its triangular faces. A plane contained by the axis is perpendicular to the H.P and inclined at 30° at the V.P. Draw the projection of the pyramid when the apex is away from the V.P.　　20

4. (a) Show that the isometric length is 0·815 times of the true length.　　5

(b) Draw the isometric view of the arrangement of the composite solid as shown in *Fig.* 1.　　15
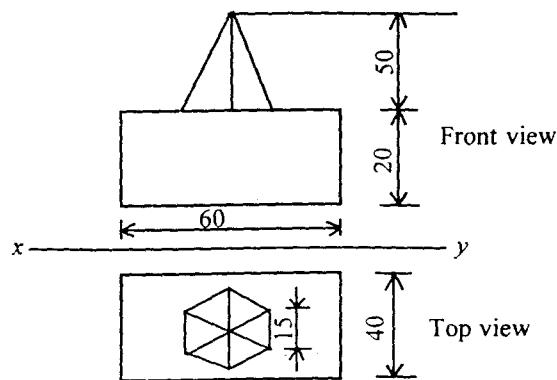

Fig. 1

Group B

5. A pentagonal prism, base 25 mm side, axis 50 mm long is resting on its base on horizontal plane, having an edge of the base parallel to V.P. It is cut by a plane inclined at 45° to H.P. and perpendicular to V.P and passing through the centre of the axis. Draw the true shape of the section and also the development of the lateral surface of the truncated prism.　　20

6. Draw the following orthographic projection of the machine part shown in *Fig.* 2 using first angle projection:

(i) Front view, looking along the direction of arrow.　　8

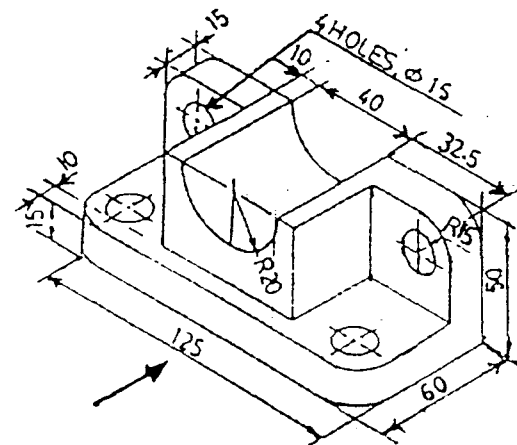(ii) Top view and　　6

(iii) Left side view.　　6

Fig. 2.

7. A cylinder of 50 mm diameter and length 75 mm is standing on the ground. It is completely penetrated by another horizontal cylinder of 30 mm diameter and 70 mm long, the axis of which is parallel to V.P. The axes of two cylinders bisect each other at right angles. Draw their projection showing the curve of penetration.　　20

8. Draw the orthographic views of double riveted zigzag lap joint. The snap head rivet dia is 20 mm and the plate thickness is 10 mm. 20

Group C

9. (.4) Choose the *correct* answer for the following questions : 1 x 10

(*i*) When a line lies in the V.P., the true length will be

(*a*) Top view

(*b*) Front view

(*c*) End view.

(*ii*) A curve traced out by an end of a rope unwound from a circle is

(*a*) Cycloid

(*b*) Involute

(*c*) Epicycloid.

(*iii*) A line lies in 2nd quadrant, the top view will be

(*a*) above the reference line, *xy*

(*b*) below the reference line, *xy*

(*c*) coincide with the reference line, *xy*.

(*iv*) A line *AB* has its end *B* in both H.P and V.P Its horizontal trace will

(*a*) coincide with horizontal projection of point *B*

(*b*) coincide with the reference line, *xy*

(*c*) both (*a*) and (*b*).

(*v*) A plane perpendicular to V.P and parallel to H.P

(*a*) It has horizontal trace

(*b*) It has no horizontal trace

(*c*) It horizont trace coincides with vertical projection.

(*vi*) The solid formed by revolution of rectangle is

(*a*) Cone

(*b*) Prism

(*c*) Cylinder.

(*vii*) If one of the edge of pyramid lying on the ground, then in initial position

(*a*) one of the side of base is parallel to reference line

(*b*) sides of base containing the edge are equally inclined with the reference line

(*c*) the edge of pyramid is perpendicular to reference line.

(*viii*) Isometric projection of a sphere is

   (*a*) circle with isometric length of radius

   (*b*) ellipse

   (*c*) circle with actual length of radius.

(*ix*) The method of development of laterial surface of pyramid

   (*a*) Parallel line development

   (*b*) Triangular development

   (*c*) Radial line development.

(*x*) When two solids bounded by plane surfaces intersect, the lines of intersection is

   (*a*) tortuous curve

   (*b*) curve line

   (*c*) straight line.

(*B*) Fill in the blanks for the following questions :   1 x 10

   (*i*) The angle of thread of Acme thread is —————.

   (*ii*) For load lifting screw jack, the suitable thread profile is —————.

   (*iii*) For double start thread, lead is ————— pitch.

   (*iv*) For Woodruff key the relation between thickness (*T*) of key and diameter (*D*) of shaft

(*v*) For gear, the module is the ratio of ——————— to —————.

(*vi*) The number points to be specified on conics in computer graphics is —————.

(*vii*) The full form of CSG for solid modelling is —————.

(*viii*) The full form of GUI in computer graphics —————.

(*ix*) The symbol of positional tolerance is —————.

(*x*) For defining circle in computer graphics, the minimum number of points is —————.

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum Marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A**,
ANY TWO *from* **Group B** *and* ALL *from* **Group C**.

*All parts of a question (a, b, etc.) should
be answered at one place.*

*Answer should be brief and to-the-point and be supplemented
with neat sketches. Unnecessary long answers may
result in loss of marks.*

*Any missing data or wrong data may be assumed suitably giving
proper justification.*

Figures on the right-hand side margin indicate full marks.

Group A

1. (a) What is the principle of construction of vernier scale ?   5

   (b) On a building plan a line 22 cm long represents a distance of 440 metres. Construct a diagonal scale for the plan to read up to 300 metres showing single metre by diagonal division. Calculate its R.F. Indicate clearly on the scale the lengths of 157, 143 and 8 metres.   15

2. (a) A line AB, 60 mm long and inclined at 30° to the ground, has its end A on the ground at 15 mm behind V.P. Its front view measures 45 mm. Draw the top view of the line AB and determine its inclination with the V.P. The H.P is 45 mm above the ground. 10

   (b) A rectangle ABCD of 50 mm × 20 mm has its corner A, 10 mm below the H.P and 25 mm behind V.P. Its plane is inclined at 45° to the H.P and the diagonal AC is parallel to the V.P. Draw its projections. 10

3. A triangular pyramid, base 25 mm side, axis 60 mm long is resting on H.P on one of its triangular faces. A plane contained by the axis is perpendicular to the H.P and inclined at 30° at the V.P. Draw the projection of the pyramid when the apex is away from the V.P. 20

4. (a) Show that the isometric length is 0·815 times of the true length. 5

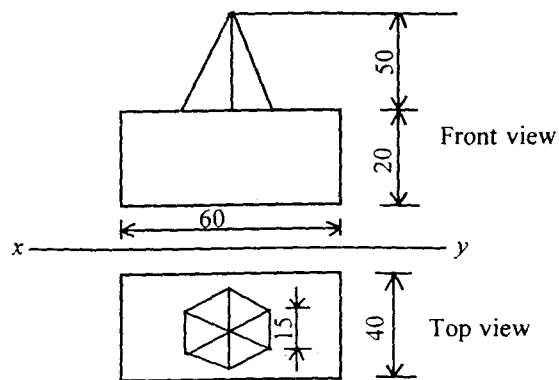   (b) Draw the isometric view of the arrangement of the composite solid as shown in Fig. 1. 15

Fig. 1

Group B

5. A pentagonal prism, base 25 mm side, axis 50 mm long is resting on its base on horizontal plane, having an edge of the base parallel to V.P. It is cut by a plane inclined at 45° to H.P. and perpendicular to V.P and passing through the centre of the axis. Draw the true shape of the section and also the development of the lateral surface of the truncated prism. 20

6. Draw the following orthographic projection of the machine part shown in Fig. 2 using first angle projection:

   (i) Front view, looking along the direction of arrow. 8

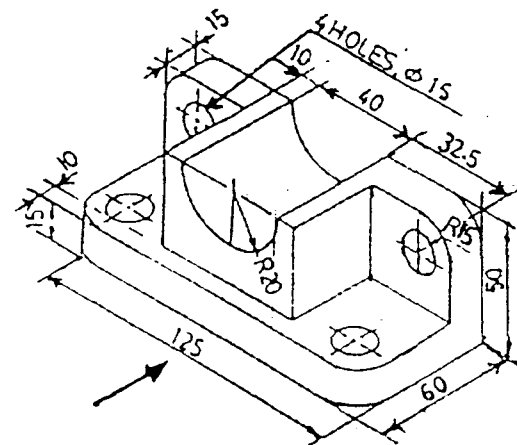   (ii) Top view and 6

   (iii) Left side view. 6

Fig. 2.

7. A cylinder of 50 mm diameter and length 75 mm is standing on the ground. It is completely penetrated by another horizontal cylinder of 30 mm diameter and 70 mm long, the axis of which is parallel to V.P. The axes of two cylinders bisect each other at right angles. Draw their projection showing the curve of penetration. 20

8. Draw the orthographic views of double riveted zigzag lap joint. The snap head rivet dia is 20 mm and the plate thickness is 10 mm. 20

Group C

9. (*A*) Choose the *correct* answer for the following questions : 1 x 10

(*i*) When a line lies in the V.P., the true length will be

(*a*) Top view

(*b*) Front view

(*c*) End view.

(*ii*) A curve traced out by an end of a rope unwound from a circle is

(*a*) Cycloid

(*b*) Involute

(*c*) Epicycloid.

(*iii*) A line lies in 2nd quadrant, the top view will be

(*a*) above the reference line, *xy*

(*b*) below the reference line, *xy*

(*c*) coincide with the reference line, *xy*.

(*iv*) A line *AB* has its end *B* in both H.P and V.P Its horizontal trace will

(*a*) coincide with horizontal projection of point *B*

(*b*) coincide with the reference line, *xy*

(*c*) both (*a*) and (*b*).

(*v*) A plane perpendicular to V.P and parallel to H.P

(*a*) It has horizontal trace

(*b*) It has no horizontal trace

(*c*) It horizont trace coincides with vertical projection.

(*vi*) The solid formed by revolution of rectangle is

(*a*) Cone

(*b*) Prism

(*c*) Cylinder.

(*vii*) If one of the edge of pyramid lying on the ground, then in initial position

(*a*) one of the side of base is parallel to reference line

(*b*) sides of base containing the edge are equally inclined with the reference line

(*c*) the edge of pyramid is perpendicular to reference line.

(*viii*) Isometric projection of a sphere is

    (*a*) circle with isometric length of radius

    (*b*) ellipse

    (*c*) circle with actual length of radius.

(*ix*) The method of development of laterial surface of pyramid

    (*a*) Parallel line development

    (*b*) Triangular development

    (*c*) Radial line development.

(*x*) When two solids bounded by plane surfaces intersect, the lines of intersection is

    (*a*) tortuous curve

    (*b*) curve line

    (*c*) straight line.

(*B*) Fill in the blanks for the following questions :   1 x 10

(*i*) The angle of thread of Acme thread is ————.

(*ii*) For load lifting screw jack, the suitable thread profile is ————.

(*iii*) For double start thread, lead is ———— pitch.

(*iv*) For Woodruff key the relation between thickness (T) of key and diameter (D) of shaft

(*v*) For gear, the module is the ratio of ———— to ————.

(*vi*) The number points to be specified on conics in computer graphics is ————.

(*vii*) The full form of CSG for solid modelling is ————.

(*viii*) The full form of GUI in computer graphics ————.

(*ix*) The symbol of positional tolerance is ————.

(*x*) For defining circle in computer graphics, the minimum number of points is ————.

W'05 : 4 FN : AN 207 (1407)

ENGINEERING DRAWING AND GRAPHICS

Time : Three hours

Maximum marks : 100

Answer FIVE *questions, taking* ANY TWO *from* **Group A,** ANY TWO *from* **Group B** *and* ALL *from* **Group C.**

All parts of a question (a, b, etc) should be answered at one place.

Answer should be brief and to-the-point and be supplemented with neat sketches. Unnecessary long answers may result in loss of marks.

Any missing data or wrong data may be assumed suitably giving proper justification.

Figures on the right-hand side margin indicate full marks.

Group A

1. A pentagonal pyramid of 30 mm side of base and height 60 mm rests on its base such that two of its base edges makes equal inclinations with V.P and nearer to the observer. Draw its views as per the following projection principles :

   (*i*) orthographic   8

   (*ii*) isometric   6

   (*iii*) oblique projection by the Cavalier method when the receding axis is inclined at 45°.   6

2. (*a*) Define: 6

   (*i*) Reducing scale

   (*ii*) Enlarging scale

   (*iii*) Representative fraction.

(*b*) The distance between two cities is 250 kilometers. On inspection of the Railway map, its equivalent distance measures only 5 cm. What is the R.F. of the scale? Draw a diagonal scale showing to a single kilometre and indicate on it the following distances: 14

   (*i*) 725 km

   (*ii*) 512 km

   (*iii*) 268 km.

3. (*a*) One end of a line of length 60 mm lies at a distance of 20 mm in front of V.P. and 10 mm above H.P. The line makes 30° with H.P. and the side view measures 45 mm. Draw the projections of the line and determine the inclination with V.P. 10

(*b*) A circular plate of 60 mm diameter has a hexagonal hole of 20 mm sides centrally punched. Draw the projections of the circular plate resting on H.P. with its surface inclined at 30° to the H.P. and the diameter through the point on which the lamina rests on H.P is inclined at 50° to V.P. The parallel sides of hexagonal hole are perpendicular to the diameter of the circular plate passing through the point on which it rests. 10

4. A rectangular pyramid of base 30 mm × 20 mm and height 35 mm rests in V.P. such that the front view of the base is a square of sides 20 mm. Front view of the axis makes 30° with H.P. The apex lies to the right and 30 mm from H.P. Draw the projections. 20

Group B

5. A pentagonal pyramid of 30 mm edge of base and 55 mm high vertically rests with one of its base edges parallel to V.P. and nearer to it. It is cut by two section planes, both being perpendicular to V.P. One of the section planes is horizontal and cuts the portion of the pyramid on the left of the axis at a height of 20 mm above the base of the pyramid. The other section plane inclined at 45° to H.P. cuts the portion of the pyramid to the right of the axis passing through a point on it 20 mm above the base and leans upwards. Draw the development of the lateral surfaces of the lower portion of the pyramid. 20

6. Orthographic views of a simple machine part are shown in the *Fig. 1*. Draw the isometric projection of the part, using isometric scale. 20
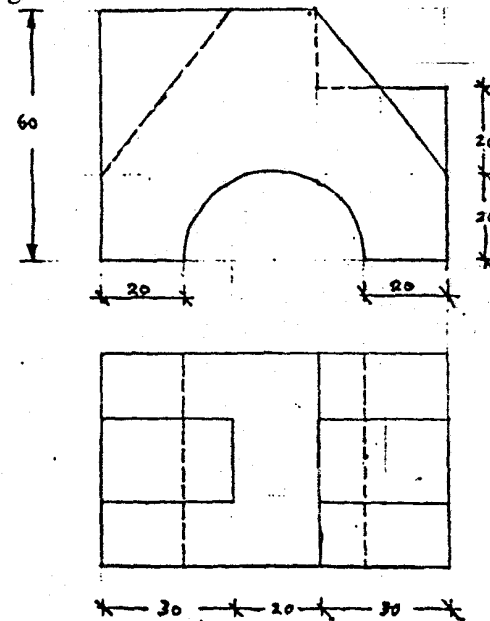

Fig. 1

All dimensions are in mm.

7. A cylinder of 50 mm diameter and 70 mm long is lying with one of its generators on H.P. such that its axis is parallel to both H.P. and V.P. A section plane perpendicular to V.P. and inclined at 30° to H.P. passes through a point on the axis 30 mm from one of its ends. Draw the sectional top view and true shape of section. 20

8. Draw the following orthographic views of the machine part shown in *Fig. 2* :

   (*i*) Front view, looking along the direction of the arrowhead. 8
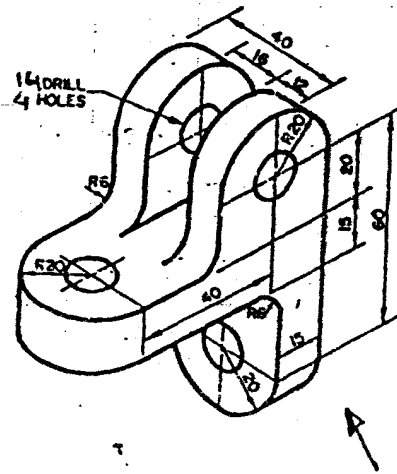
   (*ii*) Top view. 6

   (*iii*) Left end view. 6

Fig. 2

All dimensions are in mm.

Group C

9. (*A*) Choose the *correct* answer among the three answers suggested for each question : 1 × 10

   (*i*) When a point lies in the H.P. its view from the front will lie

   (*a*) on *xy*

   (*b*) below *xy*

   (*c*) above *xy*

   (*ii*) The distance of a point from the H.P. is marked from *xy* to the

   (*a*) view from above

   (*b*) view from the front

   (*c*) side view

   (*iii*) When both the views coincide with *xy*, the line is lying

   (*a*) in the H.P.

   (*b*) in the V.P.

   (*c*) both in the H.P. and V.P.

   (*iv*) When a plane is perpendicular to both the reference planes, its traces are

   (*a*) inclined to *xy*

(b) perpendicular to *xy*

(c) parallel to *xy*

(v) When the axis of a solid is perpendicular to the H.P. its relation with the V.P. is

(a) parallel

(b) perpendicular

(c) inclined

(vi) When a sphere is cut by a section plane, the true shape of the section is

(a) ellipse

(b) circle

(c) parabola

(vii) The angle between the isometric axes is

(a) 90°

(b) 120°

(c) 60°

(viii) Compass is used for

(a) transferring dimensions

(b) measuring length

(c) drawing circles and arcs

(ix) When a line is parallel to both the H.P. and V.P. it has

(a) only H.T.

(b) both H.T. and V.T.

(c) no H.T. and V.T.

(x) When both the projection of a point lie below *xy*, the point is situated in the

(a) first quadrant

(b) second quadrant

(c) fourth quadrant

(B) Choose the *correct* answer among the three answers suggested for each question: 1 × 10

(i) 1 Kilobyte means

(a) 1024 Bytes

(b) 1024 KB

(c) 1024 MB

(ii) Hardware of a computer consists of

(a) only input unit

(b) only input and output unit

(c) input, processor and output unit