S'11:4FN:AN207 (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 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

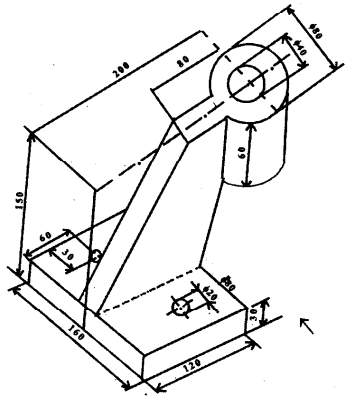


Fig. 1

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 cm^2 on a map represents an area of 36 km^2 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.

W'11:4FN:AN207 (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

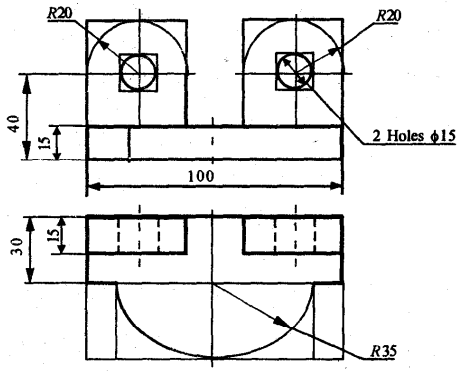


Fig. 1

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

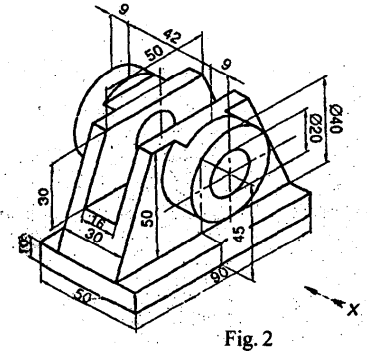


Fig. 2

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.

S'12: 6FN: 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*) Classify different types of scales. Define (*i*) representative fraction of a scale, and (*ii*) least count of a scale. 1 + 4

(*b*) Construct a vernier scale to give readings of one-tenth of a mm up to 100 mm and mark off on it the following : (*i*) 81·3 mm, (*ii*) 20·9 mm. Select a scale 15 : 1. 15

2. (*a*) A line AB has its ends A and B, 45 mm and 20 mm in front of the VP, respectively. The end projectors of the line AB, when measured parallel to the line of intersection of HP and VP, are 50 mm apart. The HT of the line is 10 mm in front of VP. The line AB is inclined at 35° to the HP. Draw the projections of the line AB and locate the VT. Find the distance of the VT of the line from the HP and the inclination of the line with the VP. 10

(Turn Over)

(*b*) A regular hexagonal plate of 30 mm sides has one corner touching VP and another opposite corner touching HP. The plate is inclined at 60° to the HP and 30° to the VP. Draw the projections of the plate neglecting its thickness. 10

3. A hexagonal prism base 20 mm side and axis 40 mm long is placed with one of its base edges on HP such that the axis is inclined at 30° to HP and 45° to VP. Draw its projections. 20

4. Two orthographic views of a cast iron bracket are shown in Fig. 1. Draw the isometric projection of the cast iron bracket using isometric scale. All dimensions are in mm. 20

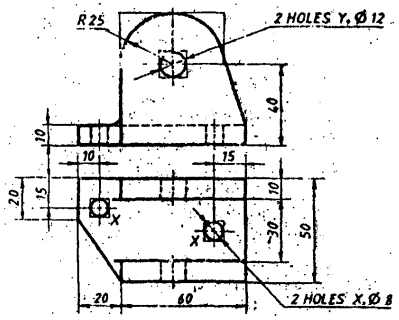


Fig. 1

Group B

5. A vertical cone 80 mm diameter of base and axis 100 mm long is penetrated by a horizontal cylinder such that the axes of both the solids intersect each other at right angles. The cylinder is 90 mm long and 40 mm in diameter. The axis of the cylinder is parallel to VP and passes at a height of 30 mm above the base of the cone. Show the intersection curves in the top and front views. 20

6. A cone, base 60 mm diameter and axis 70 mm, stands vertically with its base on HP. The vertical trace of a section plane perpendicular to VP and parallel to one of the end generators of the cone, passes at a distance of 15 mm from it. Draw the sectional top view and the true shape of the section. Name the curve of the true shape of section. 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. All dimensions are in mm. 20

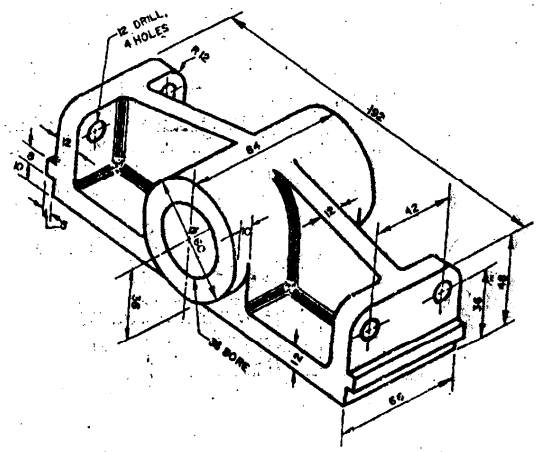


Fig. 2

8. Develop the lateral surface of a transition piece to connect coaxial circular and hexagonal holes 70 mm apart. The circular hole is 50 mm in diameter. Edges of the hexagonal hole are 50 mm. 20

Group C

9. Choose the *correct* answer/fill-in the blank appropriate word as applicable : 20 × 1

(*i*) The eccentricity of a hyperbola is

(*a*) less than 1.

(*b*) equal to 1.

(*c*) greater than 1.

(*d*) None of the three above.

(*ii*) 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*) 0·82 *D*.

(*d*) *D*.

(*iii*) The drawing board should be placed on the table always with the working edge at

(*a*) right side.

(*b*) left side.

(*c*) any side

(*d*) None of the three above.

(*iv*) When a point lies in the VP, its view from top will be

(*a*) on *xy*.

(*b*) below *xy*.

(*c*) above *xy*.

(*d*) None of the three above.

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

(*a*) mouse.

(*b*) plotter.

(*c*) printer.

(*d*) monitor.

(*vi*) Temporary joint is

(*a*) rivetted joint.

(*b*) welded joint.

(*c*) nut and bolt joint.

(*d*) lap joint.

(*vii*) When a line is parallel to both HP and VP, it has

(*a*) only HT.

(*b*) only VT

(*c*) both HT and VT.

(*d*) no HT and VT.

(*viii*) Three-dimensional modelling refers to the modelling of

(*a*) solids.

(*b*) surfaces.

(*c*) circles.

(*d*) None of the three above.

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

(*a*) 60°

(*b*) 90°

(*c*) 120°

(*d*) 30°

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

(*a*) straight line.

(*b*) curve line.

(*c*) dotted line.

(*d*) broken line.

(*xi*) A scale of chords is used to measure ——.

(*xii*) For drawing of small objects, —— scale is always used.

(*xiii*) —— is a round rod threaded on both ends.

(*xiv*) When ——of a symmetrical object is imagined to be removed, section is called a half section.

(*xv*) When a sphere is cut by a plane inclined at 30° to HP, the true shape of section is ____.

(*xvi*) The solid, which contains four equilateral triangles, is known as ——.

(*xvii*) An —— solid has its axis inclined to the base.

(*xviii*) A byte is made up of —— bits.

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

(*a*) cycloid.

(*b*) epicycloid.

(*c*) hypocycloid.

(*d*) trochoid.

(*xx*) ——command allows you to draw lines at right angles only.

W'12:6FN: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 diagonal scale with a neat sketch. 5

   (*b*) Construct a retrograde vernier scale to measure up to 4 m. A distance of 1 m is shown by 4 cm long line. Mark a distance of 2.31 m on this scale. 15

2. (*a*) A line AB inclined at 30° to the HP has its ends A and B, 25 mm and 60 mm behind the VP, respectively. The length of the top view is 65 mm and its VT is 15 mm below the HP. Draw the projections of the line and locate its HT. Also, determine the true length of the line AB and true inclination of the line with VP. 10

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

(Turn Over)

3. A cube of edge 30 mm is resting on the ground on one of its corners with a solid diagonal perpendicular to the VP. Draw the projections. 20

4. A paper-weight consists of three portions. The bottom-most portion is a cylinder of 60 mm diameter and 20 mm high. A frustum of cone, height 20 mm, bottom 60 mm diameter and top 30 mm diameter, is situated in the middle portion. The top-most portion is a hemisphere of 15 mm radius. Draw the isometric projection of the paper-weight. 20

Group B

5. (*a*) Draw the top view and sectional front view showing the dimensions of a single riveted double cover butt joint to connect two plates of 9 mm thickness. 8

(*b*) Draw the front view and sectional side view showing the dimensions of a woodruf key fitted on a shaft of 50 mm diameter. 5

(*c*) Draw the front view and top view of a square headed nut and bolt assembly, if the diameter of the bolt is 16 mm. Indicate the dimensions of it. 7

6. A pentagonal prism of side of base 40 mm and height 80 mm is cut by a section plane inclined at 30° to the ground when a vertical face of the solid is perpendicular to the VP. The section plane passes through the axis at a distance of 60 mm from the base. Draw the true shape of the section. Draw the development of the surfaces of the remaining solid. 20

7. A square pyramid, with edge of base 40 mm and height 80 mm, is resting on the ground such that all of its base edges are equally inclined to the VP. A horizontal cylinder of 30 mm diameter meets the pyramid on one side such that the axes of both the solids intersect with each other at a height of 45 mm from the base of the pyramid. The axis of the cylinder is also parallel to the VP. Draw the projections of the solids showing the lines of intersection. 20

8. Draw the front view, top view and the right-hand side view of the object as shown in Fig. 1. Construct the view from the arrow X as front view. 20

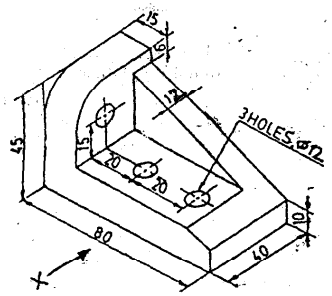


Fig. 1

Group C

9. Answer the following in brief: 20 × 1

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

(*ii*) What is the value of thread angle for metric thread ?

(*iii*) Name two most commonly used curves for tooth profile of gear.

(*iv*) What is the relation between diameter of rivet and thickness of plates to be riveted when both are in mm ?

(*v*) What is the relation between the pitch and lead of a thread ?

(*vi*) What is the symbolic representation of positional tolerance ?

(*vii*) Name the method of surface development of a pyramid.

(*viii*) What is the value of upper deviation of a basic shaft, *h* ?

(*ix*) When a line is perpendicular to HP, which view will be the true length of the line ?

(*x*) When a right regular cylinder is completely cut by an inclined plane, which is inclined to HP at 30° and perpendicular to VP, then what will be true shape of the section ?

(*xi*) In a mechanical drawing, a line segment consists of infinite number of ____, whereas in computer graphics a segment has a finite number of ____.

(*xii*) The various interactive techniques in auto CAD are ____.

(*xiii*) In isometric projection, the isometric axes are equally inclined at ____ angle.

(*xiv*) For obtaining a sectional view, the part of the object between ____ and ____ is assumed to be removed.

(*xv*) The line of intersection between prism and pyramid is ____, whereas the line of intersection between prism and cone is ____.

(*xvi*) What is the command used in auto CAD to enlarge the size of the drawing of an object ?

(*xvii*) What will be the size of isometric projection of a sphere of diameter D?

(*xviii*) What is nomograph ?

(*xix*) How do you represent enlarged scale ?

(*xx*) Name the method of drawing isometric projection of a circular plane.

S'13: 6 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*) Explain the concept and construction of vernier scale with a neat sketch. 5

(*b*) Construct a diagonal scale of RF = 2/125 and a least count of 1 cm. Show the length of 5.99 m 3.31m and 2.7 dm on it. 15

2. (*a*) The top view of a line AB is 75 mm long and inclined to xy line at 45°. One end A is 20 mm above HP and 10 mm in front of VP. The other end is 65 mm above HP and is in front of VP. What is the true length of line and its inclination with HP and VP ? Also, locate its horizontal and vertical traces. 10

(*b*) A square lamina ABCD of 30 mm side rests on the corner C such that the diagonal AC appears as at 30° to the VP, in the top view. Two sides BC and CD, containing the corner C, make equal inclinations with the HP. The surface of the lamina makes 45° with HP. Draw its top view and front view. 10

3. A pentagonal pyramid, 20 mm side of base and 35 mm altitude, rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid. 20

4. Figure 1 shows the top view and front view of an object. Draw the isometric projection of the object. 20

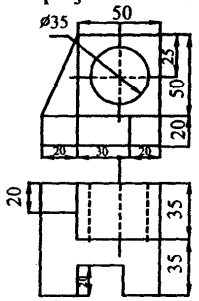


Fig. 1

Group B

5. (*i*) A double riveted chain-type lap joint to connect two plates of 20 mm thickness is to be designed. Calculate the necessary dimension and draw a simple top view and sectional front view of the designed joint. Indicate the dimensions. 7

(*ii*) It is necessary to connect a flanged hub to a shaft of 50 mm diameter by a flat saddle key. Calculate necessary proportions of the key and show the two assembled views of the key, shaft and hub. 6

(*iii*) Draw the front view and left side view of a hexagonal headed bolt and nut assembly, when the diameter of the bolt is 12 mm, when the assembly is viewed from the nut end. 7

6. A pentagonal prism, with side of base 35 mm and length of the axis 60 mm, rests on one of its rectangular faces on HP. The axis of the prism is parallel to both HP and VP. The prism is cut by a section plane making an angle of 30° with HP and perpendicular to VP. The cutting plane bisects the axis of the prism. Draw the sectional top view and true shape of the section. Also, draw the development of the remaining portion of the solid. 20

7. A square prism, 40 mm side of base and 90 mm height, stands vertically with its base on HP with two of its rectangular faces equally inclined to VP. An another horizontal square prism of 30 mm sides and 90 mm long penetrates the vertical prism such that the axes of two prisms bisect each other at right angles. Two rectangular faces of the horizontal prism are equally inclined to HP. Draw the projections showing the lines of intersection. 20

8. Draw the front view, top view and the right-hand side view of the wooden pattern shown in Fig. 2. Consider the view from the arrow X as front view. 20

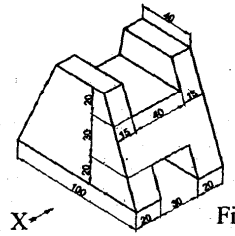


Fig. 2

Group C

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

(*i*) An area of 36 km^2 is represented by an area of 144 cm^2 on a map. The R.F. of the scale is

(*a*) 1/4

(*b*) 1/2

(*c*) 1/5000

(*d*) 1/50000

(*ii*) Which one of the following scales is used to convert the miles into kilometers ?

(*a*) Diagonal scale

(*b*) Comparative scale

(*c*) Direct vernier scale

(*d*) Retrograde vernier scale

(*iii*) A point, whose plan and elevation are above XY line, is situated in

(*a*) first quadrant.

(*b*) second quadrant.

(*c*) third quadrant.

(*d*) fourth quadrant.

(*iv*) If the front view of a point is 40 mm above *xy* line and the top view is 50 mm below *xy* line, the position of point is

(*a*) 40 mm above HP.

(*b*) 40 mm below HP.

(*c*) 50 mm in front of VP and 40 mm above HP.

(*d*) 50 mm below HP.

(*v*) If a line is parallel to both HP and VP, its true length will be seen in

(*a*) front view.

(*b*) top view.

(*c*) side view.

(*d*) both front and top views.

(*vi*) If a line is inclined at 45° to the HP and 30° to the VP, its front view is inclined at

(*a*) 30° to *xy* line.

(*b*) 45° to *xy* line.

(*c*) between 30° and 45°.

(*d*) greater than 45°.

(*vii*) If a line is inclined at 30° to HP and 60° to VP, its front view and top view are inclined at an angle of

(*a*) 30° and 60° to *xy*, respectively.

(*b*) 60° and 30° to *xy*, respectively.

(*c*) both at 90° to *xy*.

(*d*) both greater than 30° but less than 90°.

(*viii*) If the front view and top view of a plane are straight lines, then the true shape of the plane will be seen on

(*a*) profile plane.

(*b*) horizontal plane.

(*c*) vertical plane.

(*d*) any one of the three above.

(*ix*) If both the principle views of a plane object are ellipses of the same size, the side view will be

(*a*) a horizontal line.

(*b*) a vertical line.

(*c*) an inclined line.

(*d*) an ellipse.

(*x*) The number of faces in a dodecahedron is

(*a*) 4

(*b*) 8

(*c*) 12

(*d*) 20

(*xi*) If three orthographic views of a sphere containing a circular hole are drawn, the maximum number of circles that may appear altogether is

(*a*) 1

(*b*) 3

(*c*) 4

(*d*) 6

(*xii*) If a square pyramid is resting on a face in the VP, then the number of dotted lines which will appear in the front view is

(*a*) 1

(*b*) 2

(*c*) 3

(*d*) 4

(*xiii*) A cone is cut by a section plane parallel to the profile plane. Its true shape of section is seen in

(*a*) front view.

(*b*) top view.

(*c*) side view.

(*d*) auxiliary view.

(*xiv*) A cube is resting on a face in the HP with vertical faces equally inclined to the VP. It is cut by an AIP passing through the solid diagonal. The true shape of section view is a

(*a*) square.

(*b*) rectangle.

(*c*) hexagon.

(*d*) rhombus.

(*xv*) A cylinder, with 60 mm diameter and 80 mm long axis, is lying on its generator in HP. It is cut by a section plane to get an ellipse as true shape of section. The minor axis of the ellipse will be

(*a*) 60 mm

(*b*) 80 mm

(*c*) 100 mm

(*d*) None of the three above.

(*xvi*) Methods for the development of solids are

(*a*) parallel line method.

(*b*) radial line method.

(*c*) triangular method.

(*d*) All of the three above.

(*xvii*) A string is wound around a hexagonal prism, having base with 20 mm side and 50 mm long axis, to connect opposite ends of the same longer edge. The minimum length of string required is

(*a*) 110 mm.

(*b*) 120 mm.

(*c*) 130 mm.

(*d*) 140 mm.

(*xviii*) When two cylinders of equal diameters envelop a common sphere, the curve of intersection is made up of

(*a*) parabola.

(*b*) semi-circle.

(*c*) straight line.

(*d*) None of the three above.

(*xix*) Isometric drawings fall into the category of

(*a*) oblique drawings.

(*b*) axonometric drawings.

(*c*) multiview drawings.

(*d*) perspective drawings.

(*xx*) The exact value of R.F. of an isometric scale is

(*a*) 9/11

(*b*) 0.815

(*c*) 0.8165

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

W'13 : 6 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.

Assume all dimensions in mm.

Group A

1. (*a*) What are the general rules for dimensioning ? 10

(*b*) Construct a scale of 1:5 to show decimeters and centimeters and to read up to 1m. Show the length of 7.6 dm on it. 10

2. The top view of a 75 mm long line, CD, measures 50 mm. C is 50 mm in front of the V.P. and 15 mm below the H.P., 15 mm in front of the V.P. and is above the H.P. Draw the front view of CD and find its inclinations with H.P. and V.P. Also, show its traces. 20

3. A tetrahedron of 75 mm long edges has one edge

parallel to the H.P. and inclined at 45° to the V.P. while a face containing that edge is vertical. Draw its projections. 20

4. Draw isometric view of a casting, two views of which are shown in Fig. 1. 20

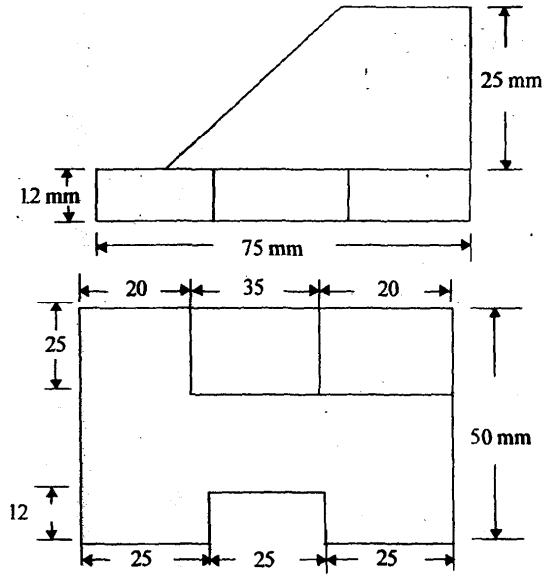


Fig. 1

Group B

5. Draw the projections of a regular pentagon of 40 mm side, having its surface inclined at 30° to the ground and a side parallel to the H.P. and inclined at an angle of 60° to the V.P. 20

6. A cube of 50 mm long edges is resting on the ground with a vertical face inclined at 30° to the V.P. It is cut by a section plane, perpendicular to the V.P., inclined at 30° to the H.P. and passing through a point on the axis, 38 mm above the ground. Draw the sectional top view, true shape of the section and development of surfaces of the remaining portion of the cube. 20

7. A vertical square prism, base 50 mm side, has its faces equally inclined to the V.P. It is completely penetrated by another square prism of base 30 mm side, the axis of which is parallel to both the planes and is 6 mm away from the axis of the vertical prism. Also, the faces of the horizontal prism are equally inclined to the V.P. Draw the projections of the solids showing lines of intersection. 20

8. Using third angle projection method, draw (*i*) front view, (*ii*) top view, and (*iii*) both side views. 6 + 6 + 8

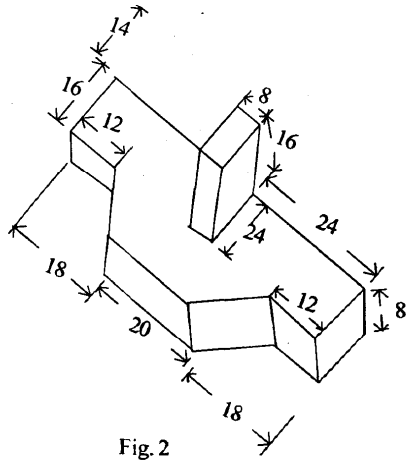


Fig. 2

Group C

9. Answer the following in brief: 20×1

(*i*) State the quadrants in which the following points is situated. A point **P**, its top view is 40 mm above XY, the front view 20 mm below the top view.

(*ii*) What is the trace of a straight line ?

(*iii*) What are types of riveted joints ?

(*iv*) Define prism.

(*v*) Define crest and root of a screw thread.

(*vi*) Write the types of solid.

(*vii*) What is the method of surface development of prism and cone ?

(*viii*) What is the difference between oblique projection and isometric projection ?

(*ix*) Define orthographic projection.

(*x*) What is nomograph ?

(*xi*) What do you mean by the term 'dimensioning' ?

(*xii*) When measurements are required in three units, —— scale is used.

(*xiii*) The planes, which are inclined to both the reference planes, are called —— planes.

(*xiv*) The true shape of the section is ——, when a cylinder is cut by a section plane inclined to the axis.

(*xv*) In first-angle projection method, the —— cones are between the observer ——— and the ——.

(*xvi*) The ratio of the length of drawing of the object to the actual length of the object is called ——.

(*xvii*) The purpose of the sectional view is to show the —— shape of the object.

(*xviii*) A solid, having four equal equilateral triangular faces, is called ——.

(*xix*) CAD/CAM is hardware oriented, but —— gives it life.

(*xx*) What are the functions of CAD ?

S'14 : 6 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*) What is isometric scale ? Draw an isometric scale for 5 cm long line. 5

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

(*c*) Distance of 250 km is represented by a line 50 mm on a railway map. What is the value of R.F. Draw a vernier scale showing single kilometer and indicate on it a distance of 457 km. 10

2. (*a*) The length of top view and front view of a straight line AB are 60 mm and 65 mm, respectively. The distance between the end projectors is 65 mm. The end A of the line is 30 mm above HP and 35 mm in front of VP. The other end B of the line lie in first

quadrant. Draw the projections of line AB and determine the true length and true inclination of the line AB with the planes of projections. Also, draw the vertical and horizontal traces of the line AB. 12

(*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 diagonals 60 mm long and the vertical plane through the longer diagonal makes 30° with the VP. 8

3. A pentagonal prism of base 50 mm side and 70 mm high rests on a corner of its base on the ground with the longer edge through that corner inclined at 45° to the HP. The vertical plane containing that longer edge and the axis of the prism is inclined at 30° to the VP. Draw the projections of the solid. 20

4. Draw the projection of the object whose top view and front view are shown in Fig. 1. 20

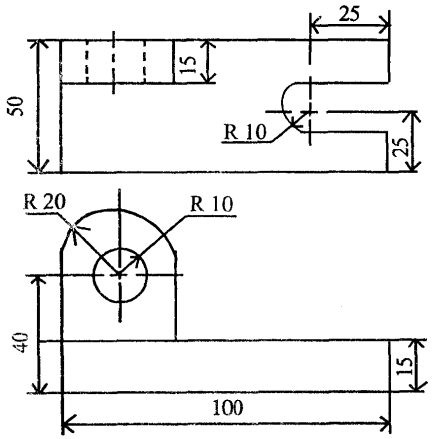


Fig. 1

Group B

5. Draw the front view, top view and left side view of the block as shown in Fig . 2. Consider the first angle projection method and view from the arrow side as front view. 20

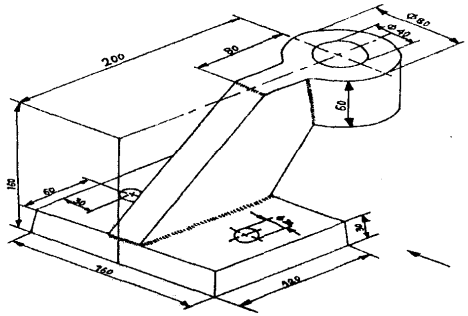


Fig. 2

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

7. Draw the development of surface 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. 20

8. (*a*) Draw the front view and top view of a stud bolt and nut fitted with a block and a plate. The diameter of the bolt is 12 mm. Assume other suitable dimensions. 8

(*b*) Draw the sectional front view and top view of single riveted butt joint with single cover to connect two plates of 9 mm. Assume and indicate the necessary dimensions. 8

(*c*) Draw a woodruf key fitted with a shaft of 50 mm diameter. 4

Group C

9. Answer the following in brief: 10 × 2

(*i*) What are different types of scales used in engineering applications ?

(*ii*) Distinguish between first angle projection and third angle projection method.

(*iii*) What is the difference between orthographic projection and oblique projection ?

(*iv*) What are the various methods of surface development ?

(*v*) What are the various computer graphics softwares ?

(*vi*) What are the methods for showing intersection of solids ?

(*vii*) How do you represent (*i*) position tolerance and (*ii*) circularity tolerance ?

(*viii*) Distinguish between stud and bolt with neat sketches.

(*ix*) What is the method of revolution for generating solids ?

(*x*) What are the various systems for placing dimensions ? Explain with sketches.

W'14 : 6 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*) A component drawing is shown (Fig.1) by chain dimensioning method. Show the same by following other methods.

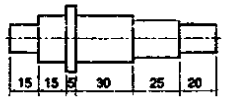


Fig . 1

(*i*) Progressive or parallel dimensioning method. 5

(*ii*) Superimposed running dimensioning. 5

(*b*) A 4 cm long line on a map represents a 1.5 m length. Determine the R.F. and draw a scale long enough to measure up to 6 m. Show a distance of 4.6 m on it. 10

2. A line AB has its end A 20 mm above HP and 30 mm in front of VP. Its end B is 15 mm below HP and 40 mm behind VP. The distance between end projectors of the line is 60 mm. Draw the projections of the line and find its true lengh, true inclination of the line to HP and VP. Also, locate the traces. 20

3. A square pyramid, having a base with 40 mm side and a 60 mm long axis, is freely suspended from one of its corners of its base. Draw its projection when the axis as a vertical plane is inclined at 45° to the VP. 20

4. Figure 2 shows the orthographic projection of an object. Draw its isometric view. 20

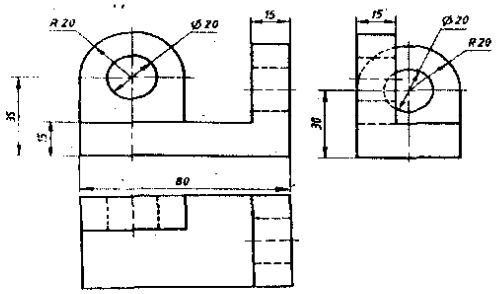


Fig . 2

Group B

5. A thin rectangular plate of size 60 mm × 40 mm has its shorter edge on the HP. It is inclined such that the top view of the plane appears as a square having 40 mm side. Draw its projection when the edge resting on the HP is inlined at 30° to the VP. 20

6. The true section of a square prism cut by an auxiliary inclined plane is a rhombus with 80 mm and 50 mm long diagonals. The section plane passes through one of the longer edges of the prism at a height of 10 mm from its base. Draw the projection of the prism showing the sectional top view, front view and true shape of the section. Also, draw development of the lateral surface of lower portion of the truncated prism. 20

7. A square pyramid, having base with a 70 mm side and 100 mm long axis, is resting on its base on the HP, with all the sides of base equally inclined to VP. A square prism, with a 30 mm side, having its axis parallel to both the principal planes, penetrates the pyramid. The axes of solids intersect each other at 30 mm above the base of the pyramid. Draw their projection showing the curves of intersection, when the faces of the prism are equally inclined to the HP. 20

8. The pictorial view of an object is shown in Fig. 3. Using first angle projection, draw its (*i*) front view, (*ii*) top view and (*iii*) right side view. The arrow indicates the direction of front view. 20

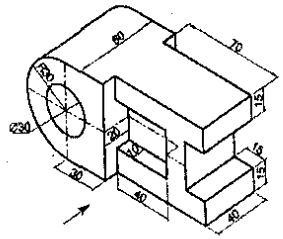


Fig . 3

Group C

9. Answer the following in brief: 10 × 2

   (*i*) What is a representative fraction ?

(*ii*) What is the principle used for measuring the length from a diagonal scale ?

(*iii*) The front view of a line AB is parallel to the XY line and measures 30 mm. What is the true length of the line, if top view of the line measures 65 mm ?

(*iv*) If a line is only inclined to HP and parallel to VP, then it will have only ——— trace.

(*v*) If two plates are joined by chain rivetting, when edge of one plate is placed on the other plate, it is called as ——— joint.

(*vi*) Name three solids of revolution.

(*vii*) To define a tetrahedron, we require only ——— dimension.

(*viii*) What is the method of development used for development of transition piece ?

(*ix*) What is the difference between isometric projection and isometric view ?

(*x*) The side view of a straight line will be a ———, if the line is parallel to and equal distance from both *HP* and VP.

S'15 : 6 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*) 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*) The view from above of a line, AB, inclined at 60° to *xy* line, measures 8.5 cm while the length of the view from the front is 6.5 cm. Its one end A is in the HP and 1.5 cm 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

(*b*) A pentagonal plane lamina of edges 2 cm 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 inclination 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

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. Draw the isometric scale and isometric projection of the arrangement of solids when a hemisphere of 6 cm diameter is placed centrally touching the flat face on the top of a frustum of a square pyramid. The base of frustum is 6 cm², top 4 cm² and its height 5 cm. 20

Group B

5. Draw the following orthographic projection of the part shown in Fig. 1 using first angle projection : (*i*) Front view looking along the direction of arrow, (*ii*) top view and (*iii*) left-side view. 7 + 7 + 6

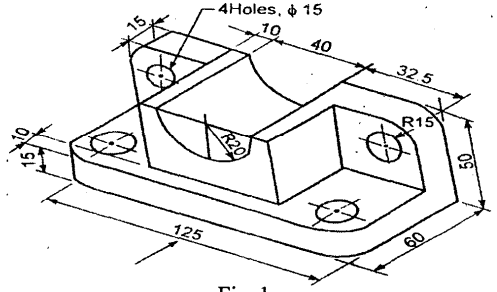


Fig. 1

6. Draw the necessary views, including sectional views, to show the details of the following :

(*i*) A double rivetted zig-zag lap joint to connect two plates of 2.5 cm thickness. 7

(*ii*) A wood ruff key fitted on to a shaft of diameter 4 cm. 5

(*iii*) A hexagonal headed nut, bolt and washer assembly to connect two blocks of each thickner 2 cm, if the major diameter of bolt is 2.5 mm. 8

7. A vertical square prism, with base side 5 cm, has one of its vertical faces inclined at 30° to the VP. It is completely penetrated by a cylinder of diameter 3 cm, the axis of which is parallel to both HP and VP and is 0.8 cm away from the axis of the prism. Draw the projection of solids showing the lines of intersection. Take the length of each solid as 7 cm. 20

8. A pentagonal pyramid of 3 cm edge of base and 5.5 cm 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 2 cm 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 2 cm above the base and leans upward. Draw the development of the lateral surface of the lower portion of the pyramid. 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 for runout 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*) Name two softwares for drawing.

(*x*) How is the helix angle (α) of multi-start thread expressed ?

W'15 : 6 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*) What is the principle of a diagonal scale ? 5

(*b*) On a certain map, a line 22 cm long represents a distance of 440 m. Draw a diagonal scale to read up to a metre. Mark on this a distance of 189 m. 10

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

2. (*a*) A line AB, 75 mm long, is inclined at 45° to the HP and 30° to the VP. Its one end A is 25 mm behind VP and 30° below HP. Draw the projections of the line and determine its traces. 10

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

3. Draw the front and top views of a cone of base 50 mm diameter and altitude of 60 mm lying on one of its generators on the ground when the (*i*) top view of the axis makes an angle of 30° with $x - y$ and (*ii*) axis makes an angle of 30° with VP. 20

4. Draw an isometric projection of the object whose top view and front view are shown in Fig. 1 according to third angle projection : 20

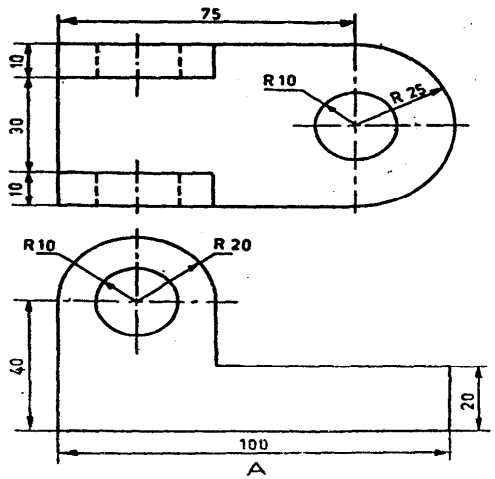


Fig. 1

Group B

5. Draw the front view, top view and left-hand side view of the object as shown in Fig. 2. Consider the first angle projection method and view from the arrow side. 20

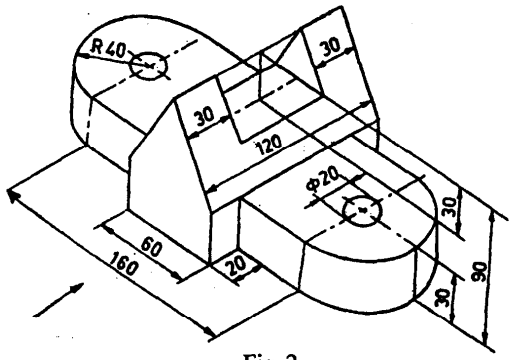


Fig. 2

6. (*a*) Draw the front view and side view of a hexagonal headed bolt fitted with hexagonal nut and washer. The diameter of bolt is 12 mm. Assume other suitable dimensions. 10

   (*b*) Draw the sectional front view and top view of double riveted zig-zag lap joint to connect two plates of 9 mm thickness. Assume and indicate necessary dimensions. 10

7. A cylinder of diameter 50 mm and axis 60 mm long lies on one of its generators on the ground with its axis making an angle of 30° with the VP. It is cut by a vertical section plane, inclined at 60° with VP and passing through the mid-point of the axis. Draw the projections, sectional front view and the true shape of the section. 20

8. A hexagonal pyramid of base 50 mm side and axis 75 mm long stands on its base on the ground with one of its base edges perpendicular to VP. A hole of diameter 40 mm is drilled through the solid. The axis of the hole is perpendicular to VP and intersects the axis of a pyramid at a point 15 mm below the apex. Draw development of the surface of a solid. 20

Group C

9. Answer the following in brief: 10×2

(*i*) What is isometric scale ?

(*ii*) What is an involute ?

(*iii*) Why is the second angle projection method not used in practice ?

(*iv*) Mention the methods of development of surface of cone and cylinder.

(*v*) What do you mean by solids of revolution ?

(*vi*) How do you represent parallelism tolerance and run out tolerance ?

(*vii*) What is the full form of CSG and GUI in context of computer graphics ?

(*viii*) What is the relation between pitch and lead ? What is the difference between them?

(*ix*) What is the value of thread angle for BSW thread and ISO metric thread ?

(*x*) What are the various types of sunk keys used in engineering applications ?

S'16: 6 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*) Explain the projection of a cube using orthographic and stereographic projections. 5

(*b*) Explain the significance of Monge's projections with a suitable example. 5

(*c*) What are tolerances ? Explain explicit and implicit type of tolerances with appropriate examples. 5

(*d*) What is point plotting in computer graphics ? What are the basic requirements to plot a point ? 5

2. (*a*) Sketch the isometric projection for the component shown in Fig. 1. 10

(Turn Over)

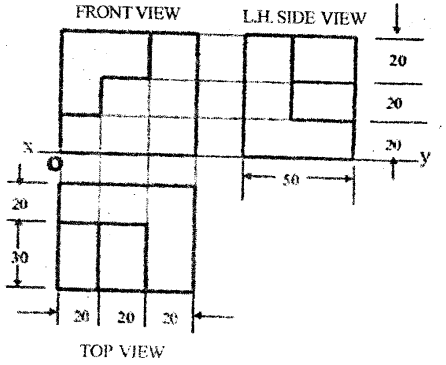


Fig. 1

(*b*) A hexagonal prism, edge of base 20 mm and axis 50 mm long, rests with its base on HP such that one of its rectangular faces is parallel to VP. It is cut by a plane perpendicular to VP, inclined at 45° to HP and passing through the right corner of top face of the prism. Draw the sectional top view and develop the lateral surface of the truncated prism. 10

3. (*a*) A cube of 50 mm side rests with one of its edges on HP such that the square faces containing that edge are making equal inclinations with HP. A horizontal section plane cuts the cube at a distance of 18 mm below the horizontal edge nearer to the observer. Obtain the front and sectional top views. 10

(*b*) Explain *any two* types of three-dimensional modeling techniques used in CAD software. 10

4. (*a*) A line CD measuring 80 mm is inclined at an angle of 30° to HP and 45° to VP. The point C is 20 mm above HP and 30 mm in front of VP. Draw the projections of the straight line. 10

(*b*) 'It is essential for product elements to be compatible for manufacturing and assembly requirements' – justify the statement with an example. 5

(*c*) Distinguish between conical and cylindrical projections with suitable examples. 5

Group B

5. (*a*) Explain the use of lengthening bar, bow divider and protractor-cum-procircle in engineering drawing with neat sketches. 10

(*b*) What is partial view ? Explain the use of partial views in engineering drawing with an example. 5

(*c*) Write the following using free-hand in single stroke vertical capital letters of 5 mm size : 5

"Engineering graphics is the universal language of engineers".

6. A frustrum of a square pyramid, base side 40 mm and top side 22 mm and altitude 53 mm, has its bases equally inclined to VP. Its axis is parallel to VP. It is tilted such that its axis is inclined at 30° to HP. Draw the projections and show the auxiliary top view. 20

7. Draw the front, top and left side view of the component shown in Fig. 2. Consider first angle projection and view from the arrow side. 20

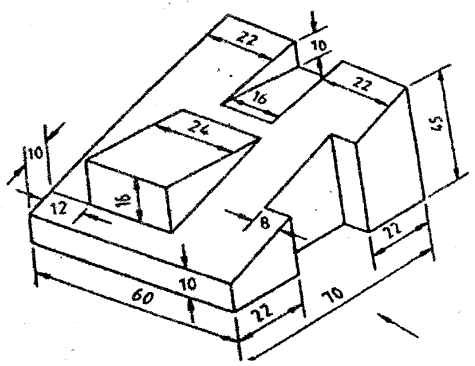


Fig. 2

8. (*a*) Draw the front view and side view of a M16 square headed bolt fitted with square nut and washer. The length of thread is 30 mm. Assume missing dimensions suitably. 10

(*b*) Draw the sectional front and top view of single riveted butt joint (double strap) to connect two plates of thickness 8 mm. Assume appropriate dimensions and indicate them clearly. 10

Group C

9. Answer the following in brief: 10 × 2

(*i*) What is the use of oblique projection ? List *two* types of oblique projection.

(*ii*) Draw the projections of a point A lying 30 mm in front of VP and 20 mm above HP.

(*iii*) Mention *any four* engineering applications of intersection of surfaces.

(*iv*) How are datum features shown in a drawing (with a sketch) ?

(*v*) Differentiate between equal and unequal bilateral tolerances with an example.

(*vi*) What is interactive computer graphics ?

(*vii*) List *any four* types of line that are drawn using 2H pencil.

(*viii*) Re-dimension the part given in Fig. 3 using parallel dimensioning.

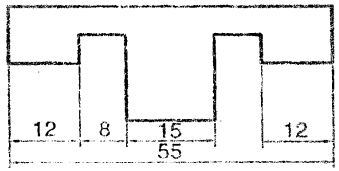


Fig. 3

(*ix*) What do the following symbols represent in a technical drawing ?

(*i*)  (*ii*) 

(*x*) Sketch the simplified method of representing internal screw threads in a technical drawing.

W'16: 6 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*) Construct a retrograde vernier scale of RF = 1/2.5 to show decimeter, centimeter and millimeter to measure up to 4 decimeter. Show 3.65 dm on this scale. 10

(*b*) Explain the construction of a diagonal scale with a neat sketch. 6

(*c*) What do you understand by isometric scale ? 4

2. (*a*) Differentiate between first angle projection and third angle projection with sketch. 3

(*b*) A straight line *AB*, 75 mm long has the end *A* in the VP and the end *B* in the HP. The line is inclined at 30° to the VP and its front view makes an angle of 45° with *xy*. Draw the projections of the line. Draw the right side view and locate the traces of the line. 12

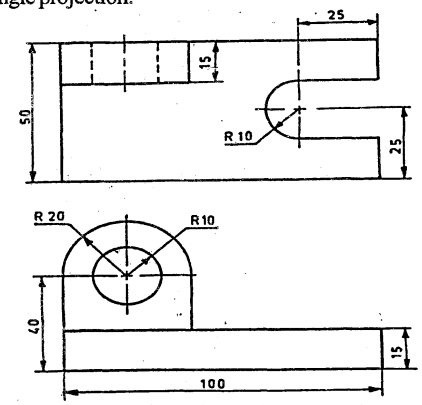
(Turn Over)

(*c*) A room is 6 m × 5 m × 3.5 m high. An electric bulb is above the centre of the longer wall and 1 m below the ceiling. The bulb is 35 cm away from the longer wall. The switch for the bulb is 1.25 m above the floor on the centre of an adjacent wall. Determine graphically the shortest distance between the bulb and the switch. 5

3. (*a*) Draw the projections of a circle of 40 mm diameter, resting on the ground on a point on the circumference. Its plane is inclined at 30° to the HP and perpendicular to the VP. Its centre is 35 mm behind the VP. Also, show its traces. 8

(*b*) A hexagonal prism with a side of base 25 mm and axis 75 mm long is resting on one of its rectangular faces on the ground. Draw the projections of the solid when the axis makes an angle of 45° with the VP. 12

4. Draw an isometric projection of the object whose top view and front view are shown in Fig. 1according to third angle projection. 20

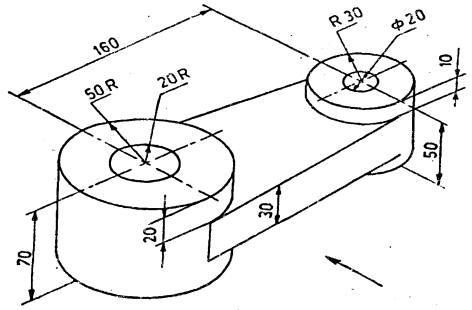


All dimension are in mm

Fig. 1

Group B

5. Draw the front view, top view and right side view of the object as shown in Fig. 2 consider the first angle projection method and view from the arrow side. 20



All dimension are in mm

Fig. 2

6. A hexagonal pyramid base 40 mm side and axis 85 mm long is lying on the ground on one of its triangular faces, with the axis parallel to VP. A vertical section plane, H.T. of which makes an angle of 45° with the reference line passes through the centre of the base and cuts the pyramid, the apex being retained. Draw the top view, sectional front view and true shape of the section. 20

7. A cone of 70 mm diameter base and axis length 100 mm, rests on the ground 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

8. (*a*) Draw sectional front view and top view of double riveted zig zag butt joint with double cover to connect two plates of 9 mm thickness. Assume and indicate necessary dimensions. 10

(*b*) Draw the sectional front view and top view of two plates of thickness 20 mm fastened together by means of a 20 mm diameter stud, a hexagonal nut and a washer. Assume and indicate necessary dimensions. 10

Group C

9. Answer the following in brief: 2 ×10

(*i*) In which octant do the points A (10, –15, 30) and B (–20, 25, –35) lie ?

(*ii*) A rectangular plot of 16 square kilometers is represented by a similar rectangle of area 1 square centimeter on a map. Determine R.F. of the scale and length of the scale by which 60 km distance can be read.

(*iii*) What is the relation between pitch and lead of a threaded bolt ?

(*iv*) Mention two functions of a key.

(*v*) Mention the method of development of surface of a prism and pyramid.

(*vi*) How do you represent 'position tolerance' and 'flatness tolerance' ?

(*vii*) Name the plain figure obtained when the cone is cut by a section plane (*a*) parallel to a generator and (*b*) parallel to base.

(*viii*) What is cycloid ? Mention one use of it.

(*ix*) Mention two software used for engineering drawing. Which command is used for drawing last side while drawing a polygon in computer graphics ?

(*x*) Mention two methods of dimensioning for placing the dimension on the drawing of an object.