ENGINEERING DRAWING

UNIT III - Part A

DEVELOPMENT OF SURFACES:

1. What is meant by development of surfaces?
2. Development of surfaces of an object is also known as flat pattern of the object. (True / False)
3. Give examples of solids that can be developed accurately.
4. Give examples of solids that cannot be developed accurately.
5. State the practical applications of development of surfaces.
6. State the methods of development.
7. State the solids whose surfaces are developed by using parallel line method.
8. Radial line method is used for developing the surfaces of _____
9. Transition pieces and reducers are developed by using _____ method.
10. What is the shape of the development of a cube of edge 10cm?
11. What will be the shape of the development of the lateral surfaces of a pentagonal prism of base edge 5cm and height 10cm?
12. A rectangular prism of height 15cm with ends 6x10cm is to be developed completely, what will be the shape of the development?
13. Show the complete development of an equilateral triangular prism of base side A and height H.
14. What is the shape of the development of the lateral surface of a cylinder of diameter 7cm and height 10cm?
15. What will be the shape of the development of the lateral surface of a cone?
16. What will be the shape of the full development of a square pyramid of base side ‘a’ and slant height ‘l’?
17. In drawing the development of objects, only true lengths are used. (True / False)
18. Just like cone and cylinder spheres can also be developed accurately. (True / False)
19. What is the development of lateral surface of a cylinder?
20. If the top view of a slant edge of a pyramid is parallel to XY, then front view of that edge will give its true length. (True / False)
21. Every line on a development must be equal to the true length of that line on the actual surface. (True / False)
22. _____ method is used for developing prisms and cylinder.

23. _____ method is used for developing pyramids and cone.
24. _____ method is used for developing double curved surfaces.
25. _____ method is used for developing transition pieces.
26. In the development of the lateral surface, the starting and closing edges should be the ____
27. If the top view of a slant edge of a pyramid is parallel to XY, then the front view of that edge will give its _____.
28. All the generators of the frustum of a cone have _____ length.

INTERSECTION OF SURFACES:

1. What is meant by intersection of surfaces?
2. What is meant by interpenetration of solids?
3. Define point of intersection.
4. Define line of intersection of surfaces.
5. State the situation when the line of intersection will be a curve.
6. Intersection of a prism and a prism is a case of interpenetration / intersection.
7. Intersection of a pyramid and a cone is a case of interpenetration / intersection.
8. Intersection of a pyramid and a prism is a case of interpenetration / intersection.
9. When two plane surfaces meet, the line of intersection formed is a _____.
10. The number of lines or curves of intersection formed when a solid pierces through another solid and comes out at the other side is _____.
11. Name any two methods of determining the line of intersection.
12. Line method is also known as _____ method or _____ method.
13. What type of cutting planes should be preferred in the cutting-plane method of finding the line of intersection?
14. The line of intersection between a cylinder and cone is made up of _____.
15. When a straight line and a solid intersect, the line of intersection formed is a _____.
16. If two cylinders of the same size intersect each other completely, the curves of intersection will be seen on both sides as straight lines / curved lines.
17. What are critical points?
18. In the intersection of a cylinder and a cone, the critical points are located in the side view as the points of intersection of the circle with the lines drawn from the centre of the circle _____ to the extreme generators of the cone.
19. State the practical applications of intersection of surfaces.
20. The hidden portions of the penetrating solid are shown by _____ lines.

UNIT III - Part B

DEVELOPMENT OF SURFACES:

1. A cube of side 30mm rests on its base on the HP with a vertical face inclined at 30˚ to the VP. It is cut by a plane perpendicular to the VP and inclined at 50˚ to the HP. The plane bisects the axis of the cube. Draw the development of the cube.
2. A rectangular prism of cross section 40 x 30 mm and height 50 mm is resting on one of its ends on the HP with one of its longer edges of the base inclined at 45˚ to the VP. It is cut by a plane perpendicular to the VP and inclined at 45˚ to the HP. The plane meets the axis at a point 15 mm below the top end. Draw the development of the surfaces of the truncated lower part of the prism.
3. A hexagonal prism of base side 20 mm and height 45 mm is resting on one of its ends on the HP with two of its lateral faces parallel to the VP. It is cut by a plane perpendicular to the VP and inclined at 30˚ to the HP. The plane meets the axis at a distance of 20 mm above the base. Draw the development of the lateral surfaces of the lower part of the prism.
4. A pentagonal prism of base side 25 mm and height 60 mm stands on one of its ends on the HP with a rectangular face parallel to the VP. A hole of diameter 30 mm is drilled centrally through the prism in such a way that the axis of the hole bisects the axis of the prism at right angles. The axis of the hole is perpendicular to VP. Draw the development of the lateral surfaces of the lower prism.
5. A cylinder of diameter 40 mm and height 50 mm is resting vertically on one of its ends on the HP. It is cut by a plane perpendicular to the VP and inclined at 30˚ to the HP. The plane meets the axis at a point 30 mm from the base. Draw the development of the lateral surface of the lower portion of the truncated cylinder.
6. Draw the development of the lateral surface of the right portion of the cylinder of diameter 50 mm and height 65 mm cut by a plane inclined at 60˚ to the base and passing through the axis at a height of 40 mm above base.
7. A circular hole of diameter 30 mm is drilled through a vertical cylinder of diameter 50 mm and height 65 mm. The axis of the hole is perpendicular to the VP and meets the axis of the cylinder at right angles at a height of 30 mm above the base. Draw the development of the lateral surface of the cylinder.
8. A pentagonal pyramid of base side 25 mm and height 60 mm is resting vertically on its base on the ground with one of the sides of the base parallel to the VP. It is cut by a plane perpendicular to VP and parallel to the HP at a distance of 25 mm above the base. Draw the

development of the lateral surfaces of the frustum of the pyramid. Also show the plan of the cut surface.

9. A hexagonal pyramid of base of side 25 mm and altitude 50 mm is resting vertically on its base on the ground with two of the sides of the base perpendicular to the VP. It is cut by a plane perpendicular to the VP and inclined at 40˚ to the HP. The plane bisects the axis of the pyramid. Draw the development of the lateral surface of the pyramid.
10. Draw the development of a square pyramid of base side 40 mm and altitude 60 mm when it is resting on the HP on its base with two edges parallel to the VP.
11. A square pyramid of base side 25 mm and altitude 50 mm rests on its base on the HP on its base with two sides of the base parallel to the VP. It is cut by a plane bisecting the axis and inclined at 30˚ to the base. Draw the development of the lateral surfaces of the lower part of the cut pyramid.
12. A square pyramid of base side 35 mm and axis 60 mm rests on its base on the ground with one of the sides of the base inclined at 30˚ to the VP. A string is wound round the surfaces of the pyramid starting from left extreme point on the base and ending at the same point. Find the shortest length of the string required. Also trace the path of the string in the front and top views.
13. A right circular cone of base diameter 60 mm and height 70 mm is resting on its base on the ground. It is cut by a plane perpendicular to the VP and inclined at 30˚ to the HP. The cutting plane bisects the axis of the cone. Draw the development of the lateral surface of the truncated cone.
14. A cone of base diameter 60 mm and height 70 mm is resting on its base on the ground. . It is cut by a plane perpendicular to VP and parallel to the HP at a distance of 20 mm from the vertex. It is also cut by a plane inclined at 40˚ to the base and meeting the axis at a point 20 mm above base. Draw the development of the lateral surface of the cut cone.
15. Draw the development of a lamp shade which is in the form of a frustum of a cone of base diameter 80 mm and top diameter 40 mm the height of the frustum being 40 mm.
16. A cone of base diameter 60 mm and height 70 mm rests vertically on its base on the ground. A string is wound round the curved surface of the cone starting from left extreme point on the base and ending at the same point. Find the shortest length of the string required. Also trace the path of the string in the front and top views.
17. A cone of base diameter 60 mm and height 70 mm rests vertically on its base on the ground. A slot of shape of an equilateral triangle of side 30 mm is cut through the cone so that its axis is perpendicular to the VP and meets the axis of the cone at right angles. The base of the

slot is at a distance of 10 mm above the base of the cone. Draw the development of the lateral surface of the cone.

INTERSECTION OF SURFACES:

1. A horizontal cylinder of diameter 40 mm penetrates into a vertical cylinder of diameter 60 mm. The axes of the cylinders intersect at right angles. Draw the curves of intersection when the axis of the horizontal cylinder is parallel to the VP.
2. A vertical cylinder of diameter 90 mm is fully penetrated by a cylinder of diameter 60 mm, their intersecting each other. The axis of the penetrating cylinder is inclined at 30˚ to the HP and is parallel to the VP. Draw the top and front views of the cylinders and show the curves of intersection.
3. A cylinder of diameter 28 mm pierces through a vertical cylinder of diameter 44 mm. The axis of the piercing cylinder is parallel to both the HP and the VP. The axes are separated by a distance of 5 mm, the axis of the horizontal cylinder being nearer to VP. Draw the projections of the cylinders. Show also the curves of intersection.
4. A cylinder of diameter 40 mm pierces through another vertical cylinder of diameter 40 mm. The axes are at right angles and are separated by 6 mm. The axis of the vertical cylinder is nearer to the VP. The axis of the penetrating cylinder is parallel to both the HP and the VP. Draw the projections of the cylinder and show the curves of intersection.
5. A cylinder of diameter 50 mm penetrates fully into a cone of base diameter 80 mm and altitude 110 mm resting on its base on the HP. The axis of the cylinder intersects the axis of the cone at right angles at a distance of 30 mm above the base of the cone. The axis of the cylinder is parallel to both the HP and the VP. Draw the curves of intersection of the solids.
6. A cone of base diameter 50 mm and altitude 60 mm rests on its base on the HP. A cylinder of diameter 24 mm pierces through the cone and comes out at the other end. The axis of the cylinder is situated at a distance of 15 mm above the base of the cone and 4 mm away from the axis of the cone. The axis of the cylinder is parallel to both the HP and the VP. Draw the curves of intersection of the solids.
7. A cone of base diameter 60 mm and altitude 120 mm penetrates into a cylinder of diameter 70 mm that stands on one of its ends on the HP. Their axes intersect at right angles at 50 mm from the base of the cone and 50 mm from the base of the cylinder. The axis of the cone is parallel to both the HP and the VP. Draw the projections of the solids and show the curves of intersection.