DEVELOPMENT OF SURFACES 13

13-1 INTRODUCTION

In engineering practice, a large number of objects like funnel, bucket, hopper, chimney, duct of air conditioner, boiler shell, storage tank and tray etc. are made of metal sheets. The fabrication of these objects can be planned in an economic way if the accurate shape and size of metal sheet is known. This chapter deals with proper layout planning of the surface of the object on a single plane called the development of surfaces.

13-2 CLASSIFICATION OF SURFACES

Surfaces of various geometrical objects may be classified as:

1. Plane surfaces: Surfaces of prism, pyramids, cube and polyhedra are plane surfaces.

2. Singly curved surfaces: Surfaces of object like cylinder and cone are singly curved surfaces.

3. Doubly curved surfaces: Surfaces of spheres, paraboloid, ellipsoid, hyperboloid are doubly curved surfaces.

MULTIPLE CHOICE QUESTIONS

Choose the most appropriate answer out of the given alternatives:

i)   The method by which the development of surface of an oblique solid is obtained

(a) Radial line   (b) Parallel line   (c) Triangulation   (d) Approximation

ii)   Methods for the development of solids are

(a) Parallel line method   (b) Radical line method
(c) Triangular method   (d) All of them

iii)   Development of sphere is done by

(a) Zone or Lune method   (b) Parallel line or Radial line method
(c) Triangulation method   (d) Any of these methods

iv) The nature of lateral surface of a cylinder is

(a) Plane surface
(b) Singly curved surface
(c) Doubly curved surface
(d) Singly or doubly curved surface

v) The nature of surface of a sphere is

(a) Plane surface
(b) Singly curved surface
(c) Doubly curved surface
(d) Singly or doubly curved surface

vi) If a semicirclular thin sheet is folded to form a cone, then the front view of the cone appears as,

(a) Equilateral triangle
(b) Isosceles triangle
(c) Rectangle
(d) Semicircle

vii) Sector of a circle of radius 60 mm and angle 120⁰ represents development of the lateral surface of a cone. The top view of the cone is a circle of diameter

(a) 20 mm
(b) 40 mm
(c) 60 mm
(d) 80 mm

viii) If the front view of a cone is represented by an equilateral triangle of 60 mm side. The area of its lateral surface is

(a) 30 π
(b) 60 π
(c) 90 π
(d) 120 π

ix) The development of suface of a tetrahedron of 60 mm edge can be represented by an equilateral triangle of side

(a) 60 mm
(b) 90 mm
(c) 120 mm
(d) None of these

x) The development of suface of a tetrahedron of 60 mm edge can be represented by a parallelogram of adjacent sides

(a) 60 mm and 90 mm
(b) 60 mm and 120 mm
(c) 90 mm and 120 mm
(d) None of these

xi) A rectangle of 120 mm X 60 mm represents the development of the lateral surface of

(a) A square prism of side 30 mm
(b) A hexagonal prism of side 20 mm
(c) A cylinder of diameter 120/π
(d) All of these

xii) A string is wound around a hexagonal prism of base 20 mm side and axis 50 mm long, 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

Answer: (i) c (ii) a (iii) a (iv) b (v) c (vi) a (vii) b (viii) b (ix) c (x) b (xi) d (xii) c