

GEOMETRICAL CONSTRUCTIONS

3

3-1 INTRODUCTION

The engineers should be familiar with the principles of plane and solid geometry. A thorough knowledge of these principles is a prerequisite to solve engineering graphics problems. Plane figures such as circle, triangle, and different polygons frequently constitute a part of various objects for preparing engineering drawings. This chapter presents some of the important methods of geometrical constructions based on the principles of plane geometry studied earlier.

MULTIPLE CHOICE QUESTIONS

Choose the most appropriate answer out of the given alternatives:

- i) When two graphic entities are at a constant distance apart along the length is commonly referred as
(a) Concentricity (b) Parallelism (c) Perpendicularity (d) Chordality
- ii) If a line intersects a circle at two points, not passing through the center, the line segment inside the circle is referred as
(a) Radial line (b) Chord (c) Quadrant (d) Sequent
- iii) Which of the following would be considered a primitive in a 3D solid modeling system?
(a) Cylinder (b) Square (c) Rhombus (d) Spline
- iv) If an octagon is circumscribed around the perimeter of a circle, which of the following statements is **true**?
(a) The diameter of the circle is equal to the across-the-corners measurement.
(b) The radius of the circle is equal to the across-the-flats measurement.
(c) The diameter of the circle is equal to the across-the-flats measurement.
(d) The radius of the circle is equal to the across-the-corners measurement.
- v) To draw perpendicular from a given point P on line XY, name the point where the compass needle shall be placed first.
(a) P (b) X or Y (c) Any convenient point along XY
(d) A point near the midpoint of PX and PY

- vi) Line XY is to be divided into 12 equal parts by geometric construction. Which of the following statements concerning this procedure is correct?
- (a) Ray line PY, drawn from Y, is the same length as XY
 - (b) A compass should be set to spread equal to one twelfth of the length of XY
 - (c) A line should be drawn from X to the 12th interval on ray line PY
 - (d) The acute angle formed by XY and ray line PY should be 30° or less
- vii) Which of the following actions should be your first step in constructing a square geometrically when you are given only the length of its diagonal?
- (a) Lay out a horizontal line equal to one half of the given length
 - (b) Lay out a vertical line equal to one half of the given length
 - (c) Lay out a horizontal line equal to twice the given length
 - (d) Lay out a horizontal line equal to the given length
- viii) When two diameters of a circle are drawn at right angles to each other, which of the following polygons will have all of the sides at 45° to these diameters?
- (a) A hexagon inscribed in a given circle
 - (b) An octagon inscribed in a given circle
 - (c) A pentagon inscribed in a given circle
 - (d) A square inscribed in a given circle
- ix) The included angle of a pentagon is
- (a) 68°
 - (b) 72°
 - (c) 108°
 - (d) 112°
- x) When a circle passes through three given points, its center lies at the intersection of
- (a) The perpendicular bisector of the longest line and the perpendicular line drawn from the end of the shortest line
 - (b) The perpendicular bisector of the shortest line and the perpendicular line drawn from the end of the longest line
 - (c) The perpendicular bisectors of the lines that connect the points
 - (d) The tangents drawn through each point
- xi) To draw a circle of a given radius which is also tangent to the two sides of a given angle, the first step is to draw
- (a) Two nonparallel lines at right angles to the sides of the angle
 - (b) Two lines that are parallel to the sides of the angle at a distance equal to one half of the given radius
 - (c) Two lines that are parallel to the sides of the angle at a distance equal to the given radius
 - (d) Two parallel lines at right angles to the sides of the angle

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