परमाणु ऊर्जा शिक्षण संस्था
Atomic Energy Education Society
उत्तर कुंजी / Answer Key (2025-26)

कक्षा /Class: VII   विषय /Subject: Mathematics   माह/ Month: ________ अंक/Marks: 40

दिया गया पाठ्यक्रम/Portion covered: Chapter 6 (CONSTRUCTION AND TILING)

Section A

1. A

2. B

3. D

4. D

5. A

6. D

7. C

8. C

9. A

10. B

11) Fill in the blanks:
   2) hexagons
   3) eight

12) A point equidistant from X and Y lies on the perpendicular bisector of XY.
   A perpendicular bisector cuts the segment at right angles and at its midpoint.
   Perpendicular bisector of XY and it is perpendicular to XY at its midpoint.

13) A regular hexagon can tile the plane.
   At every vertex, the angles of the polygons meeting there must add up to 360°.
   Regular hexagon and the angles around a point must sum to 360°.

14) For a region to be tiled by 2×1 tiles in a black-white grid, the number of black and white squares must be

   equal.
   Here black = 11 and white = 11, which are equal.
   Yes, it can be tiled and the equal black-white squares rule is used.

15) To divide a full circle into equal parts:

   1. Start with a 90° angle and bisect it to create two 45° angles.
   2. Continue bisecting each angle until you achieve the desired number of equal parts.
   3. For example, to divide a circle into 8 parts, bisect the 90° angle four times, creating 8 equal
   4. parts of 45° each.

16) a. They need two 90° angles: one vertical and one horizontal line crossing at the centre.
   b.
      1. Draw a horizontal line through the centre O.

2. At O, construct a perpendicular to get a vertical line; now you have

   four 90° angles (like a "plus" sign).

3. Bisect each 90° angle using the angle-bisection method with a compass:
   From O, draw an arc cutting the two arms of a 90° angle.
   From these cut points, draw arcs that intersect; join this intersection to O.
4. Repeating this for all four right angles gives four extra lines.
   Altogether there are 4 original arms + 4 bisectors = 8 supporting lines, each 45°

   apart, giving 8 sectors for 8 petals.

17)
   a. Only Option 2: Regular hexagons can tile the hall if only one type of regular polygon is allowed.
   b. At every vertex in a tiling, the sum of the angles around the point must be 360°.
      - A regular pentagon has interior angle 108°. 3 × 108° = 324°, 4 × 108° = 432°, so they

        cannot fit exactly around a point without gaps/overlap.

      - A regular hexagon has interior angle 120°. 3 × 120° = 360°, so exactly three

        hexagons can meet at each vertex and tile the plane.

   Hence regular hexagons alone can tile the floor; regular pentagons alone cannot.

18) Angle bisection involves dividing an angle into two equal parts using geometric tools.
   Steps for angle bisection:

   1. Draw an arc from the vertex of the angle.
   2. Use a compass to draw arcs from the two intersection points of the first arc with the sides of the angle.
   3. The point where the two arcs meet is the line that bisects the angle.

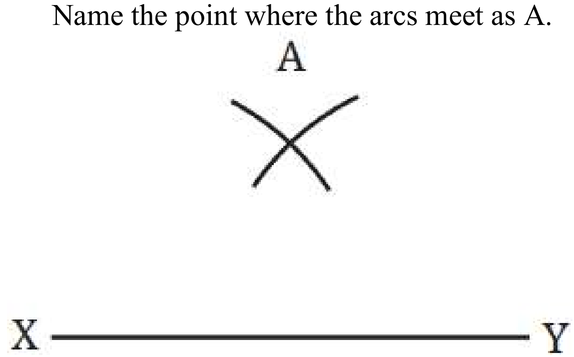
   This method is useful in creating geometric patterns, like repeating units in tilings, where equal angles

   ensure symmetry and consistency.

19) **Steps:**

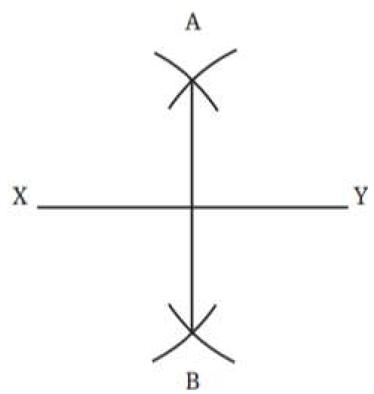
   i. Taking some fixed radius, from X and then Y, construct two sufficiently long arcs above XY.

      Name the point where the arcs meet as A.



   ii. Using the same radius, from X and then Y, construct two sufficiently long arcs below XY.

      Name the point where the arcs meet as B.



iii. AB is the required perpendicular bisector.

20) A full circle measures 360°.
For 16 sectors, each angle must be:
360° ÷ 16 = 22.5°

Steps:

i. Construct a straight line through the center.
ii. Construct a 90° angle.
iii. Bisect 90° to get 45°.
iv. Bisect 45° to get 22.5°.

Each 22.5° angle is repeated around the center to form 16 equal sectors.

Reason:
Angle bisection creates two equal angles using congruent triangles.
Repeating this process allows us to accurately divide 360° into 16 equal parts.