परमाणु ऊर्जा शिक्षण संस्था
Atomic Energy Education Society
कार्यपत्रक / Worksheet (2025-26)

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

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

विद्यार्थी का नाम/Name of the student: _____

अनुक्रमांक /Roll No._____ कक्षा/अनुभाग Class /Sec.:_____ दिनांक /Date: _____

Section A

1 What is the purpose of the supporting line XY in the construction of eyes? **[1]**
a) To measure the length of the eyes
b) To ensure symmetry
c) To create a straight edge
d) To mark the center

2 In a construction of an "eye" with supporting line XY , points A and B are chosen such that $AX = AY$ and $BX = BY$. **[1]**
What is always true about the line AB ?
a) AB is parallel to XY
b) AB is the perpendicular bisector of XY
c) AB passes through X
d) AB is the angle bisector of $\angle XAY$

3 What mathematical principle is essential for creating a perfectly symmetrical design? **[1]**
a) The Pythagorean theorem
b) Proportional relationships
c) The Golden Ratio
d) Equal dimensions

4 What geometric shape is commonly used in designing patterns like rangoli? **[1]**
a) Triangles
b) Squares
c) Circles
d) Polygons

5 A9 × 12 rectangular grid is to be tiled using 2 × 1 domino tiles. Which statement is correct? **[1]**
a) It is tileable because9 × 12 is even
b) It is not tileable because 12 is even
c) It is tileable only if one corner square is removed
d) It is not tileable because 9 is odd

6 How does understanding geometric constructions enhance problem - solving skills? **[1]**
a) By promoting creative thinking
b) By simplifying calculations
c) By providing rigid guidelines
d) By fostering analytical skills

7 When constructing geometric shapes, what is the significance of using two centers for arcs? **[1]**
a) To ensure smooth transitions
b) To create more complex shapes
c) To achieve accurate measurements

d) To simplify the drawing process

8 A designer wants to create an 8 - petalled flower by dividing a full circle into equal angles using constructions only. **[1]**

What is the measure of each central angle between two adjacent petals?

a) 22.5°

b) 30°

c) 45°

d) 60°

9 What condition must be met for two arcs to create a symmetric eye? **[1]**

a) They must have equal distances from a baseline

b) They must intersect at a point

c) They must have different radii

d) They must be drawn using the same center

10 You construct a90° angle at a point O on a line l by first making O the midpoint of XY on l and then drawing the perpendicular bisector of XY . **[1]**

Which idea is being used in this construction?

a) Exterior angle property of triangles

b) Any point on a perpendicular bisector is equidistant from the endpoints

c) Midpoint theorem of triangles

d) Sum of angles in a triangle is180°

11 **Fill in the blanks:** **[2]**

1. Equilateral triangles, squares and regular _____ can tile the entire plane.
2. In an 8 - petalled design, the full circle is divided into _____ equal angles.

12 If a point P satisfies PX = PY for a line segment XY, name the line on which P lies and also state one property of that line. **[2]**

13 Name one regular polygon other than a square that can tile the plane and also state the angle condition that makes this tiling possible. **[2]**

14 A coloured grid has 11 black squares and 11 white squares; state whether it can be tiled using 2 × 1 tiles and also give the rule used. **[2]**

15 Explain how the bisection of an angle is used to divide a full circle into equal parts. **[3]**

16 A school wants to design an 8 - petalled rangoli pattern in its courtyard using chalk. They will draw supporting lines first and then draw arcs. **[3]**

1. How many 90° angles do they need to construct to get 8 equal sectors?
2. Explain step by step how they can obtain all eight 45° supporting lines using only constructions.

17 A hall floor is to be tiled entirely using regular polygons of just one type. The engineer suggests three options: **[3]**

- Option 1: Regular pentagons
- Option 2: Regular hexagons
- Option 3: A mix of regular pentagons and regular hexagons

1. Which option(s) can tile the hall without gaps or overlaps if only one type of regular polygon is allowed?
2. Give a mathematical reason for your answer based on interior angles and tiling.

18 Explain the concept of angle bisection. How is it useful in creating geometric patterns? **[3]**

19 Given a line segment XY, how do we draw its perpendicular bisector using only an unmarked ruler and a compass? **[5]**

20 A digital artist wants to divide a circular logo into 16 equal sectors. Explain the sequence of constructions needed and the mathematics behind it. **[5]**