

## Constructions

## MATHEMATICAL REASONING

- For which of the following conditions the construction of a triangle is NOT possible?
   (a) If two sides and one angle is given.
  - (b) If two sides and included angle between them is given.
  - (c) If three sides are given.
  - (d) If two angles and side between them is given.
- 2. The construction of a  $\Delta LMN$  in which LM = 8 cm,  $\angle L = 45^{\circ}$  is possible when (MN + LN) is \_\_\_\_\_. (a) 6 cm (b) 7 cm (c) 9 cm (d) 5 cm
- Which of the following angles CANNOT be constructed by using ruler and compass only?
  (a) 30°
  (b) 45°
  (c) 70°
  (d) 90°
- 4. The construction of a  $\triangle ABC$  in which 6C = 6 cm and  $\angle B = 50^{\circ}$  is NOT possible when (AB - AC) is equal to \_\_\_\_. (a) 5.6 cm (b) 5 cm

•	<b>,</b>	• • •	
(c	) 6 cm	(d)	4.8 cm

5. Which of the following options is INCORRECT?
(a) An angle of 52.5° can be constructed.
(b) A triangle ABC can be constructed in which AB = 5 cm, ∠A = 45° and BC + AC = 5 cm.
(c) A triangle ABC can be constructed in which BC = 6 cm, ∠C = 30° and AC - AB = 4 cm.
(d) A triangle ABC can be constructed in which ∠B = 60°, ∠C = 45° and AB + BC + AC = 12 cm.

## **ACHIEVERS SECTION (HOTS)**

6. Following are the steps of construction of a ∆ABC in which AB = 5 cm, ∠A = 30° and AC - BC = 2.5 cm. Arrange them and select the CORRECT option.
(i) Draw ∠BAX = 30°
(ii) Draw the perpendicular bisector of BD which cuts AX at C.
(iii) Draw AB = 5 cm
(iv) Join BD
(v) Join BC to obtain the required triangle ABC
(vi) From ray AX, cut off line segment AD = AC-BC = 2.5 cm
(a) (i) → (iii) → (iv) → (v) → (vi) → (ii)

(b) (iii)  $\rightarrow$  (i)  $\rightarrow$  (vi)  $\rightarrow$  (iv)  $\rightarrow$  (ii)  $\rightarrow$  (v) (c) (iii)  $\rightarrow$  (i)  $\rightarrow$  (ii)  $\rightarrow$  (v)  $\rightarrow$  (iv)  $\rightarrow$  (vi)

(d) (iii)  $\rightarrow$  (ii)  $\rightarrow$  (iv)  $\rightarrow$  (i)  $\rightarrow$  (vi)  $\rightarrow$  (v)

7. State T for true and 'F' for false.
(i) A triangle whose sides measure 8 cm, 4 cm and 12 cm can be possible.
(ii) It is possible to construct an angle of 67.5°

using ruler and compass only.

(iii) It is possible to construct a  $\Delta XYZ$  in which  $\angle X = 60^\circ, \angle Y = 100^\circ$  and  $\angle Z = 20^\circ$ .

	(i)	(ii)	(iii)
(a)	Т	F	Т
(b)	F	F	F
(c)	F	Т	Т
(d)	Т	Т	F

8. Let ABC be a triangle in which BC = 5 cm,  $\angle B = 60^{\circ}$  and AC + AB = 7.5 cm. Given below are the steps of constructing the triangle ABC. Which of the following steps is INCORRECT? **Step I:** Draw a line segment BC of length 5 cm. **Step II:** Draw an  $\angle XBC = 60^{\circ}$  at point B of line segment BC. **Step III:** Cut off PB = 3.5 cm on the ray BX. Step IV: Join PC. **Step V:** Draw  $\perp$  bisector of BC which intersect ray BX at A. Join AC. **Step VI:** ABC is the required triangle. (a) Step II only (b) Step III only (c) Step II and V (d) Step III and V

9. Following are the steps of construction of a rectangle ABCD whose adjacent sides are of lengths 5 cm and 3.5 cm. Arrange them and select the CORRECT option.
(p) Draw a line segment BC of length 5 cm.

(p) Draw a line segment BC of length 5 cm. (q) With A as centre, draw an arc of radius 5 cm. (r) Draw an  $\angle XBC = 90^{\circ}$  at point B of line segment BC.

(s) Cut a line segment AB = 3.5 cm on  $\overrightarrow{BX}$ (t) With C as centre, draw an arc of radius 3.5 cm which intersects the arc at D. (u) Join AD and CD.

(a) (p)  $\rightarrow$  (s)  $\rightarrow$  (q)  $\rightarrow$  (r)  $\rightarrow$  (u)  $\rightarrow$  (t)

 $(b) (p) \rightarrow (r) \rightarrow (s) \rightarrow (q) \rightarrow (t) \rightarrow (u)$ 

(c) (p)  $\rightarrow$  (s)  $\rightarrow$  (r)  $\rightarrow$  (q)  $\rightarrow$  (t)  $\rightarrow$  (u)

(d) (p)  $\rightarrow$  (q)  $\rightarrow$  (r)  $\rightarrow$  (s)  $\rightarrow$  (u)  $\rightarrow$  (t)

10. Step I & Step V are in correct order while constructing an equilateral triangle one of whose altitudes measures 5 cm. Which of the following options is CORRECT while arranging the remaining steps in CORRECT order? Step I: Draw a line XV. (i) From  $\angle P$ , set off PA = 5 cm, cutting PQ at A (ii) From P, draw  $PQ \perp XY$ . (iii) Mark any point P an XY. **Step V:** Construct  $\angle PAB = 30^{\circ}$  and  $\angle PAC = 30^{\circ}$ , meeting XY at B and C respectively.  $(a)(i) \rightarrow (ii) \rightarrow (iii)$ (b) (iii)  $\rightarrow$  (ii)  $\rightarrow$  (i)  $(c)(ii) \rightarrow (i) \rightarrow (iii)$ (d) (iii)  $\rightarrow$  (i)  $\rightarrow$  (ii)

## HINTS & EXPLANATIONS

- **1.** (a) :
- **2.** (c) : Construction of a triangle is possible when sum of two sides is greater than the third side. Only option (c) satisfies above condition.
- **3.** (c) :
- **4.** (c) : Construction of  $\triangle ABC$  is not possible when AB AC = BC 6 cm.
- **5.** (b) :
- **6.** (b) :
- **7.** (b) :
- **8.** (d) :
- **9.** (b) :
- **10.** (b) :