Total Marks: 25

**Q.1. A.** Choose the correct alternative. [4]

i. Which of the following triplets will not form a right angled triangle?

(A) (5, 12, 13)   (B) (8, 15, 17)   (C) (20, 10, 11)   (D) (9, 40, 41)

ii. In $\triangle PQR$, $\angle Q = 30°$, $\angle R = 90°$ and the length of the hypotenuse is 20 cm. What will be length of QR?

(A) 10 cm   (B) $10\sqrt{3}$ cm   (C) $10\sqrt{2}$ cm   (D) $5\sqrt{2}$ cm

iii. If the length of the diagonal of a square is 16 cm, then its perimeter will be

(A) 32 cm   (B) $32\sqrt{2}$ cm   (C) 64 cm   (D) $64\sqrt{2}$ cm

iv. In $\triangle PQR$, $\angle Q = 90°$ and $QS \perp PR$. If $PS = 32$ cm, $SR = 8$ cm, then $QS =$
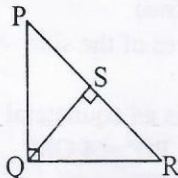
(A) 8 cm   (B) $2\sqrt{10}$ cm   (C) 16 cm   (D) 40 cm

Q.1. B. Solve the following questions. (Any one) [2]

i. Find the diagonal of a rectangle having length and breadth 12 cm and 8 cm respectively.

ii. In $\triangle ABC$, AP is a median. If $AP = 7$, $AB^2 + AC^2 = 260$, then find BC.

Q.2. A. Complete the following activities. (Any one) [2]

i. For finding AB and BC with the help of information given in the adjoining figure, complete the following activity.
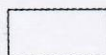
Solution:

$AB = BC$

∴ $\angle BAC = \angle BCA$

∴ $\angle BAC = \boxed{}$ [Isosceles triangle theorem]

∴ $AB = BC = \boxed{\dfrac{1}{2}} \times AC$ [Theorem of $45° - 45° - 90°$ triangle]

$= \boxed{\dfrac{1}{}} \times \sqrt{8}$

$= \boxed{\dfrac{1}{}} \times 2\sqrt{2}$

∴ $AB = BC = \boxed{\sqrt{2}}$
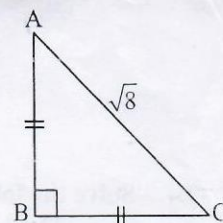
ii. In $\triangle ABC$, $\angle ACB$ is an obtuse angle, seg $AD \perp$ seg BC. Prove that: $AB^2 = BC^2 + AC^2 + 2\,BC \times CD$.

Complete the proof by filling the blanks.

Proof:

$BD = \boxed{} + DC$ [B–C–D]

∴ $BD = a + x$

In $\triangle ADB$, $\angle D = 90°$

∴ $c^2 = \boxed{} + p^2$

∴ $c^2 = a^2 + \boxed{} + x^2 + p^2$ (i)

Also, in $\triangle ADC$, $\angle D = 90°$
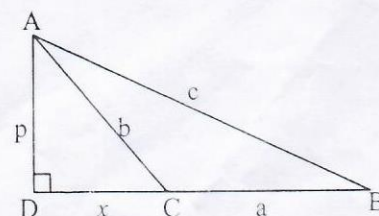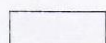
$$\therefore \quad \boxed{} = x^2 + p^2 \qquad \text{[Pythagoras theorem]}$$

$$\therefore \quad p^2 = \boxed{} \qquad \qquad \text{(ii)}$$

$$\therefore \quad c^2 = a^2 + 2ax + x^2 + b^2 \boxed{} \qquad \text{[From (i) and (ii)]}$$

$$\therefore \quad c^2 = a^2 + b^2 + 2ax$$

$$\therefore \quad AB^2 = \boxed{}$$

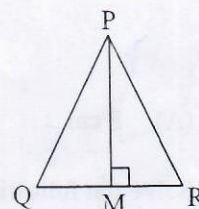**Q.2. B.** Solve the following questions. (Any two) **[4]**

i.   A 50 m long ladder reaches a window 14 m above the ground. Find the distance of the foot of the ladder from the base of the wall.

ii. Find the perimeter of a square whose diagonal is 10 cm.

iii. Find the height of an equilateral triangle having side 15 cm.

Q.3. Solve the following questions. (Any two) **[6]**

i.   Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of diagonals.

ii. In the adjoining figure, $\triangle PQR$ is an equilateral triangle, seg $PM \perp$ side QR. Prove that: $PQ^2 = 4\,QM^2$

iii. In the given figure, SV is the median and $SW \perp TU$. Prove that,
$SU^2 - ST^2 = 2TU \times VW$
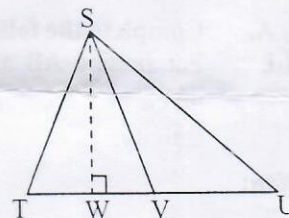
Q.4. Solve the following questions. (Any one) **[4]**

i.   The length of one side of a parallelogram is 17 cm. If the length of its diagonals are 12 cm and 26 cm, then find the length of the other side of the parallelogram.

ii. ABC is a triangle in which AB = AC and D is a point on BC. Prove that
$AB^2 - AD^2 = BD.CD$.

Q.5. Solve the following questions. (Any one) **[3]**

i.   If a and b are natural numbers and $a > b$, then show that $(a^2 + b^2)$, $(a^2 - b^2)$, $(2ab)$ is a Pythagorean triplet. Find two Pythagorean triplets using any convenient value of a and b.

ii. Pranali and Prasad started walking to the East and to the North respectively, from the same point and at the same speed. After 2 hours distance between them was $15\sqrt{2}$ km. Find their speed per hour.