PRACTICE PAPER 06 (2024-25)
CHAPTER 06 TRIANGLES

SUBJECT: MATHEMATICS   **MAX. MARKS : 40**
**CLASS : X**   **DURATION : 1½ hrs**

General Instructions:
(i).   **All** questions are compulsory.
(ii).   This question paper contains **20** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv).   There is no overall choice.
(v).   Use of Calculators is not permitted

SECTION – A
Questions 1 to 10 carry 1 mark each.

1. Shown below are two triangles such that length of two sides of each is known. Along with the given information, which of these is sufficient to conclude whether ∆KLM is similar to ∆PQR?
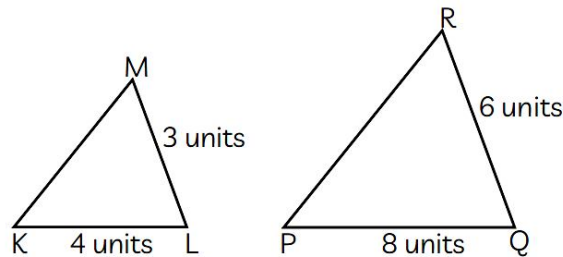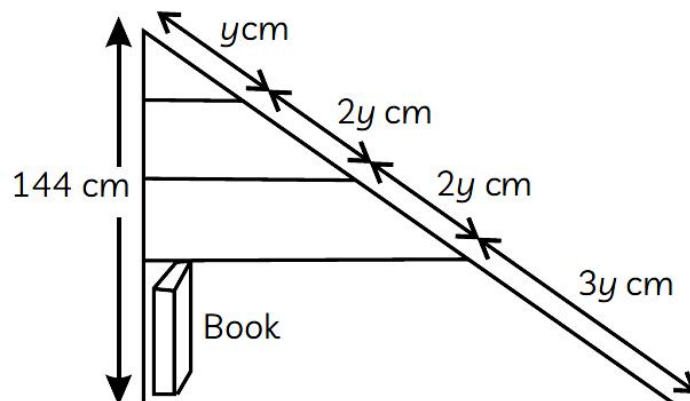

(I) ∠KLM = ∠PQR
(II) Ratio of KM : PR = 1 : 2
Options:
(a) only (I)
(b) only (II)
(c) either (I) or (II)
(d) the given information is enough to conclude that ∆KLM ~ ∆PQR as ratio of sides is known

2. Leela has a triangular cabinet that fits under his staircase. There are four parallel shelves as shown below.

The total height of the cabinet is 144 cm. What is the maximum height of a book that can stand upright on the bottom-most shelf?
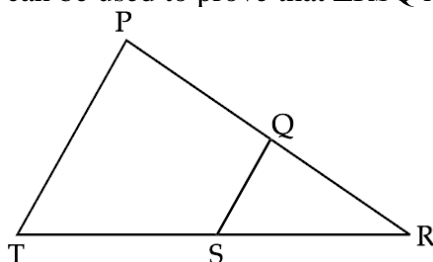(a) 18 cm   (b) 36 cm   (c) 54 cm   (d) 86.4 cm

3. In the given figure, ΔABC ~ ΔQPR. If AC = 6 cm, BC = 5 cm, QR = 3 cm and PR = x; then the value of x is:
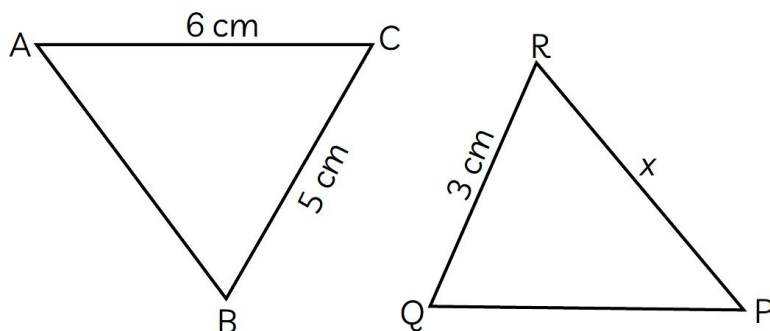

(a) 3.6 cm   (b) 2.5 cm   (c) 10 cm   (d) 3.2 cm

4. In the following figure, Q is a point on PR and S is a point on TR. QS is drawn and ∠RPT = ∠RQS. Which of these criteria can be used to prove that ΔRSQ is similar to ΔRTP?


(a) AAA similarity criterion   (b) SAS similarity criterion
(c) SSS similarity criterion   (d) RHS similarity criterion

5. Shown below are three triangles. The measures of two adjacent sides and included angle are given for each triangle.
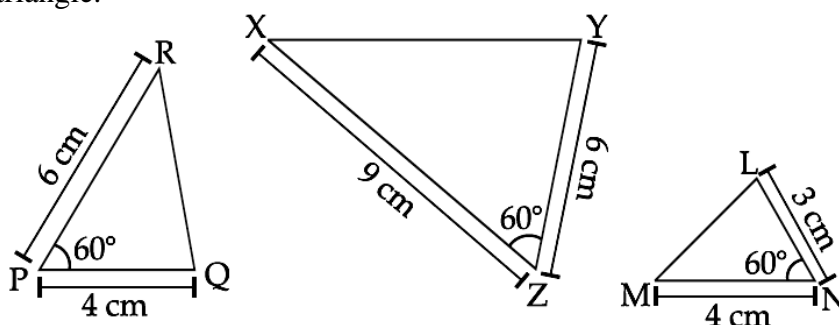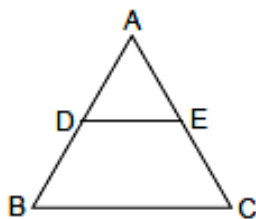

(a) ΔRPQ and Δ XZY
(b) ΔRPQ and Δ MNL
(c) ΔXZY and Δ MNL
(d) ΔRPQ, Δ XZY and Δ MNL are similar to one another.

6. In the following figure, ST || QR, point S divides PQ in the ratio 4 : 5. If ST = 1.6 cm, what is the length of QR?
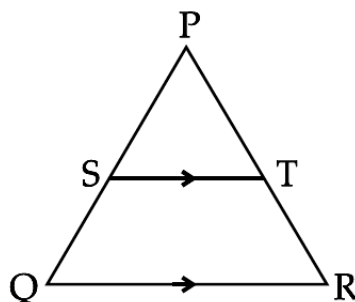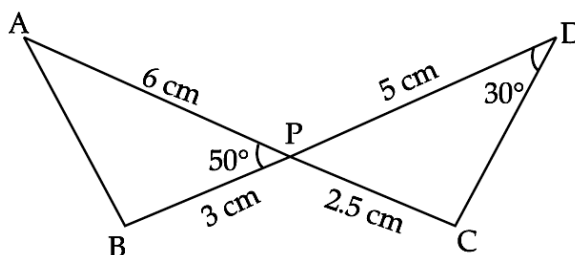

(a) 0.71 cm   (b) 2 cm   (c) 3.6 cm   (d) cannot be calculated from the given data.

7. In the given figure, DE ∥ BC, AE = a units, EC = b units, DE = x units and BC = y units. Which of the following is true?

(a) $x = \dfrac{a+b}{ay}$ (b) $y = \dfrac{ax}{a+b}$ (c) $x = \dfrac{ay}{a+b}$ (d) $\dfrac{x}{y} = \dfrac{a}{b}$

8. In the figure given below, two line segments AC and BD intersect each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm, ∠APB = 50° and ∠CDP = 30°. Then, ∠PBA is equal to:

(a) 50° (b) 30° (c) 60° (d) 100°

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

9. Assertion (A): D and E are points on the sides AB and AC respectively of a ΔABC such that DE∥BC then the value of x is 4, when AD = x cm, DB = (x – 2) cm, AE = (x + 2) cm and EC = (x – 1) cm.
Reason (R): If a line is parallel to one side of a triangle then it divides the other two sides in the same ratio.

10. Assertion (A): D and E are points on the sides AB and AC respectively of a ΔABC such that AB = 10.8cm, AD = 6.3cm, AC = 9.6cm and EC = 4cm then DE is not parallel to BC.
Reason (R): If a line divides any two sides of a triangle in the same ratio then it is parallel to the third side.
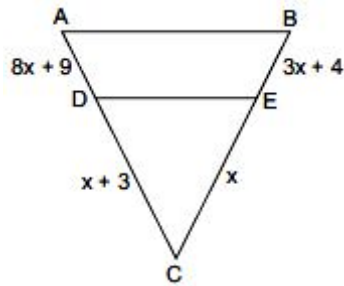
SECTION – B
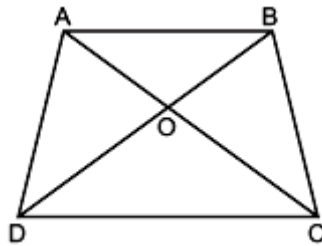**Questions 11 to 14 carry 2 marks each.**

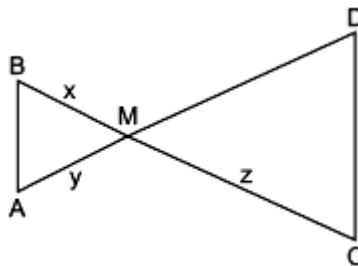**11.** In the given figure, considering triangles BEP and CPD, prove that BP × PD = EP × PC.
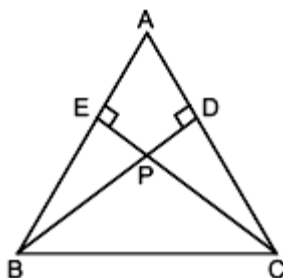
12. What value(s) of *x* will make DE || AB in the given figure?

13. In the given figure, $\dfrac{AO}{OC} = \dfrac{BO}{OD} = \dfrac{1}{2}$ and AB = 4 cm. Find the value of DC.

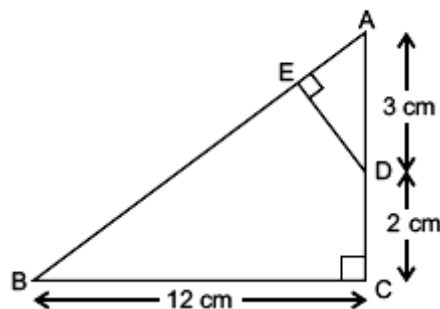**14.** In the given figure, ΔAMB ~ ΔCMD.

Determine MD in terms of *x*, *y* and *z*.

SECTION – C
Questions 15 to 17 carry 3 marks each.

15. In figure, ΔABC is right angled at C and DE ⊥ AB. Prove that ΔABC ~ ΔADE and hence find the lengths of AE and DE.

16. In figure, M is mid-point of side CD of a parallelogram ABCD. The line BM is drawn intersecting AC at L and AD produced at E. Prove that EL = 2BL.
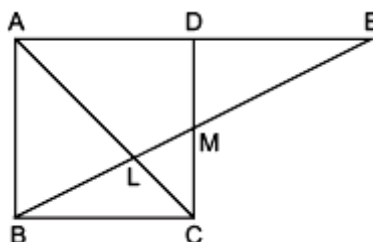
17. In an isosceles ΔABC, the base AB is produced both ways to P and Q such that $AP \times BQ = (AC)^2$. Prove that ΔACP ~ ΔBCQ.

SECTION – D
Questions 18 carry 5 marks.

18. If a line is drawn parallel to one side of a triangle, the other two sides are divided in the same ratio, prove it. Use this result to prove the following :

In figure, D and E are points on AB and AC respectively, such that DE ∥ BC. If $AD = \dfrac{1}{3}$ BD, AE = 4.5 cm, find EC.
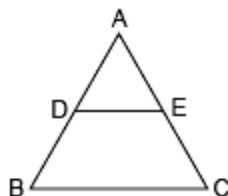
SECTION – E (Case Study Based Questions)
Questions 19 to 20 carry 4 marks each.

19. While browsing through the catalogue of wooden shelves, Karthik came across this beautiful triangular shaped shelf. In the shelf, DE is parallel to the base BC could be used for displaying small plants and showpieces.


(a) Find the relation between the sides AD, DB, AE and EC. Also, mention the theorem used. (1)
(b) With measurement AE = 1.8 cm, BD = 7.2 cm and CE = 5.4 cm. Karthik thought of finding the length of side AD from the given figure of shelf. How he will find the length. (1)
(c) Find the value of x if AD = (x + 3) cm, BD = (3x + 19) cm, AE = x cm and EC = (3x + 4) cm. (2)

OR

(c) If AB = 9 cm, AC = 18 cm, AD = 2 cm and AE = 4 cm, then prove that DE ∥ BC. (2)

20. Anjali placed a light bulb at a point O on the ceiling and directly below it placed a table. He cuts a polygon, say a quadrilateral PQRS, from a plane cardboard and place this cardboard parallel to the ground between the lighted bulb and the table. Then a shadow of PQRS is cast on the table as P′Q′R′S′. Quadrilateral P′Q′R′S′ is an enlargement of the quadrilateral PQRS with scale factor 1 : 3. Given that PQ = 2.5 cm, QR = 3.5 cm. RS = 3.4 cm and *PS* = 3.1 cm; ∠P = 115°, ∠Q = 95°, ∠R = 65° and ∠S = 85°.
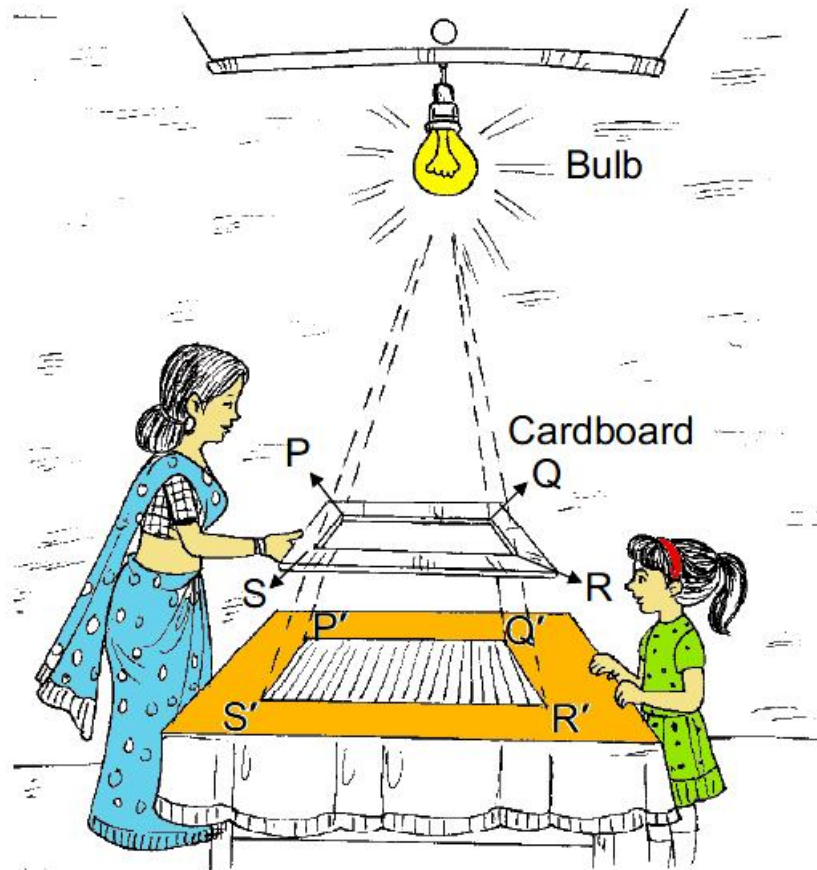
(a) Find the length of R′S′. (1)
(b) Find the measurement of ∠Q′ (1)
(c) Find the ratio of sides P′Q′ and Q′R′. (2)

OR

(c) Find the sum of the lengths Q′R′ and P′S′. (2)