PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 15 : Similarity

(Geometry : Similar Triangles, Basic Proportionality, Areas of Similar Triangles, Maps and Models)

Maximum Marks: 40 ***Time allowed: One and a half hours***

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the question paper.*
3. ***The time given at the head of this Paper is the time allowed for writing the answers.***
4. *Attempt* ***all*** *questions from* ***Section A*** *and* ***any two*** *questions from* ***Section B****.*
5. ***All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.***
6. ***Omission of essential working will result in loss of marks.***
7. *The intended marks for questions or parts of questions are given in brackets [ ].*
8. *Notation: ΔABC ~ ΔPQR means the triangles are similar with the vertices written in order of correspondence; k denotes the scale factor. Figures are not necessarily drawn to scale.*

Question 1

Choose the correct answers to the questions from the given options. [8]

(Do not copy the question, write the correct answers only.)

(i) ΔABC ~ ΔPQR, AB = 6 cm, PQ = 9 cm and BC = 8 cm. Then QR is:

(a) 10 cm
(b) 12 cm
(c) 16/3 cm
(d) 14 cm

(ii) The areas of two similar triangles are in the ratio 4 : 9. The ratio of their corresponding sides is:

(a) 4 : 9
(b) 16 : 81
(c) 2 : 3
(d) 3 : 2

(iii) In ΔABC, D and E lie on AB and AC and DE ∥ BC. If AD = 4 cm, DB = 6 cm and AE = 6 cm, then EC is:

(a) 9 cm
(b) 8 cm
(c) 10 cm
(d) 12 cm

(iv) On a map drawn to a scale of 1 : 50,000, two towns are 4 cm apart. The actual distance between them is:

(a) 0.2 km
(b) 2 km
(c) 20 km
(d) 200 km

(v) A model is made to a scale factor 1/4. If the volume of the actual object is 640 cm³, the volume of the model is:

(a) 160 cm³
(b) 40 cm³
(c) 10 cm³
(d) 2.5 cm³

(vi) ΔABC ~ ΔDEF and their areas are in the ratio 25 : 36. If the perimeter of ΔABC is 30 cm, the perimeter of ΔDEF is:

(a) 36 cm
(b) 43.2 cm
(c) 25 cm
(d) 24 cm

(vii) **Assertion (A):** Any two similar triangles are congruent.

Reason (R): Two triangles are similar if their corresponding angles are equal and their corresponding sides are proportional.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

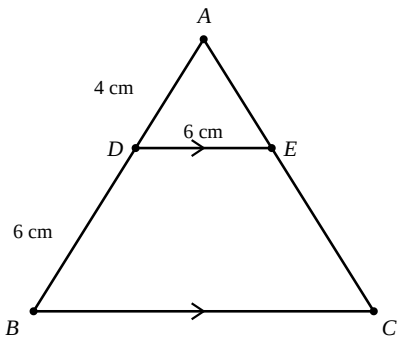
(viii) **Assertion (A):** In a triangle ABC right-angled at B, if BD ⊥ AC, then $BD^2 = AD \times DC$.

Reason (R): The perpendicular from the right-angle vertex to the hypotenuse divides the triangle into two triangles similar to each other and to the whole triangle.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

Question 2

(i) In the figure, DE ∥ BC, AD = 4 cm, DB = 6 cm and DE = 6 cm. (a) Prove that ΔADE ~ ΔABC. (b) Find BC. (c) Find the ratios Area(ΔADE) : Area(ΔABC) and Area(ΔADE) : Area(trapezium DBCE). [4]



(ii) On a map drawn to a scale of 1 : 25,000, a rectangular field measures 8 cm by 5 cm. Find (a) the actual length and breadth of the field in km, (b) the actual area of the field in sq. km. [4]

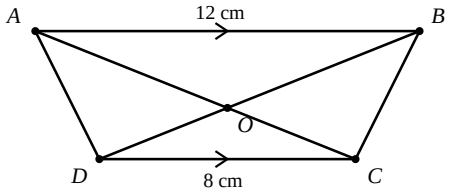
(iii) Two similar triangles have areas 54 cm² and 96 cm². A side of the smaller triangle is 9 cm. Find the corresponding side of the larger triangle. Also find the ratio of the perimeters of the two triangles. [4]

SECTION B (20 Marks)

*(Attempt **any two** questions from this Section.)*

Question 3

In the figure, ABCD is a trapezium in which AB ∥ DC. The diagonals AC and BD intersect at O. AB = 12 cm and CD = 8 cm.



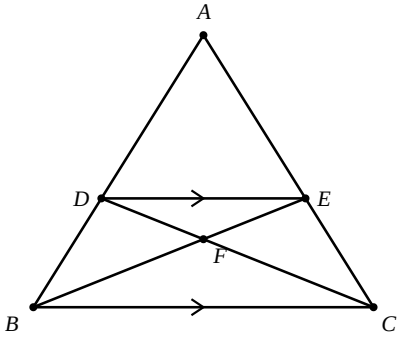
(i) Prove that ΔAOB ~ ΔCOD. [3]

(ii) If AC = 15 cm, find the lengths of OA and OC. [3]

(iii) If the area of ΔCOD is 16 cm², find the area of ΔAOB and the area of ΔAOD. [4]

Question 4

In the figure, D and E lie on AB and AC such that DE ∥ BC and AD : DB = 3 : 2. The lines BE and CD intersect at F.



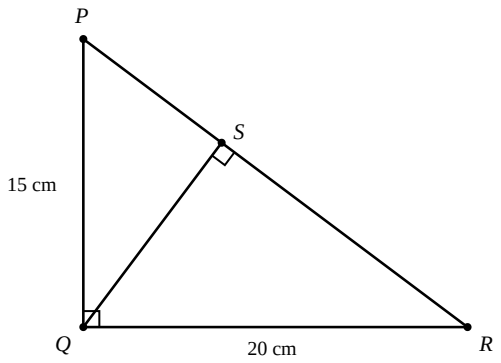
(i) Find the ratios DE : BC and AE : EC. [3]

(ii) Prove that ΔDEF ~ ΔCBF and hence find EF : FB. [3]

(iii) If the area of ΔDEF is 27 cm², find the area of ΔCBF and the area of ΔDEC. [4]

Question 5

In the figure, ΔPQR is right-angled at Q and QS ⊥ PR. PQ = 15 cm and QR = 20 cm.



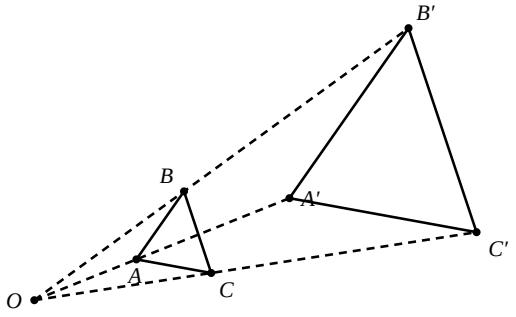
(i) Prove that ΔPQS ~ ΔPRQ. [3]

(ii) Find PR, PS and QS. [3]

(iii) Find the area of ΔPQR, the area of ΔPQS and the area of ΔQSR. [4]

Question 6

(i) In the figure, ΔA′B′C′ is an enlargement of ΔABC with centre O. OA = 4 cm and AA′ = 6 cm. Find the scale factor. If AB = 7 cm, find A′B′. If the area of ΔABC is 12 cm², find the area of ΔA′B′C′. [3]



(ii) On a map drawn to a scale of 1 : 40,000, a plot of land is a right-angled triangle with sides 3 cm, 4 cm and 5 cm. Find the actual length of the longest side in km and the actual area of the plot in sq. km. [3]

(iii) A model of a building is made to a scale of 1 : 50. (a) The building is 24 m high. Find the height of the model in cm. (b) The floor area of a room in the model is 40 cm². Find the floor area of the actual room in m². (c) The volume of the room in the model is 72 cm³. Find the volume of the actual room in m³. [4]

— End of Question Paper —