PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 7 : Ratio and Proportion

(Including Properties and Uses)

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. *Ratios must be written in their lowest terms unless otherwise stated. In proofs, every step must be justified.*

SECTION A (20 Marks)

*(Attempt **all** questions from this Section.)*

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) If a : b = 3 : 4, then (2a + b) : (a + 2b) is:

(a) 10 : 11
(b) 11 : 10
(c) 2 : 3
(d) 5 : 6

(ii) The duplicate ratio of 4 : 5 is:

(a) 2 : √5
(b) 8 : 10
(c) 16 : 25
(d) 64 : 125

(iii) The mean proportional between 4 and 25 is:

(a) 10
(b) 14.5
(c) 20
(d) 100

(iv) **Assertion (A):** If a : b = c : d, then (a + b) : (a − b) = (c + d) : (c − d).

Reason (R): Adding 1 to, and subtracting 1 from, both sides of a/b = c/d and then dividing the two results gives this property.

(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).

(v) The third proportional to 4 and 6 is:

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

(vi) A price increases in the ratio 4 : 5. If the new price is ₹ 150, the original price is:

(a) ₹ 100
(b) ₹ 112.50
(c) ₹ 120
(d) ₹ 187.50

(vii) If x : y = 3 : 5, then (x + y) : (y − x) is:

(a) 4 : 1
(b) 1 : 4
(c) 8 : 3
(d) 2 : 1

(viii) **Assertion (A):** The numbers 3, 4, 6 and 9 are in proportion.

Reason (R): Four numbers a, b, c, d are in proportion if $a \times d = b \times c$.

(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) If $(7x + 2y) : (3x + 4y) = 10 : 9$, find $x : y$. Hence find the ratio $(3x + y) : (x + 2y)$. [4]

(ii) The ages of two brothers are in the ratio 5 : 3. After 6 years, the ratio of their ages will be 7 : 5. Find their present ages. [4]

(iii) Find the ratio compounded of the duplicate ratio of 2 : 3, the reciprocal ratio of 5 : 12 and the sub-duplicate ratio of 49 : 36. [4]

SECTION B (20 Marks)

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

Question 3

(i) Divide ₹ 1,750 among A, B and C such that A : B = 2 : 3 and B : C = 4 : 5. [3]

(ii) What quantity must be added to each term of the ratio 7 : 11 so that it becomes 3 : 4? [3]

(iii) The incomes of two persons are in the ratio 5 : 4 and their expenditures are in the ratio 3 : 2. If each saves ₹ 1,200 per month, find their monthly incomes. [4]

Question 4

(i) Find: [3]

(a) the fourth proportional to 4, 9 and 12

(b) the mean proportional between 0.2 and 1.8

(c) the third proportional to 2.5 and 3.5

(ii) What number must be subtracted from each of 7, 11 and 19 so that the remainders are in continued proportion? [3]

(iii) The mean proportional between two numbers is 10 and the third proportional to them is 80. Find the numbers. [4]

Question 5

(i) If a : b = c : d, prove that (5a + 2c) : (5b + 2d) = (a − 4c) : (b − 4d). [3]

(ii) If a, b and c are in continued proportion, prove that $(a + b + c)(a - b + c) = a^2 + b^2 + c^2$. [3]

(iii) If a, b, c and d are in proportion, prove that $(a^2 + ab + b^2) : (c^2 + cd + d^2) = (a^2 - ab + b^2) : (c^2 - cd + d^2)$. [4]

Question 6

(i) If (6x + 5y) : (6x − 5y) = 3 : 1, use componendo and dividendo to find x : y. [3]

(ii) Using properties of proportion, solve for x: $\frac{\sqrt{(2x+3)} + \sqrt{(2x-3)}}{\sqrt{(2x+3)} - \sqrt{(2x-3)}} = 3$. [3]

(iii) Using properties of proportion, solve for x: $\frac{(x+2)^3 + (x-2)^3}{(x+2)^3 - (x-2)^3} = \frac{9}{7}$. [4]

— End of Question Paper —