CLASS VIII – MATHEMATICS

Chapter Test: Proportional Reasoning-2 – Step-by-Step Solutions & Marking Scheme

(Ganita Prakash, Grade 8, Part II – Chapter 3)

M. M.: 40 | Marks for each step are shown in square brackets.

Section A – Multiple Choice Questions (1 mark each)

Q.	Ans.	Solution
1	**(C)**	Angle = (30/120) × 360° = (1/4) × 360° = **90°**.
2	**(A)**	Blue = 3 parts = 15 L, so 1 part = 5 L; white = 5 parts = **25 litres**.
3	**(D)**	Total parts = 3 + 5 + 7 = 15; one part = 150 ÷ 15 = 10; largest = 7 × 10 = **70**.
4	**(B)**	xy is constant: 6 × 20 = 120 = 15 × y, so y = 120 ÷ 15 = **8**.
5	**(C)**	Parts = 2 + 3 + 4 = 9; largest angle = (4/9) × 180° = **80°**.
6	**(A)**	More workers → fewer days (inverse): 12 × 10 = 15 × d, d = 120 ÷ 15 = **8 days**.
7	**(D)**	For a fixed route, speed × time = distance is constant, so speed and time are in inverse proportion. The other pairs are direct proportions.
8	**(B)**	Divide each term by the HCF 2: 4 : 6 : 10 = **2 : 3 : 5**.
9	**(D)**	Parts = 2 + 3 + 5 = 10; one part = 60 ÷ 10 = 6 m; longest piece C = 5 × 6 = **30 m**.
10	**(A)**	RF 1 : 5,00,000 means 1 cm = 5,00,000 cm = 5 km. So 4 cm = 4 × 5 = **20 km**.

Section B – Very Short Answer Questions (2 marks each)

Q11. Pie chart of fruits (Fig. 3)

(i) Mango angle = 144°; fraction = 144/360 = **2/5**. Number = (2/5) × 800 = **320 people**. [1]

(ii) Banana: (72/360) × 800 = (1/5) × 800 = **160 people**. [1]

Q12.

(A) More taps → less time, so inverse proportion: 5 × 12 = 8 × t. [1]

t = 60 ÷ 8 = **7.5 hours**. [1]

(B) Products: 4 × 40 = 160, 8 × 20 = 160, 16 × 10 = 160. [1]

The product xy is the same constant (160), so x and y are **in inverse proportion**. [1]

Q13.

Chillies: 3 parts → 9 spoons, so the multiplying factor is 9 ÷ 3 = 3. [1]

Coriander = 6 × 3 = **18 spoons**; *toor dal* = 2 × 3 = **6 spoons**. [1]

Section C – Short Answer Questions (3 marks each)

Q14. Map of villages (Fig. 4)

(i) 1 cm = 4,00,000 cm = 4,000 m = **4 km**. [1]

(ii) AB = 3 × 4 = **12 km**; BC = 5 × 4 = **20 km**; AC = 4 × 4 = **16 km**. [1]

(iii) Total = 12 + 20 + 16 = **48 km**. [1]

Q15.

(A) Total parts = 2 + 3 + 4 = 9; one part = 7200 ÷ 9 = ₹800. [1]

Arun = 2 × 800 = **₹1,600**; Bina = 3 × 800 = **₹2,400**. [1]

Chitra = 4 × 800 = **₹3,200**. (Check: 1600 + 2400 + 3200 = 7200.) [1]

(B) Sum of angles = 180°; parts = 3 + 4 + 5 = 12; one part = 180° ÷ 12 = 15°. [1]

Angles: 3 × 15° = **45°**, 4 × 15° = **60°**, 5 × 15° = **75°**. [1½]

Check: 45 + 60 + 75 = 180°. [½]

Q16.

(A) Ratio 40 : 30 : 20 : 10 : 20 with total 120; 360° ÷ 120 = 3° per student. [1]

Cricket 40 × 3 = **120°**; Football 30 × 3 = **90°**; Hockey 20 × 3 = **60°**; Tennis 10 × 3 = **30°**; Chess 20 × 3 = **60°**. [1½]

Sum = 120 + 90 + 60 + 30 + 60 = 360° ✓. [½]

(B) Maths: (90/360) × 720 = (1/4) × 720 = **180 students**. [1½]

Science: (144/360) × 720 = (2/5) × 720 = **288 students**. [1½]

Q17.

(A) Fewer days needs more men: inverse proportion, so 15 × 24 = x × 18. [1½]

x = 360 ÷ 18 = **20 men**. [1½]

(B) In 1 hour A does 1/6 of the work and B does 1/3 of the work. [1]

Together in 1 hour: 1/6 + 1/3 = 1/6 + 2/6 = 3/6 = 1/2 of the tank. [1]

So the full tank takes 1 ÷ (1/2) = **2 hours**. [1]

Section D – Long Answer / Case-based Questions (4 marks each)

Q18.

(A) (i) The largest angle is 150° (Bus), so **bus** is the most common mode. [1]

(ii) Car = 48/360 = **2/15**. [1]

(iii) 2/15 of the children = 24, so total = 24 × 15/2 = **180 children**. [1]

(iv) Cycle = (72/360) × 180 = (1/5) × 180 = **36 children**. [1]

(B) (i) Parts = 1 + 2 + 4 = 7; one part = 2800 ÷ 7 = 400 kg. [1]

Cement = **400 kg**, sand = 2 × 400 = **800 kg**, gravel = 4 × 400 = **1600 kg**. [1]

(ii) Sand = 2 parts = 600 kg, so one part = 300 kg. [1]

Total concrete = 7 × 300 = **2,100 kg** (cement 300 kg, gravel 1,200 kg). [1]

Q19.

(A) (i) Total food, i.e. (number of students) × (number of days) = 60 × 25 = **1500** student-days. [1]

(ii) Students become 75: **75 × d = 60 × 25** (inverse proportion). [1]

(iii) d = 1500 ÷ 75 = **20 days**. [1]

(iv) Students become 40: days = 1500 ÷ 40 = **37.5 days**. [1]

(B) (i) A fills **1/4** of the tank in 1 hour. [1]

(ii) B fills **1/12** of the tank in 1 hour. [1]

(iii) Together: 1/4 + 1/12 = 3/12 + 1/12 = 4/12 = **1/3**. [1]

(iv) 1/3 of the tank per hour, so the tank takes **3 hours**. [1]

Q20. Case Study: School trip

(i) Speed × time = 240 (constant). At 48 km/h: time = 240 ÷ 48 = **5 hours**. [1]

(ii) Speed = 240 ÷ 3 = **80 km/h**. [1]

(iii) x × 6 = 240, so x = **40 km/h**. [1]

(iv) 240 km = 240 × 1,00,000 cm = 2,40,00,000 cm. Map distance = 2,40,00,000 ÷ 30,00,000 = **8 cm**. [1]

Note for teachers: Award full marks for any correct alternative method (for example the unitary method for direct and inverse proportion). In Q19(B) accept any correct treatment of 'work done per hour'. Units must be stated in the final answers.