CLASS IX – MATHEMATICS

Chapter Test: How Quantities Combine – Understanding Data

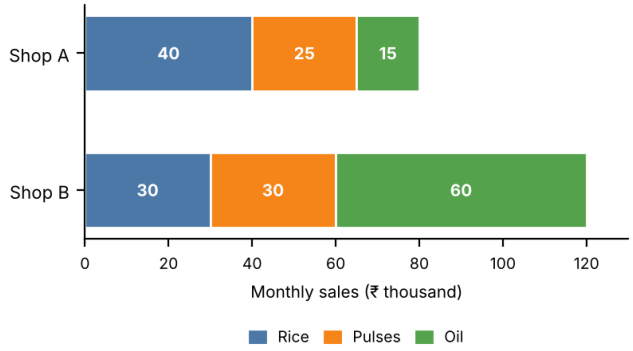
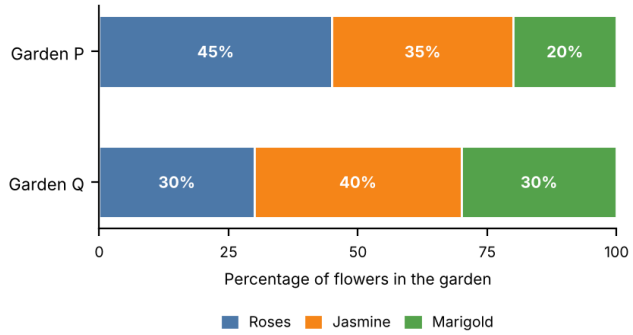
(Ganita Manjari, Grade 9, Part II – Chapter 10)

Time: 1½ Hours **M. M.: 40**

General Instructions:

1. This paper contains 21 questions. All questions are compulsory.
2. This paper is divided into 5 sections: **A, B, C, D** and **E**.
3. In **Section A**, Questions no. **1** to **10** are MCQs and questions no. **11** and **12** are Assertion-Reason based questions of 1 mark each.
4. In **Section B**, Questions no. **13** to **16** are Very Short Answer type questions carrying 2 marks each.
5. In **Section C**, Questions no. **17** and **18** are Short Answer type questions carrying 3 marks each.
6. In **Section D**, Questions no. **19** and **20** are Long Answer type questions carrying 5 marks each.
7. In **Section E**, Question no. **21** is a case based question carrying 4 marks. Internal choice is provided in the 2 marks part of the case study.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 1 part of Section E.
9. Show all the steps of your working. Figures are not drawn to scale.
10. Use of calculator is **not** allowed.

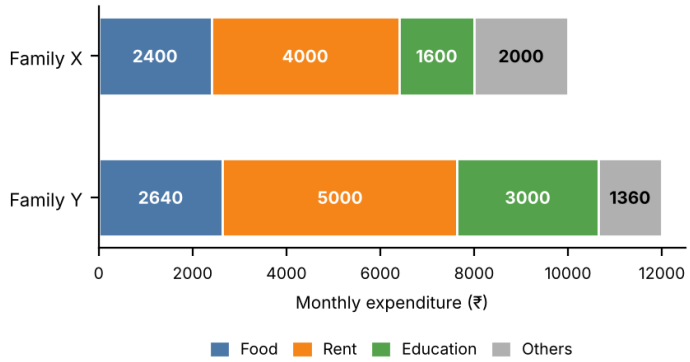
Q. No.	Section – A	Marks
1.	Class A has 20 students with an average mark of 60 and Class B has 30 students with an average mark of 70. The average mark of all 50 students is (A) 64 (B) 65 (C) 66 (D) 68	**[1]**
2.	The average of the averages of two collections gives the correct combined average when (A) the collections have different sizes (B) the collections have the same size (C) one collection is empty (D) the averages are different	**[1]**
3.	300 mL of lemonade with 10% jaggery is mixed with 200 mL of lemonade with 20% jaggery. The concentration of jaggery in the mixture is (A) 15% (B) 12% (C) 16% (D) 14%	**[1]**
4.	A student scores 50, 60 and 80 in internals, project and final exam, which are combined in the ratio 2 : 3 : 5. The weighted average score is (A) 68 (B) 63.3 (C) 70 (D) 65	**[1]**
5.	Equal quantities of 12% and 18% salt solutions are mixed. The concentration of the mixture is (A) 14% (B) 15% (C) 16% (D) 30%	**[1]**
6.	A customer rates food 4, service 5 and ambience 3. The weights for food : service : ambience are 5 : 3 : 2. The combined rating is (A) 3.9 (B) 4.0 (C) 4.1 (D) 4.2	**[1]**
7.	The average of five numbers is 12. A sixth number 18 is added. The new average is (A) 13 (B) 14 (C) 15 (D) 12	**[1]**

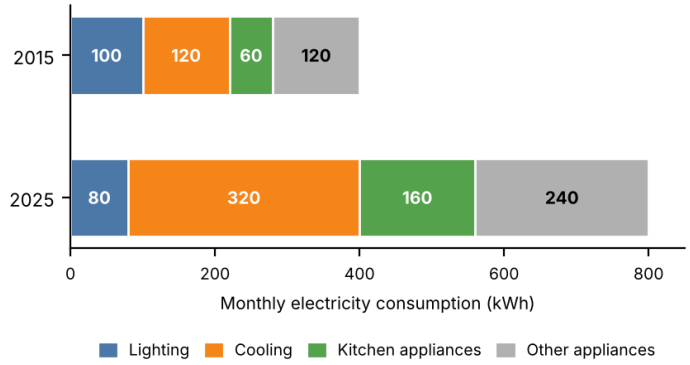
Q. No.	Section – A	Marks
8.	The stacked bar chart shows the monthly sales of two shops. What percentage of Shop B's sales is from oil?  (A) 25% (B) 33% (C) 50% (D) 60%	**[1]**
9.	The 100% stacked bar chart shows the percentage of flowers of each kind in two gardens. Which of the following can be inferred?  (A) Garden P has more roses than Garden Q (B) Garden Q has more jasmine than Garden P (C) Both gardens have the same total number of flowers (D) In Garden P there are more roses than jasmine	**[1]**
10.	To compare totals and also keep track of the parts that make up each total, the most suitable chart is a (A) pie chart (B) stacked bar chart (C) line graph (D) histogram	**[1]**
	Questions number 11 and 12 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below. (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 and 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.	
11.	**Assertion (A):** If 10 students have an average of 40 and 40 students have an average of 60, the average of all 50 students is 50. **Reason (R):** The averages of two collections can be combined by a simple average only when the collections have equal sizes.	**[1]**
12.	**Assertion (A):** Mixing 100 mL of a 10% solution with 100 mL of a 20% solution gives a 15% solution. **Reason (R):** When equal quantities are mixed, the concentration of the mixture is midway between the two concentrations.	**[1]**

Q. No.	Section – B	Marks
13.	In a school, Batch 1 has 24 students with an average mark of 55 and Batch 2 has 16 students with an average mark of 70. Find the average mark of all 40 students.	**[2]**
14.	(A) 400 mL of a salt solution with 5% salt is mixed with 100 mL of a salt solution with 20% salt. Find the concentration of salt in the mixture. **OR** (B) 4 kg of tea costing ₹300 per kg is mixed with 6 kg of tea costing ₹400 per kg. Find the cost per kg of the mixture.	**[2]**
15.	A student scores 70% in internals, 80% in the project and 60% in the final exam. These are combined in the ratio 2 : 3 : 5. Find the annual percentage score.	**[2]**
16.	(A) The average of 9 numbers is 24. A tenth number 34 is included. Find the new average. **OR** (B) After 9 overs a team's run rate is 7 runs per over. In the 10th over it scores 17 runs. Find the run rate after 10 overs.	**[2]**

Q. No.	Section – C	Marks
17.	(A) Batch A of brass weighs 120 kg and is 70% copper. Batch B weighs 80 kg and is 50% copper. They are melted with Batch C, which is 40% copper. The final alloy is 56% copper. Find the weight of Batch C. **OR** (B) A 20-litre solution contains 15% acid. How many litres of water must be added to make it a 10% acid solution?	**[3]**
18.	(A) A stationery shop sold pens worth ₹6,000 at 25% profit and notebooks worth ₹4,000 at 40% profit. Find the overall percentage profit on the total sales. **OR** (B) A stork's average daily flying distance over 15 days is 40 km. On the 16th day it flew 56 km. Find its average daily distance over the 16 days.	**[3]**

Q. No.	Section – D	Marks
19.	(A) A facility has 50 langurs. The average weight of the male langurs is 18 kg, of the female langurs is 14 kg, and of all 50 langurs is 15.6 kg. (i) Let there be x male and y female langurs. Write two equations connecting x and y. [2] (ii) Find the number of male and of female langurs. [2] (iii) Two female langurs weighing 20 kg and 12 kg join the facility. Find the new average weight of the female langurs. [1] **OR** (B) 300 mL of an 8% acid solution is mixed with x mL of a 20% acid solution to get a 12% solution. (i) Form an equation in x. [2] (ii) Solve it to find x. [2] (iii) Find the total volume of the mixture and the quantity of acid in it. [1]	**[5]**

Q. No.	Section – D	Marks
20.	(A) The stacked bar chart shows the monthly expenditure of two families.  (i) Find the total monthly expenditure of each family. [1] (ii) What percentage of its expenditure does each family spend on education? [2] (iii) Family X spends 24% of its expenditure on food and Family Y spends 22%. Does Family X spend more rupees on food than Family Y? Justify. [2] **OR** (B) Ten customers rated a restaurant on a scale of 1 to 5. Food: five gave 5, three gave 4 and two gave 3. Ambience: four gave 4, five gave 3 and one gave 2. Service: one gave 5, two gave 4, two gave 3, four gave 2 and one gave 1. (i) Find the average rating for food, ambience and service. [3] (ii) Find the overall rating if food : ambience : service are weighted 5 : 3 : 2. [2]	**[5]**

Q. No.	Section – E	Marks
21.	**Case Study:** The stacked bar chart shows the average monthly electricity consumption of a household in 2015 and 2025, split by use.  (i) Find the total monthly consumption in 2025. **[1]** (ii) What percentage of the consumption was for cooling in 2015 and in 2025? **[1]** (iii) (A) The share of lighting fell from 25% in 2015 to 10% in 2025. Did the actual lighting consumption fall by the same percentage points? Find the actual values and explain. **[2]** **OR** (iii) (B) In a 100% stacked bar chart, the share of "other appliances" is 30% in both years. Does this mean its actual consumption stayed the same? Justify with the actual values. **[2]**	**[4]**