CLASS IX – SCIENCE PRACTICE PAPER (2026-27)

Chapter 5: Exploring Mixtures and their Separation

Max. Marks: 40 **Time Allowed: 1 hour 30 minutes**

General Instructions:

(i) This question paper consists of **20 questions** in **5 sections (A to E)**. All questions are compulsory. Internal choice is given in some questions.

(ii) **Section A** has 10 questions of 1 mark each: Q1–8 are Multiple Choice Questions and Q9–10 are Assertion–Reason questions.

(iii) **Section B** has 4 Very Short Answer questions of 2 marks each (about 30–40 words).

(iv) **Section C** has 3 Short Answer questions of 3 marks each (about 50–60 words).

(v) **Section D** has 2 Case-Based questions of 4 marks each.

(vi) **Section E** has 1 Long Answer question of 5 marks with an internal choice.

(vii) Questions are competency-based and application-oriented. Show all steps in numerical questions.

(viii) **Questions 2, 6, 12, 16, 19 and 20 are figure-based** and refer to Fig. 1 to Fig. 6.

SECTION A – Objective Questions (10 × 1 = 10 marks)

1 Which of the following pairs contains only homogeneous mixtures? **1**

(A) Brass and muddy water

(B) Vinegar and an aerated drink

(C) Milk and sugar solution

(D) Smoke and fog

2 **[Figure-based]** A laser beam is passed through three beakers X, Y and Z (Fig. 1). The path of the beam is not visible in X but is clearly visible in Y and Z. On standing for an hour, a deposit forms at the bottom of Y, while X and Z show no change. X, Y and Z respectively are: **1**

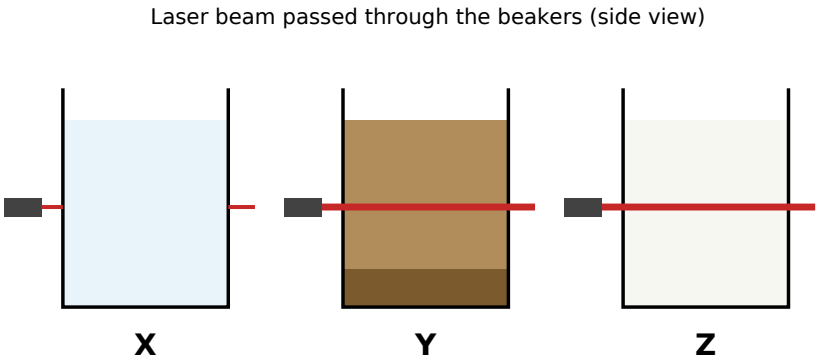


Fig. 1: Laser beam passed through beakers X, Y and Z

(A) solution, colloid, suspension

(B) solution, suspension, colloid

(C) colloid, suspension, solution

(D) suspension, solution, colloid

3 When 20 g of sugar is dissolved in 80 g of water, the mass by mass percentage of the solution formed is: **1**

(A) 25%

(B) 20%

(C) 16.7%

(D) 80%

4 A 250 mL bottle of vinegar is labelled '5% v/v acetic acid'. The volume of acetic acid in the bottle is: **1**

(A) 5 mL
(B) 12.5 mL
(C) 25 mL
(D) 50 mL

5 A mixture of camphor and sand can be most conveniently separated by: **1**

(A) filtration
(B) centrifugation
(C) sublimation
(D) crystallization

6 **[Figure-based]** Fig. 2 shows the solubility curves of two compounds P and Q in water. A saturated solution of P is prepared in 100 g of water at 60 °C and then cooled to 20 °C. The mass of P that crystallizes out is: **1**

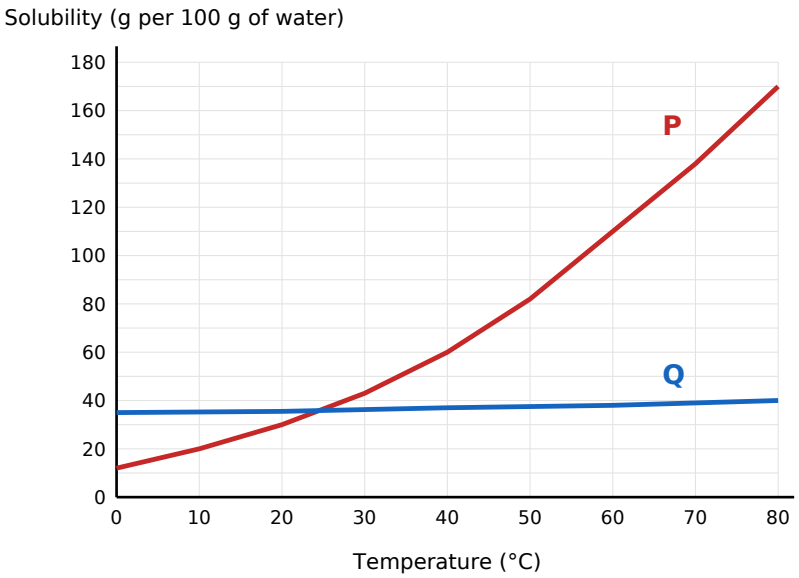


Fig. 2: Solubility curves of P and Q

(A) 30 g
(B) 50 g
(C) 80 g
(D) 110 g

7 Which of the following mixtures will show the Tyndall effect? **1**

(A) Copper sulphate in water
(B) Starch in water
(C) Common salt in water
(D) Acetone in water

8 Powdered alum is added to muddy water because it: **1**

(A) dissolves the mud particles
(B) makes tiny suspended particles clump together and settle
(C) kills the germs in water
(D) changes the boiling point of water

Questions 9 and 10 consist of two statements: Assertion (A) and Reason (R). Choose the correct option:
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, and R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

9 **Assertion (A):** When a hot saturated solution of potassium nitrate is cooled slowly, crystals separate out. **1**

Reason (R): The solubility of most solids in water decreases as the temperature decreases.

10 **Assertion (A):** Milk is a colloid and its particles do not settle on standing. **1**

Reason (R): The particles in a colloid are larger than 1000 nm in diameter.

SECTION B – Very Short Answer Questions (4 × 2 = 8 marks)

11 Differentiate between a **solution** and a **suspension** on any two points. (1 + 1) **2**

12 **[Figure-based]** Fig. 3 shows the set-up used to separate a mixture of acetone (boiling point 56 °C) and water (boiling point 100 °C). **2**

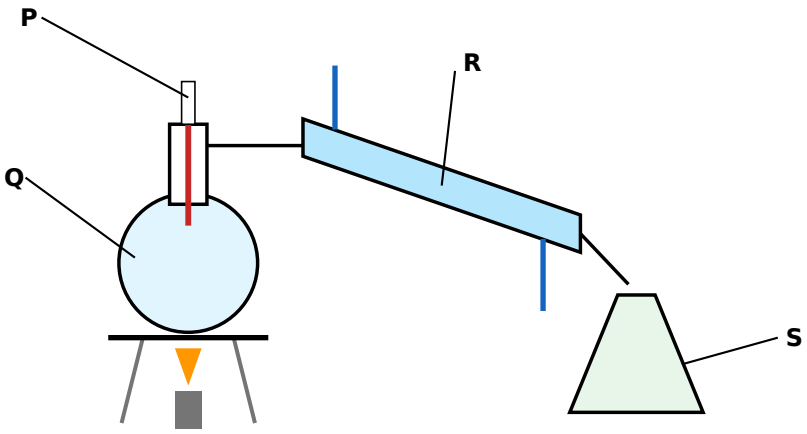


Fig. 3: A laboratory set-up

(a) Name the parts R and S. (1)

(b) Which liquid is collected in S and why? (1)

13 A hand sanitiser is labelled '70% v/v ethanol'. Name the type of concentration expressed and calculate the volume of ethanol present in a 200 mL bottle. (1 + 1) **2**

14 *Attempt either option A or B.* **2**

A. Differentiate between evaporation and crystallization on any two points. (1 + 1)

OR

B. Petrol and kerosene have boiling points that differ by less than 25 °C. Name the method used to separate such liquids and state where it is used industrially. (1 + 1)

SECTION C – Short Answer Questions (3 × 3 = 9 marks)

15 Calculate the concentration of each of the following solutions using a suitable method: (1 + 1 + 1) **3**

(i) 15 g of common salt dissolved in 135 g of water. (% m/m)

(ii) 10 g of glucose dissolved in water to make 200 mL of solution. (% m/v)

(iii) 25 mL of ethanol mixed with water to make 250 mL of solution. (% v/v)

16 **[Figure-based]** A student separates a sample of black ink by paper chromatography. Fig. 4 shows the result. Lane 'Ink' shows three components P, Q and R. Lanes X, Y and Z are three pure dyes spotted on the same baseline. **3**

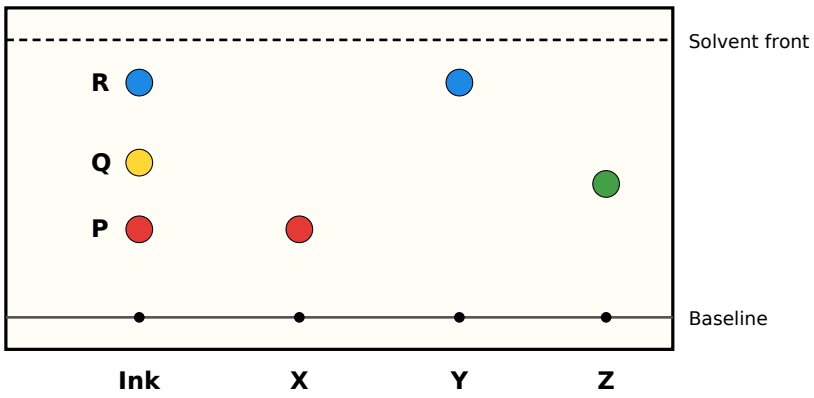


Fig. 4: Chromatogram of a black ink

(i) Which of the dyes X, Y and Z are present in the ink? Give a reason. (1)

(ii) Which component of the ink moves the fastest? (1)

(iii) Why is the baseline drawn with a pencil and why should the solvent level be below the baseline at the start? (1)

17 *Attempt either option A or B.* **3**

A. Describe how you would separate a mixture of mustard oil and water. Name the apparatus and the principle involved, and state the steps. (3)

OR

B. Describe the steps involved in obtaining pure crystals of copper sulphate from an impure sample. (3)

SECTION D – Case-Based Questions (2 × 4 = 8 marks)

18 **Case Study: Intravenous Fluids in a Hospital** **4**

A nurse prepares to give a patient a 500 mL bottle of 5% m/v glucose solution. She also keeps a 200 mL bottle of 0.9% m/v sodium chloride (saline) solution ready. The concentration of an intravenous solution has to be accurate because a wrong concentration can harm the patient.

(i) Calculate the mass of glucose in the 500 mL bottle. (1)

(ii) Calculate the mass of sodium chloride in the 200 mL saline bottle. (1)

(iii) Why is the concentration of such fluids expressed as mass by volume percentage and not as mass by mass percentage? (1)

(iv) What volume of 5% m/v glucose solution contains 7.5 g of glucose? (1)

19 Case Study: A Village Water Treatment Plant **4**

[Figure-based] A village gets its water from a muddy pond. The water is treated in the plant shown in Fig. 5. In tank P powdered alum is added to the muddy water. The water then flows slowly to tank Q and then through the sand filter R to the storage tank S.

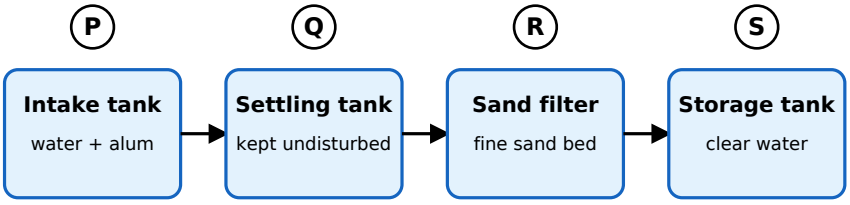


Fig. 5: Stages in a water treatment plant

(i) Name the process that takes place in P and the role of alum in it. (1)

(ii) What happens in tank Q? Name the method of separating the clear water from the settled impurities. (1)

(iii) Name the type of mixture that the muddy water is, and state why filtration alone is often not enough to clear it. (1)

(iv) The clear water in S shows no Tyndall effect. What does this tell us about the particles still present in it? (1)

SECTION E – Long Answer Question (1 × 5 = 5 marks)

20 **[Figure-based]** Fig. 6 shows the flow chart used by a student to separate the components of a mixture of camphor, sand and common salt. Steps are marked P, Q and R and the products X, Y and Z. **5**

Attempt either option A or B.

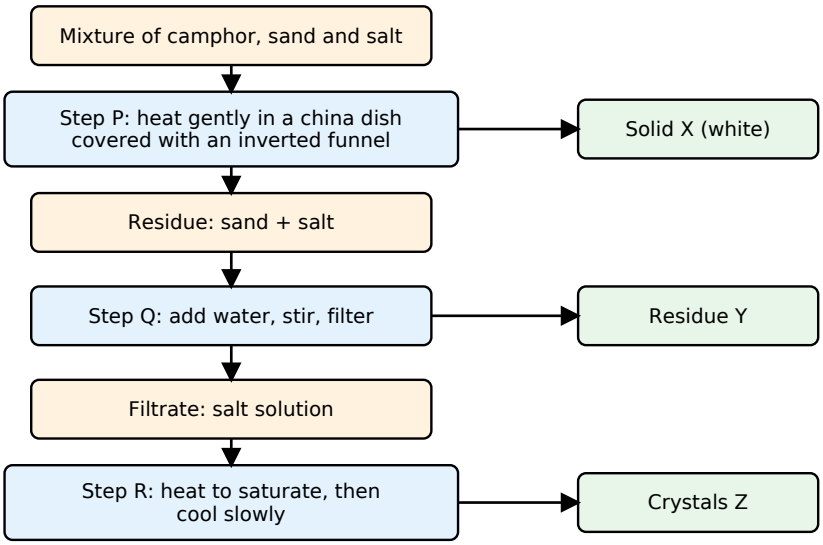


Fig. 6: Separation of camphor, sand and common salt

A.

(i) Name the process in step P. Also name the process by which camphor vapours turn back into a solid on the funnel wall. (1)

(ii) Identify X, Y and Z. (1)

(iii) Name the technique used in step Q and the property of sand that makes it possible. (1)

(iv) Name the process in step R. Why is it preferred to heating the filtrate to dryness? (1)

(v) Why should the heating in step P be gentle and not strong? (1)

OR

B. The student started with 50 g of the mixture and obtained 10 g of X, 15 g of Y and 25 g of Z.

(i) Calculate the mass percentage of camphor (X) in the mixture. (1)

(ii) The student dissolves the 25 g of Z in 75 g of water. Find the mass by mass percentage of the solution. (1)

(iii) What mass of salt is present in 200 g of this solution? (1)

(iv) Why could step P not be used to separate sand from salt? (1)

(v) Name the process in step R and state one advantage over evaporating the filtrate to dryness. (1)

***** END OF QUESTION PAPER *****