INDIAN SCHOOL AL WADI AL KABIR

Class: IX	Department: SCIENCE 2022-23	Date:
Worksheet No.: 1 with answers	Topic: CHEMISTRY IS MATTER AROUND US PURE?	Note: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

MULTIPLE CHOICE QUESTIONS (1 MARK)

1. Two chemical species X and Y chemically combine together to form a product P which contains both X and Y
   X + Y → P
   X and Y cannot be broken down into simpler substances by simple chemical reactions.
   Which of the following concerning the species X, Y and P are correct?
   i. P is a compound
   ii.X and Y are compounds
   iii.X and Y are elements
   iv.P has a fixed composition
   a.   (i), (ii) and (iii)
   b.   (i), (ii) and (iv)
   c.   (ii), (iii) and (iv)
   d.   (i), (iii) and (iv)

2. Shaving cream produces foam. What kind of colloid is shaving cream?
   a.   Liquid dispersed in a gas
   b.   Gas dispersed in a liquid
   c.   Solid dispersed in a liquid
   d.   Solid dispersed in a gas

3. Two substances A and B when reacted together form a substance C with the evolution of heat. The properties of C are entirely different from those of A and B. The substance C is:
   a.   A compound
   b.   An element
   c.   A mixture
   d.   None of the above

4. Which of the following is an example of a homogeneous substance?
   a.   Granite
   b.   Copper sulphate
   c.   Salt and sand
   d.   Muddy water

5. Tincture of iodine has antiseptic properties. This solution is made by dissolving
a.   Iodine in potassium iodide
b.   Iodine in Vaseline
c.   Iodine in water
d.   Iodine in alcohol

6. What is the name of the metal which exists in liquid state at room temperature?
a.   Sodium
b.   Potassium
c.   Mercury
d.   Bromine

7. In sugar solution,
a.   Sugar is solute, water is solvent
b.   Sugar is solvent, water is solute
c.   Both are solutes
d.   Both are solvents.

ASSERTION REASON TYPE QUESTIONS (I MARK)

For the following questions, two statements are given- one labelled *Assertion* (A) and theother labelled *Reason* (R). Select the correct answer to these questions from the codes (i),(ii), (iii) and (iv) as given below

(i) Both A and R are true and R is the correct explanation of the assertion.
(ii) Both A and R are true but R is not the correct explanation of the assertion.
(iii)A is true but R is false.
(iv)A is false but R is true.

8. Assertion: Elements and compounds are pure substances.
      Reason: Properties of compounds are different from those of its constituent
            elements.

9. Assertion: A solution can scatter a beam of light passing through it.
      Reason: The particles of solution are smaller than 1nm in diameter.

10. Assertion: A solution of table salt in a glass of water is homogeneous.
      Reason: A solution having different composition throughout is homogeneous.

1 MARK QUESTIONS (OBJECTIVE TYPE QUESTIONS)

11. Give an example of solid in liquid solution.
12. Give an example of a gas in liquid solution.
13. Define concentration of a solution.

14. How can we say that sugar is a pure substance whereas milk is not?
15. Name the three categories in which elements can be normally divided.
16. Smoke and fog both are aerosols. In what way are they different? [NCERT Exemplar]

2 MARKS QUESTIONS

17. Prachi took 50 mL of water in two beakers at room temperature and added sodium chloride to one beaker while sugar to the other, till no more solute would be dissolved. Then she heated the contents of the beakers and added more solutes in them.
  (a) Will the amount of salt and sugar that can be dissolved in water at given temperature same?
  (b) What will you expect to happen if she cools the contents of the beakers? Justify your answer.

3 MARKS QUESTIONS

18. Write one point of difference between concentration and solubility. What is the effect of temperature on the rate of solubility?
19. Identify the dispersed phase and dispersing medium in the following colloids.
    a) Fog
    b) Cheese
    c) Coloured gemstone
20. Describe any three properties of colloid.
21. Classify the following into metals, non-metals and metalloids:
    a) Germanium
    b) Boron
    c) Diamond
    d) Iodine
    e) Copper
    f) Helium.

5 MARKS QUESTIONS

22. Rahul and Manav each were given a mixture of iron fillings and Sulphur powder. Rahul heated the mixture strongly and a new substance was formed. Write three points of difference between the two.
23. Three students A, B and C prepared mixtures using chalk powder, common salt and milk respectively in water. Whose mixture:
    i) would not leave residue on filter paper after filtration?
    ii) would show Tyndall effect?
    iii) would give transparent/clear solution?
    iv) would settle down at the bottom when left undisturbed?
    v) could be filtered by filter paper?

24. Classify the following into elements, compounds and mixtures.
    i)   Pure sand
    ii) Air
    iii) Ammonia gas
    iv) Ice
    v)   Glass
    vi) CaO

25. Explain the following giving examples:
    i)   Saturated solution
    ii) Pure substance
    iii) Colloid
    iv) Suspension

NUMERICAL BASED QUESTIONS

26. 0.5 g of salt is dissolved in 25 g of water. Calculate the mass percentage amount of the salt in the solution.

27. A solution of urea in water contains 16 grams of it in 120 grams of solution. Find out the mass percentage of the solution.

28. A solution has been prepared by mixing 5.6 mL of alcohol with 75 mL of water. Calculate the percentage (by volume) of alcohol in the solution.

29. During an experiment the students were asked to prepare a 10% (Mass/Mass) solution of sugar in water. Ramesh dissolved 10 g of sugar in 100 g of water while Sarika prepared it by dissolving 10 g of sugar in water to make 100 g of the solution. [NCERT Exemplar]
    a) Are the two solutions of the same concentration?
    b) Compare the mass % of the two solutions.

30. Calculate the mass of sodium sulphate required to prepare its 20% (mass per cent) solution in 100 g of water. [NCERT Exemplar]

31. Calculate the mass of water and glucose required to make 250 g of 40% solution of glucose.

32. How much water should be mixed with 12 mL of alcohol so as to obtain 12% alcohol solution?

PREVIOUS YEAR QUESTIONS

33. A solution is prepared by adding 40 g of sugar in 100 g of water. Calculate the concentration in terms of mass by mass percentage of solution.
34. What is Tyndall effect? Why the solution of copper sulphate does not show Tyndall effect?
35. How Tyndall effect can be observed in the canopy of a dense forest.

36. Give two reason to support the statement that CO_2 is a compound and not a mixture.
37. Classify the following as pure substance or a mixture. If mixture, indicate whether homogeneous or heterogeneous.
    i)   24 carat gold
    ii) Air
    iii) Concrete

PASSAGE BASED /CASE STUDY BASED QUESTIONS

38. Elements are classified into metals, non-metals and metalloids. Metals are lustrous, malleable, ductile, mostly solids, forms positive ions and are good conductors of heat and electricity. Non-metals are brittle, non-lustrous, non-malleable, non-ductile, exists as solids and gases, forms negative ions and are poor conductors of heat and electricity. Metals and non-metals vary in their reactivity. A homogeneous mixture of two or more metals or metal with non-metal is called solid solution or an alloy.

    (a) An element is seen as a silver-grey shiny material. It is available in the ribbon form. Identify the element as a metal or a non-metal. Justify.
    (b) Give the name of a liquid metal at room temperature
    (c) Brass is an example of an alloy. It is
        i)   Homogeneous compound
        ii) Homogeneous mixture
        iii) Heterogeneous mixture
        i v) Heterogeneous compound
    (d) X is an element which is seen in gaseous state at room temperature and is the major constituent of air. Identify the element and comment whether the element is non-metal or metal justifying your answer.

39. A homogeneous mixture of two or more substances is called a true solution. It consists of solute and solvent. The particle size of a true solution is less than 1nm. A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium. A colloid is a mixture that is actually heterogenous but appears to be homogeneous as the particles are uniformly spread throughout the solution.
    (i) Which one of the following is the most stable?
        a) True solution
        b) Suspension
        c) Colloid
        d) Both (a) and (b)

    (ii) Which type of mixture can be separated by filtration?
        a) Colloid
        b) True solution
        c) Suspension
        d) All of these

(iii) Which statement is incorrect about Tyndall effect?
   a) Size of particle causes Tyndall effect
   b) If particles are very tiny, there is no Tyndall effect
   c) True solutions show Tyndall effect
   d) All of the above

(iv) Which is the correct order of stability of solution?
   a) True solution < colloid < suspension
   b) Suspension < true solution < colloid
   c) True solution < suspension < colloid
   d) Suspension < colloid < true solution

Q. No.	ANSWERS
1.	d) (i), (iii) and (iv)
2.	b) Gas dispersed in a liquid
3.	a) A compound
4.	b) Copper sulphate
5.	d) Iodine in alcohol
6.	c) Mercury
7.	a) Sugar is solute, water is solvent
8.	ii) Both A and R are true but R is not the correct explanation of the assertion
9.	iv) A is false but R is true
10.	iii) A is true but R is false
11.	A solution of sugar and water.
12.	Aerated drinks like soda water.
13.	It indicates the exact amount of solute dissolved in an exact amount of solvent or solution.
14.	Sugar is a pure substance because it cannot be separated and is formed of only single type molecule. In the case of milk, it can be separated by physical process into components. It has components like water, fat, proteins etc.
15.	Metals, Non-metals, metalloids.
16.	Both fog and smoke have gas as the dispersion medium. The only difference is that the dispersed phase in fog is liquid and in smoke it is a solid.
17.	1. No. Solubility is different for different solutes 2. Crystals will be formed as the saturated solution is cooled
18.	(i) Concentration of solution is the amount of solute present in a given amount of solution or the amount of solute dissolved in a given mass or volume of the solvent. Solubility is the maximum amount of solute that can be dissolved in a given solution at a given temperature. (ii) The rate of solubility increases with increase in temperature.

19.	Fog—liquid, gas (b)Cheese—liquid, solid (c) Coloured gemstone—solid, solid
20.	(i) It is a heterogenous mixture. (ii) Size of particles is too small to be seen by naked eye. (iii)They scatter light passing through them making its path visible. (iv)They do not settle down when left undisturbed. (v) They cannot be separated by the process of filtration, (any three points)
21.	Metal – Copper, Non-metals – Diamond, iodine and heliumMetalloids – Germanium, boron.
22.	Rahul has a compound, Manav has a mixture

Table (within item 22):

	Compound	Mixture
(i)	Elements react to form a compound.	Elements or compounds get mixed together.
(ii)	Fixed composition.	Variable composition.
(iii)	Totally differentproperties	Shows properties of constituent substances.

23.	(i) Mixture of common salt and water. Mixture of milk and water. (ii) Mixtures of chalk powder with water and milk with water. (iii)Mixture of common salt and water. (iv)Mixture of chalk powder and water. (v) Mixture of chalk powder and water.
24.	Elements – Nil Compounds – Pure sand, Ice, CaO, Ammonia gasMixture – Air, Glass.
25.	**i) Saturated Solution:** A saturated solution is a solution that contains the maximum amount of solute that can be dissolved under the condition at which the solution exists. **Examples:** Saturated solution of sugar **ii) Pure Substance:** Pure substances are made up of only one kind of particles and have a fixed or constant structure. An element is a pure substance as it cannot be broken down or transformed into a new substance even by using some physical or chemical means. Elements are mostly metals, non-metals or metalloids. **Examples:** All elements are mostly pure substances. A few of them include gold, copper, oxygen, chlorine, diamond, etc. Compounds such as water, salt or crystals, baking soda, amongst others, are also grouped as pure substances. **iii) Colloids:** Colloids are defined as a mixture where one of the substances is split into very minute particles dispersed throughout a second substance. The minute particles are known as colloidal particles. Colloids are heterogeneous mixtures in which solute particles' size is intermediate between those in true solutions and those in suspensions and are big enough to scatter light. **Examples:** Milk, Blood etc. **Iv) Suspension:** A suspension is a heterogeneous mixture in which the small particles of a solid are spread throughout a liquid without dissolving in it. The naked eye can see the particles of a suspension. In this type of mixture, all the components are completely mixed, and all the particles

	can be seen under a microscope. A suspension is a heterogeneous mixture containing solid particles that are sufficiently large for sedimentation. **Examples:** Chalk -water mixture, Flour in water, Milk of Magnesia etc.
26.	Mass of salt present = 0.5 g Mass of water present in solution = 25 g ∴ Percentage amount of the salt = $0.50/.5+25\times100$ = 1.96%
27.	Mass of urea present in solution = 16 g Mass of solution = 120 g $$\text{Mass per cent of urea} = \frac{\text{Mass of urea}}{\text{Mass of solution}} \times 100$$ $$= \frac{16\,g}{120\,g} \times 100$$ $$= \textbf{13.33\%}$$
28.	Volume of alcohol present in solution = 5.6 mL Volume of water = 75 mL Total volume of solution = (75 + 5.6) mL = 80.6 mL $$\text{Percentage (by volume) of alcohol} = \frac{\text{Volume of alcohol}}{\text{Total volume of solution}} \times 100$$ $$= \frac{5.6\,mL}{80.6\,mL} \times 100$$ $$= \textbf{6.95\%}$$
29.	(a) No. $$\text{Mass per cent} = \frac{\text{Mass of solute}}{\text{Mass of solute + Mass of solvent}} \times 100$$ (b) **Solution made by Ramesh:** $$\text{Mass per cent} = \left(\frac{10}{10+100}\right)100$$ $$= \frac{10}{110} \times 100$$ $$= \textbf{9.09\%}$$ **Solution made by Sarika:** $$\text{Mass per cent} = \frac{10}{100} \times 100 = \textbf{10\%}$$ The solution prepared by Sarika has a higher mass per cent than that prepared by Ramesh.
30.	Let the mass of sodium sulphate required be x g. The mass of solution would be = (x + 100)g $$20 = \frac{x}{x+100} \times 100$$ $$20x + 2000 = 100x$$ $$80x = 2000$$ $$x = \frac{2000}{80} = \textbf{25 g}$$ So, the mass of sodium sulphate required is 25 g.
31.	Mass of solution = 250g

	$$\text{Concentration of solution} = \frac{\text{Mass of glucose}}{\text{Mass of solution}} \times 100$$ $$40 = \frac{\text{Mass of glucose}}{250} \times 100$$ ∴ Mass of glucose = $\frac{40 \times 250}{100}$ = 100g Mass of solution = Mass of glucose + Mass of water So, Mass of water = Mass of solution – Mass of glucose = 250g – 100g = 150g
32.	Volume of solute =12 mL Let the volume of water = x mL Volume of solution = (12 + x) mL Concentration of solution = Volume of solute / Volume of solution ×100 $12 = \frac{12}{12+x} \times 100$ 12 + x = 100 x = 100 – 12 = 88mL So, 88 mL of water should be mixed
33.	Given, mass of sugar= 40g mass of water= 100g To find :- concentration of sugar in water Total mass of solution = mass of sugar + mass of water=100g +40g = 140g percentage of concentration of sugar in solution= (40/140) ×100=28.57%)
34.	Tyndall effect refers to the process by which light is scattered by colloids or suspension making the path of the light to be visible. Copper sulphate when dissolves in water forms a true solution. True solution does not show Tyndall effect.
35.	In the forests, the air contains mists which acts as the colloid dispersed in air. When the sunlight enters the dense forest, the rays of light pass through these particles of colloids and get scattered.
36.	(i) Carbon and oxygen are present in a fixed ratio of 3:8 by mass in carbon dioxide. (ii) The constituents of carbon dioxide cannot be separated by simple physical methods.
37.	Carbon and oxygen are present in a fixed ratio in CO_2. The constituents of carbon dioxide cannot be separated by simple physical methods. (i) 24 carat gold is a pure substance. Air is a homogeneous mixture. (iii)Concrete is a heterogeneous mixture.
38.	a) Metal as it is malleable and lustrous b) Mercury c) ii) d) Nitrogen – a non-metal as its boiling point is very low and hence seen in gaseous state
39.	(i) a) True solution (ii) c) Suspension (iii) c) True solutions show Tyndall effect (iv) d) Suspension < colloid < true solution

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