INDIAN SCHOOL AL WADI AL KABIR		
Class: IX	**Department: SCIENCE 2021 - 22**	**Date: 04.09.2021**
Worksheet No.: 2 **With answers**	**Topic: CHEMISTRY** IS MATTER AROUND US PURE?	**Note: A4 FILE FORMAT**
NAME OF THE STUDENT:	**CLASS & SEC:**	**ROLL NO.**

I. MULTIPLE CHOICE QUESTIONS (1 MARK)

1. A mixture of sulphur and carbon disulphide is
   a) heterogeneous and shows Tyndall effect
   b) homogeneous and shows Tyndall effect
   c) heterogeneous and does not show Tyndall effect
   d) homogeneous and does not show Tyndall effect

2. Two chemical species X and Y combine together to form a product P which contains both X and Y
   $X + Y \rightarrow P$
   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)

3. 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

4. Which of the following is a true solution?
   a) NaCl in sulphur dioxide.
   b) Copper in silver.
   c) Salt in petrol.
   d) Mud in water.

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

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

7. 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

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

9. 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.

10. Which of the following is a characteristic of both mixtures and compounds?
    a) They contain components in fixed proportions.
    b) Their properties are the same as those of their components.
    c) Their weight is equal to the sum of the weights of their components.
    d) Energy is given out when they are being prepared.

II. ASSERTION REASON TYPE QUESTIONS (I MARK)

For the following questions, two statements are given- one labelled *Assertion* (A) and the other 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.

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

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

13. Assertion : Colloidal solutions are stable and the colloidal particles do not settle down.
    Reason : Brownian movement counters the force of gravity acting on colloidal particles.

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

III. I MARK QUESTIONS (OBJECTIVE TYPE QUESTIONS)

15. Give an example of solid in liquid solution.
16. Give an example of a gas in liquid solution.
17. Define concentration of a solution.
18. How can we say that sugar is a pure substance whereas milk is not?
19. Name the three categories in which elements can be normally divided.
20. Smoke and fog both are aerosols. In what way are they different? [NCERT Exemplar]

IV. 3MARKS QUESTIONS

21. Is air a mixture or a compound? State three reasons in support of your answer.
22. Write one point of difference between concentration and solubility. What is the effect of temperature on the rate of solubility?
23. Identify the dispersed phase and dispersing medium in the following colloids.
    a) Fog
    b) Cheese
    c) Coloured gemstone
24. Describe any three properties of colloid.
25. Classify the following into metals, non-metals and metalloids:
    a) Germanium
    b) Boron
    c) Diamond
    d) Iodine
    e) Copper
    f) Helium.

V. 5MARKS QUESTIONS

26. 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 pointsof difference between the two.

27. 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?

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

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    v) Could be filtered by filter paper?

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

VI. NUMERICAL BASED QUESTIONS

31. 0.5 g of salt is dissolved in 25 g of water. Calculate the percentage amount of the salt in the solution.

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

33. 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.

34. 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.

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

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

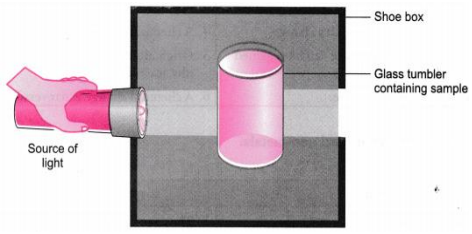
37. How much water should be mixed with 12 mL of alcohol so as to obtain 12% alcohol solution?

VII. PREVIOUS YEAR QUESTIONS

38. A solution is prepared by adding 40 g of sugar in 100 g of water. Calculate the concentration interms of mass by mass percentage of solution.
39. What is Tyndall effect? Why the solution of copper sulphate does not show Tyndall effect?
40. How Tyndall effect can be observed in the canopy of a dense forest.
41. Give two reason to support the statement that CO_2 is a compound and not a mixture.
42. Classify the following as pure substance or a mixture. If mixture, indicate whether homogeneous or heterogeneous.
    i) 24 carat gold
    ii) Air
    iii) Concrete

VIII. PASSAGE BASED / CASE STUDY BASED QUESTIONS

43. A group of students took an old shoe box and covered it with a black paper from all sides. They fixed a source of light (a torch) at one end of the box by making a hole in it and made another hole on the other side to view the light. They placed a milk sample contained in a beaker/tumbler in the box as shown in the Fig.. They were amazed to see that milk taken in the tumbler was illuminated. They tried the same activity by taking a salt solution but found that light simply passed through it?



    a) Explain why the milk sample was illuminated. Name the phenomenon involved.
    b) Same results were not observed with a salt solution. Explain.
    c) Can you suggest two more solutions which would show the same effect as shown by the milk solution?

44. 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 < colloid < suspension
b) Suspension < true < colloid
c) True < suspension < colloid
d) Suspension < colloid < true

Q. No.	ANSWERS
1.	a) Heterogeneous and shows Tyndall effect
2.	d) (i), (iii) and (iv)
3.	b) Gas dispersed in a liquid
4.	b) Copper in silver.
5.	a) A compound
6.	b) Copper sulphate
7.	d) Iodine in alcohol
8.	c) Mercury
9.	a) Sugar is solute, water is solvent
10.	c) Their weight is equal to the sum of the weights of their components.
11.	ii) Both A and R are true but R is not the correct explanation of the assertion
12.	iv) A is false but R is true
13.	i) Both A and R are true and R is the correct explanation of the assertion
14.	iii) A is true but R is false
15.	A solution of sugar and water.

<table>
<tr><td>16.</td><td>Aerated drinks like soda water.</td></tr>
<tr><td>17.</td><td>It indicates the exact amount of solute dissolved in an exact amount of solvent or solution.</td></tr>
<tr><td>18.</td><td>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 intocomponents. It has components like water, fat, proteins etc.</td></tr>
<tr><td>19.</td><td>Metals, Non-metals, metalloids.</td></tr>
<tr><td>20.</td><td>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.</td></tr>
<tr><td>21.</td><td>Air is a mixture. Air can be separated into its constituents like oxygen, nitrogen etc. by the physical process of fractional distillation. Air shows the properties of all the gases present in it. Air has a variable composition.</td></tr>
<tr><td>22.</td><td>(i) Concentration of solution is the amount of solute present in a given amountof 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 givensolution at a given temperature.
(ii) The rate of solubility increases with increase in temperature.</td></tr>
<tr><td>23.</td><td>Fog—liquid, gas (b)Cheese—liquid, solid (c) Coloured gemstone—solid, solid</td></tr>
<tr><td>24.</td><td>(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)</td></tr>
<tr><td>25.</td><td>Metal – Copper, Non-metals – Diamond, iodine and heliumMetalloids – Germanium, boron.</td></tr>
<tr><td>26.</td><td>Rahul has a compound, Manav has a mixture
<table>
<tr><td></td><td>Compound</td><td>Mixture</td></tr>
<tr><td>(i)</td><td>Elements react to forma compound.</td><td>Elements or compounds get mixed together.</td></tr>
<tr><td>(ii)</td><td>Fixed composition.</td><td>Variable composition.</td></tr>
<tr><td>(iii)</td><td>Totally differentproperties</td><td>Shows properties of constituent substances.</td></tr>
</table></td></tr>
<tr><td>27.</td><td>(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.</td></tr>
<tr><td>28.</td><td>Elements – Nil
Compounds – Pure sand, Ice, CaO, Ammonia gasMixture – Air, Glass.</td></tr>
<tr><td>29.</td><td>Mixture done by B will not leave any residue as salt solution is a true solution Tyndall effect will be shown by milk solution of C. It's a colloidal solution. So, it shows Tyndall effect. Salt solution will obviously be the clear solution. So, again its B. Chalk powder, mixture of A will settle down when left undisturbed. Again, Chalk powder of A can be filtered by filter paper.</td></tr>
</table>

	Although, it is possible to filter milk solution of C also, if sufficiently micro-porous filter is used.
30.	**a) 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:** Beverages are one of the most widely used and loved saturated solutions. Soil present on the earth surface can also be called a saturated mixture which consists of nitrogen. Once the saturation point is reached, the excess nitrogen is let out into the air in gas. **b) 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. **c) 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. **d) 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.
31.	Mass of salt present = 0.5 g Mass of water present in solution = 25 g ∴ Percentage amount of the salt = 0.50.5+25×100 = 1.96%
32.	Mass of urea present in solution = 16 g Mass of solution = 120 g $\text{Mass per cent of urea} = \frac{\text{Mass of urea}}{\text{Mass of solution}} \times 100$ $= \frac{16\,\text{g}}{120\,\text{g}} \times 100$ $= \mathbf{13.33\%}$
33.	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

	$\text{Percentage (by volume) of alcohol} = \frac{\text{Volume of alcohol}}{\text{Total volume of solution}} \times 100$ $= \frac{5.6\ \text{mL}}{80.6\ \text{mL}} \times 100$ $= \mathbf{6.95\%}$
34.	(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:** $\text{Mass per cent} = \left(\frac{10}{10+100}\right)100$ $= \frac{10}{110} \times 100$ $= \mathbf{9.09\%}$ **Solution made by Sarika:** $\text{Mass per cent} = \frac{10}{100} \times 100 = \mathbf{10\%}$ The solution prepared by Sarika has a higher mass per cent than that prepared by Ramesh.
35.	Let the mass of sodium sulphate required be x g. The mass of solution would be = (x + 100)g $20 = \frac{x}{x+100} \times 100$ $20x + 2000 = 100x$ $80x = 2000$ $x = \frac{2000}{80} = \mathbf{25\ g}$ So, the mass of sodium sulphate required is 25 g.
36.	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 = 40×250100 = 100g Mass of solution = Mass of glucose + Mass of water So, Mass of water = Mass of solution – Mass of glucose = 250g – 100g = 150g
37.	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=1212+x×100 12 + x = 100 x = 100 – 12 = 88mL So, 88 mL of water should be mixed

38.	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)
39.	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.
40.	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.
41.	(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.
42.	Carbon and oxygen are present in a fixed ratio in CO_2. The constituents of carbon dioxidecannot separated by simple physical methods.(i) 24 carat gold is a pure substance. Air is a homogeneous mixture. (iii)Concrete is a heterogeneous mixture.
43.	a) Milk is a colloid. If a beam of light is put on a milk sample contained in a beaker, the path of light beam is illuminated and becomes visible when seen from the other side. This is because the colloidal particles are big enough to scatter light falling on them. This scattered light enters our eyes and we are able to see the path of light beam. The scattering of light by colloidal particles is known as Tyndall effect. b) Salt solution is a true solution. If a beam of light is put on a salt solution kept in a beaker in a dark room, the path of light beam is not visible inside the solution when seen from the other side. This is because salt particles present in it are so small that they cannot scatter light rays falling on them. c) Detergent solution, sulphur solution
44.	(i) a) True solution (ii) c) Suspension (iii) c) True solutions show Tyndall effect (iv) d) Suspension < colloid < true

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