Chemical Composition of Matter

UNIT 3

Section A Multiple Choice Questions

For each question, choose the most suitable option and write its letter (A, B, C or D) in the brackets provided.

1. Which element is a greenish-yellow gas used to kill bacteria in swimming pools?

   A Nitrogen **B** Oxygen
   C Sulfur **D** Chlorine [ ]

2. Which one of the following is an element?

   A Water **B** Carbon dioxide
   C Oxygen **D** Air [ ]

3. Water, salt and sugar are examples of _____.

   A mixtures **B** compounds
   C elements **D** solvents [ ]

4. When elements chemically combine together in fixed proportion by mass, they form a _____.

   A mixture **B** compound
   C solution **D** suspension [ ]

5. Aerated drinks are mixtures of _____ and _____.

   A solid, liquid **B** liquid, liquid
   C solid, gas **D** liquid, gas [ ]

6. Common salt dissolves in water to form _____.

   A an element **B** a new compound
   C a mixture **D** two new compounds [ ]

7. What is formed when iron filings and sulfur powder are strongly heated together?

   A A mixture that has the properties of both iron and sulfur.
   B A mixture that has properties different from those of iron and sulfur.
   C A compound that has the properties of both iron and sulfur.
   D A compound that has properties different from those of iron and sulfur.

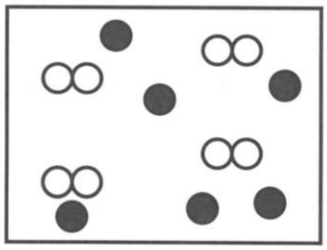
[ ]

8. Which of the following groups of substances consists of elements only?

   A Ammonia, water and steel
   B Nitrogen, iron and steam
   C Argon, magnesium, chlorine
   D Sodium, steam, ammonia

[ ]

9. What does the diagram below represent?



   A Element **B** Compound
   C Mixture **D** Solid

[ ]

10. A solution is said to be saturated when _____.

   A it boils
   B no more solute can dissolve in it
   C its concentration is low
   D its concentration is high

[ ]

11. Which one of the following is a suspension?

   A Calamine lotion **B** Bronze
   C Aqueous copper sulfate **D** Iodine mixed with alcohol

[ ]

12. Fizzy beverages are made by dissolving _____ gas in sugar solution.

A carbon dioxide B oxygen
C ammonia D nitrogen [ ]

13. Which one of the following is a widely used solvent?

A Water B Alcohol
B Petrol D Turpentine [ ]

14. In order for digested nutrients to be absorbed into the body, they need to have _____.

A high melting point B high density
C high boiling point D high solubility [ ]

15. Which of the following is **not** correct?

	Solute	*Solvent*	*Solution*
A	Iodine	Alcohol	Iodine solution
B	Mineral salts, carbon dioxide	Water	Sparkling water
C	Oxygen	Water	Fizzy drink
D	Carbon	Iron	Steel

[ ]

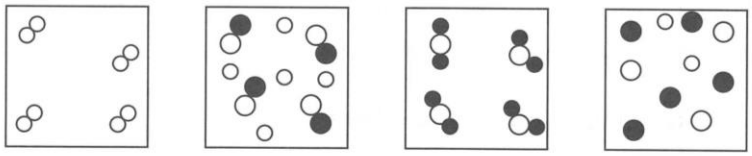
16. Vitamin C found in citrus fruits is an example of a _____.

A water-soluble vitamin
B fat-soluble vitamin
C vitamin soluble in gas
D vitamin very rarely found [ ]

17. When bees sting, an acid is injected into the skin. The pain can be reduced by rubbing _____ on it.

A sodium chloride B lime juice
C baking soda D vinegar [ ]

18. Which of the following diagrams best represents a mixture of two elements?



A B C D

[ ]

19.

N O P C

The above symbols represent _____ in the Periodic Table.

A non-metals **B** metals

C gases **D** solids [ ]

20. Which of the following is the correct symbol for sodium?

A S **B** So

C Na **D** N [ ]

21. Chlorine is a greenish-yellow gas. Sodium is a shiny, silvery metal. When these two are chemically combined, a new substance called sodium chloride is formed.

Which of the following is true about sodium chloride?

A Sodium chloride is a mixture.

B Sodium chloride is a compound that can be separated easily by physical methods.

C Sodium and chlorine remain as elements in sodium chloride.

D Sodium chloride is a compound with its own set of properties. [ ]

22. The fizzy drink contains water, sugar, carbon dioxide and some fruit flavours. Which of them is the solvent in the given drink?

A Carbon dioxide

B Sugar

C Water

D Fruit flavours [ ]

23. Which of the following affects the rate of dissolving of a substance?

I Type of solvent

II Type of solute

III Temperature

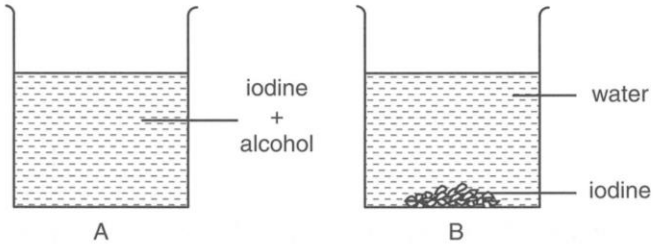
A I and II only

B I and III only

C II and III only

D I, II and III [ ]

24. An experiment was carried out to find the solubility of iodine in alcohol and water.



Which of the following statements is a correct observation of the above set-ups?

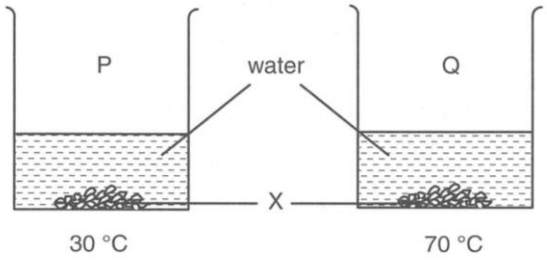
A Water cannot dissolve any solutes.

B Alcohol is the only solvent that can dissolve iodine.

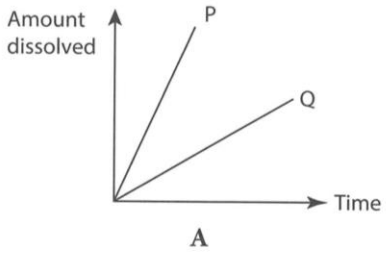
C The type of solvent affects the solubility of a substance.

D If iodine powder is added to water, it can dissolve easily in it. [ ]

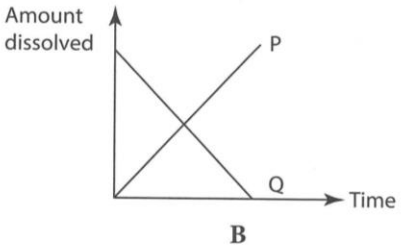
25. In an experiment of two different set-ups, P and Q, substance X of the same masses were dissolved in the same volume of water. The temperature of the water was 30 °C and 70 °C respectively. The diagrams below shows the set-ups at the start.



Which of the following graphs correctly shows the rate of dissolving of X in both beakers?



A



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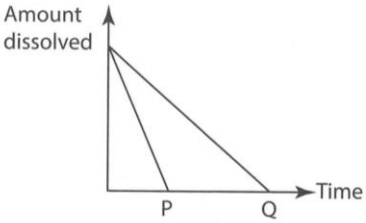
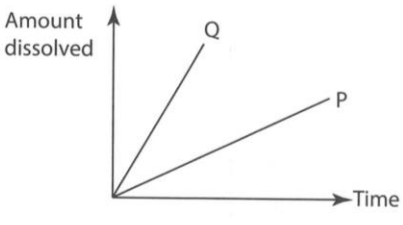


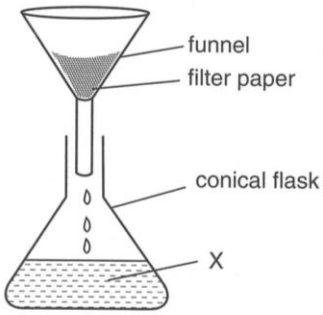
C



D

[ ]

26. The substance X that passes through the filter paper during filtration is called _____.



A Filter **B** Distillate

C Residue **D** Filtrate [ ]

27. Which of the following substance would **not** have any residue when dissolved in water?

A Chalk powder **B** Common salt

C Flour **D** Clay soil [ ]

28. Copper (II) sulfate crystals were added to a beaker of water. The water becomes a blue coloured solution. Which of the following correctly identifies the solute, solvent and solution?

	Copper (II) sulfate crystals	*Water*	*Aqueous copper (II) sulfate*
A	Solute	Solution	Solvent
B	Solution	Solvent	Solute
C	Solution	Solute	Solvent
D	Solute	Solvent	Solution

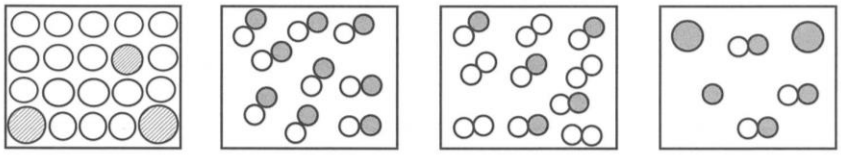
[ ]

29. Study the table given below. Which of the following experiment set-ups would take the shortest time to dissolve the common salt?

Set-up	*Volume of water (mℓ)*	*Common salt*	*Temperature (°C)*
A	50	10 g rock crystals	30
B	50	10 g fine powder	60
C	100	10 g rock crystals	30
D	100	10 g fine powder	60

[ ]

30. Which one of the following is an example of an element-element mixture?



A **B** **C** **D**

[ ]

Section B Short Answer Questions

Answer all the questions in the spaces provided.

1. Classify the following substances into elements, mixtures and compounds.

Seawater	Fertilisers	Oxygen	Calcium oxide
Alcohol	Water vapour	Brass	Iron
Ink	Milk	Chlorine	Phosphorous

Elements	*Mixtures*	*Compounds*

2. **(a)** State the symbols of the following elements in the table below.

Elements	*Symbol*
Calcium	
Iron	
Potassium	

(b) State **one** difference between an element and a compound. *[Note: Do not give the definitions of element and compound.]*

3. **(a)** Define 'solubility of a solute'.

(b) How does temperature affect the solubility of solutes in solvents?

_____

_____

_____

_____

4. (a) Separate the following substances into two groups.

Salt water Muddy water	Slurry Coca-Cola	Wine Eye drops	Calamine lotion Bronze

A	*B*

(b) Give a suitable heading for the two groups.

A: _____

B: _____

5. Name the **three** factors that affect the solubility of a solid in a solvent.

_____

_____

_____

_____

6. An experiment was set up to determine how stirring affects the rate of dissolving in a solution. The results are shown in the table below.

	Volume of water (cm^3)	*Mass of sugar (g)*	*No. of times of stirring*	*Temperature (°C)*	*Time taken for the sugar to dissolve completely*
R	50	4	4	40	10 min 30 s
S	50	4	8	40	8 min 15 s
T	50	4	12	40	6 min 10 s
U	50	4	16	40	5 min 8 s

(a) What is the variable that changed in the given experiment?

_____

(b) What is the dependant variable observed or measured?

_____

(c) What are the controlled variables that are kept constant?

_____

_____

(d) What conclusion can be derived from this experiment?

_____

(e) Name **two** other factors that can increase the rate of dissolving of sugar.

_____

_____

7. If you were to dissolve rock salt in distilled water, how can you

(a) increase the amount of salt to be dissolved?

_____

(b) shorten the time taken for a fixed mass of rock salt to be dissolved? (List **two** possible ways.)

_____

_____

8. Given below is a list of elements from the Periodic Table.

Carbon	Sodium	Chlorine	Oxygen
Zinc	Iodine	Sulfur	Calcium
Iron	Nitrogen	Silver	Potassium

(a) What are **two** ways by which these elements can be classified?

_____

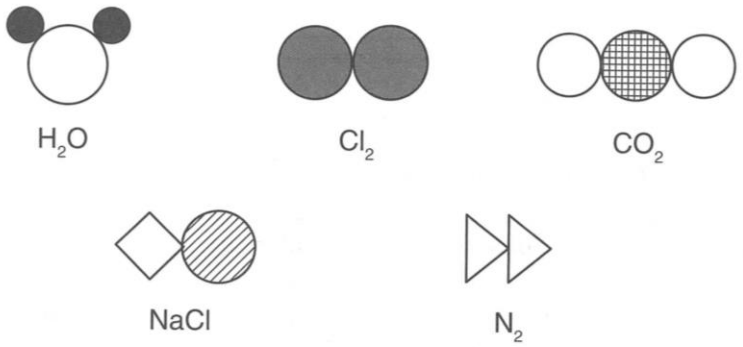
_____

(b) Classify the above elements using one of the methods you mentioned in **(a)**.

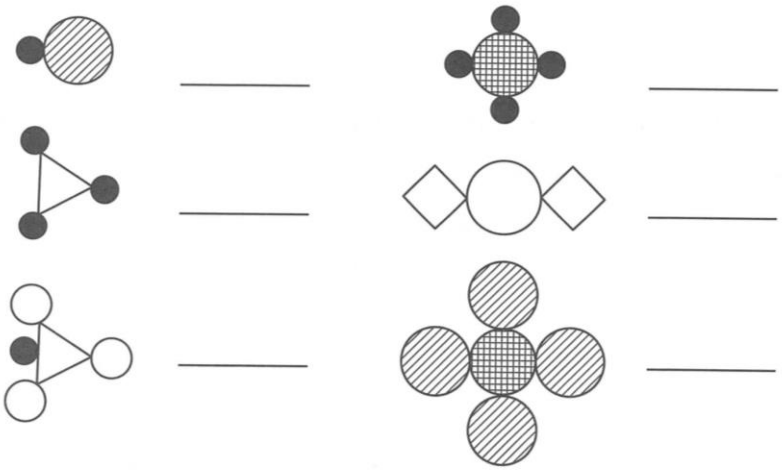
(c) Using the Periodic Table, write the correct symbols for the elements given below.

Sodium	_____	Calcium	_____
Chlorine	_____	Iron	_____
Oxygen	_____	Nitrogen	_____
Zinc	_____	Silver	_____
Iodine	_____	Potassium	_____

9. Below are some compounds represented by models. Different elements are represented by different shapes.



Use the shapes to identify the models given below.



10. Given below is a table with examples of elements, compounds and mixtures. Use your knowledge about their properties to state the differences between each group.

Element	*Compound*	*Mixture*
Oxygen	Water	Seawater
Hydrogen	Carbon dioxide	Air
Iron	Ammonia	Crude oil
Bromine	Sodium chloride	Brass

	Properties	*Element*	*Compound*	*Mixture*
(i)	Do they have fixed melting and boiling points?			
(ii)	Can they be separated?			
(iii)	Are they represented by symbols or formulas?			
(iv)	What is their composition?			
(v)	Are they made up of atoms and/or molecules?			

Section C Free Response Questions

Answer all the questions in the spaces provided.

1. **(a)** Define the term 'solvent'.

_____

_____

(b) Name **two** solvents that are widely used in industries.

_____

_____

_____

2. The table below shows the masses of three solids, A, B and C, which can be dissolved in different liquids P, Q, R, S and T.

Same volume of liquid	*Mass of the solid dissolved (g)*		
	A	**B**	**C**
P	5	5	10
Q	2	1	0
R	0	0	10
S	20	10	20
T	8	6	12

(i) Which solids do **not** dissolve in liquid R?

_____

(ii) Which solvent is the best for solid A?

_____

(iii) In which solvents does solid C dissolve equally in?

_____

(iv) If solids B and C are accidentally mixed up, what solvent can you use to separate them?

_____

3. List a solvent and a solution used in homes, in the industries and in agriculture, and give **one** example of its use.

Home

Solvent: _____

Solution: _____

Industries

Solvent: _____

Solution: _____

Agriculture

Solvent: _____

Solution: _____