AKENTEN APPIAH-MENKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT
INSTITUTE FOR TEACHER PROFESSIONAL DEVELOPMENT AND LIFELONG LEARNING (ITPDLL)
END OF FIRST SEMESTER EXAMINATION 2024/2025

COURSE CODE	EJS 232
COURSE TITLE	PARTICULATE NATURE

SECTION A (20 MARKS)

Each of the questions below is followed by four options, lettered A, B, C, and D. Choose the option that best completes each statement and write the letter A, B, C, or D of the option you have chosen in your Answer Booklet.

1. What is the maximum number of electrons that can occupy an s-orbital?

   A. 1
   B. 2
   C. 6
   D. 10

2. Which of the following elements has the largest atomic radius?

   A. Argon
   B. Fluorine
   C. Hydrogen
   D. Sodium

3. What type of bond is formed when electrons are transferred from one atom to another?

   A. Covalent bond
   B. Hydrogen bond
   C. Ionic bond
   D. Metallic bond

4. A solution that cannot dissolve more solute at a given temperature is called…

   A. Dilute
   B. Saturated
   C. Supersaturated
   D. Unsaturated

5. What happens to most solid solutes as the temperature of the solvent increases?

   A. Solubility decreases
   B. Solubility increases
   C. Solubility remains the same
   D. The solute crystallizes

6. What type of mixture is milk classified as?

   A. Colloid
   B. Heterogeneous solution
   C. Homogeneous solution
   D. Suspension

7. In an exothermic reaction…

   A. Energy is absorbed from the surroundings.
   B. Energy is released to the surroundings.
   C. Products have more energy than reactants.
   D. Temperature decreases.

8. Which method is best for separating a mixture of oil and water?

   A. Chromatography
   B. Decantation
   C. Evaporation
   D. Filtration

9. How many electrons does a chlorine ion (Cl^-) have?

   A. 16
   B. 17
   C. 18
   D. 19

10. Ionic compounds tend to…

    A. Have low melting points.
    B. Be good conductors in solid state.
    C. Be brittle and dissolve in water.
    D. Form molecules rather than crystals.

11. Covalent bonds are typically found in…

    A. Ionic salts
    B. Metals
    C. Noble gases
    D. Nonmetals

12. What determines the shape of a molecule?

    A. Atomic radius
    B. Electron-pair repulsion
    C. Number of isotopes
    D. Types of bonds

13. A colloid differs from a solution in that…

A. Colloidal particles dissolve completely.
B. Colloidal particles scatter light.
C. Colloidal particles settle upon standing.
D. It is a homogeneous mixture.

14. How is the solubility of gases in liquids affected by temperature?

A. Decreases with temperature
B. Increases and then decreases
C. Increases with temperature
D. Remains constant

15. Which separation method uses a porous barrier to separate solids from liquids?

A. Chromatography
B. Distillation
C. Evaporation
D. Filtration

16. What is the pH of a neutral solution?

A. 0
B. 1
C. 7
D. 14

17. Which of the following represents an endothermic process?

A. Combustion
B. Freezing of water
C. Melting of ice
D. Condensation of steam

18. Which factor does NOT affect the rate of solubility?

A. Stirring
B. Surface area of solute
C. Temperature
D. Volume of solvent

19. The process of chromatography separates mixtures based on…

A. boiling points.
B. particle size.
C. affinity for a stationary phase.
D. rate of crystallization.

20. Which of the following elements is most electronegative?

A. Chlorine
B. Fluorine
C. Nitrogen
D. Oxygen

SECTION B (5 MARKS)

This section contains statements. Write True or False for each of the following statements

21. Electrons in the same orbital must have opposite spins.
22. Ionic compounds are typically more soluble in non-polar solvents than in water.
23. Covalent bonds always involve unequal sharing of electrons.
24. Temperature has no effect on the solubility of a gas in a liquid.
25. Distillation is an effective method for separating a mixture of salt and sand.

SECTION C (5 MARKS)

This section contains two columns, columns A and B. You are to match items in Column A with those in Column B.

Column A	Column B
21. Suspension	A. A mixture where solute particles dissolve completely
22. Colloid	B. A mixture with particles that scatter light
23. Endothermic	C. Absorbs energy from surroundings
24. Exothermic	D. Releases energy to surroundings
25. Homogeneous Solution	E. A mixture where particles settle over time
	F . Released energy from surroundings
	G. A mixture with particles that scatter energy

SECTION D (10 MARKS)

Provide short answers to the following questions

31. The atomic number of an element is determined by the number of.....in its nucleus.
32. In a covalent bond, atoms.....electrons to form a stable molecule.
33. The separation of a mixture based on boiling points is known as .....
34. The maximum number of electrons in a p-orbital is .....
35. Exothermic reactions release heat to the.....
36. A solution that contains more solute than it can theoretically hold is referred to as .....

37. Colloids exhibit a phenomenon called the .....effect, where light is scattered.

38. A molecule with an uneven distribution of charge is said to be.....

39. The ..... rule states that atoms are most stable with eight electrons in their valence shell.

40. The energy required to break a bond is called the.....energy.

SECTION E (20 MARKS)

Answer only One question from this section

Elements	P	Q	R
Mass number	23	20	35
Number of neutrons	12	10	18

41 a. Study the table above and answer the following questions:

i. Write the atomic number and electronic configuration of elements P, Q and R 3 marks

ii. To which groups do P, Q and R belong 3 marks

iii. To which periods do P, Q and R belong? 3 marks

iv. Which amongst P, Q and R is

i. An alkali metal
ii. Noble gas
iii. Halogen 3 marks

b. An aqueous solution of volume 5.0 dm^3 contains 36.4 g of sodium chloride. Calculate the concentration of the solution in mol/dm^3
(Na = 23 Cl = 35.5) 5 marks

c. Balance the following chemical equations:

i. $N_2 + H_2 \rightarrow NH_3$ 1 mark

ii. $Ca(OH)_2 + H_3PO_4 \rightarrow Ca_3(PO_4)_2 + H_2O$ 1 mark

iii. $S_8 + F_2 \rightarrow SF_6$ 1 mark

42a. In a laboratory experiment, a student was required to prepare 500 cm^3 of 1.0 M solution of glucose ($C_6H_{12}O_6$) [C = 12, H = 1, O = 16]

Determine the:

i. Molar mass of glucose
ii. Amount of glucose in moles in the solution
iii. Mass of glucose contained in the solution 6marks

b. Define the following:

i. Exothermic reaction
ii. Endothermic reaction
iii. Closed system
iv. Open system 4marks

c. The atomic number of an element X is 19. Predict

i. the number of valence electrons in its atom 2 marks
ii. its group number 2 marks
iii. whether it is a metal or a non-metal 2 marks
iv. the nature of oxide formed by it 2 marks
v. the formula of its chloride 2 marks