CHEMISTRY

1. Nature and Behaviour

1. **Which one of the following is a pure substance?**
   A) Ice **B)** Brick
   C) Wood **D)** Milk
2. **The empirical formula of butane is .....**
   A) C_4H_{10} **B)** C_2H_5
   C) C_3H_8 **D)** C_5H_{10}
3. **An example of solid in gas mixture is .....**
   A) air **B)** smoke
   C) soil **D)** none
4. **Matter exists in ..... states.**
   A) one **B)** two
   C) three **D)** four
5. **The molecules are closely packed in .....**
   A) solids **B)** liquids
   C) gases **D)** liquids and gases
6. **The symbol Cl represents .....**
   A) carbon **B)** calcium
   C) chlorine **D)** chromium
7. **Air is a .....**
   A) compound **B)** mixture
   C) element **D)** atom
8. **The chemical name of common salt is .....**
   A) Sodium hydroxide
   B) Sodium carbonate
   C) Sodium chloride
   D) Sodium bicarbonate
9. **The symbol for gold is .....**
   A) Ag **B)** Au
   C) Al **D)** As
10. **The only metal in the liquid state is .....**
    A) zinc **B)** bromine
    C) mercury **D)** antimony
11. **A solution of salt in water is a .....**
    A) homogeneous mixture
    B) heterogeneous mixture
    C) precipitate
    D) compound
12. **Invar is an alloy of .....**
    A) nickel and iron **B)** lead and tin
    C) copper and iron **D)** zinc and tin
13. **Water is made up of the elements .....**
    A) carbon and oxygen
    B) nitrogen and oxygen
    C) hydrogen and oxygen
    D) copper and oxygen
14. **..... will form a colloidal solution when dissolved in water.**
    A) clay **B)** starch
    C) Sodium **D)** none
15. **2.5g of sugar is dissolved in 47.5g of water. Calculate its concentration as per cent by mass.**
    A) 5% **B)** 2%
    C) 4% **D)** 3%
16. **Calculate the amount of glucose required to prepare 250g of 5% solution of glucose by mass.**
    A) 12.5g **B)** 13.5g
    C) 11g **D)** 10g
17. **What is the molecular mass of CH_4?**
    A) 16u **B)** 71u
    C) 32u **D)** 2u
18. **Convert into mole 12g of oxygen gas.**
    A) 0.375 mole **B)** 0.32 mole
    C) 0.345 mole **D)** 0.333 mole
19. **What is the mass of 0.5 mole of water molecule?**
    A) 9g **B)** 10g
    C) 8g **D)** 7g
20. **What is the latin name of gold?**
    A) Aurum **B)** Cuprum
    C) Ferrum **D)** Kalium

21. **Name the element of the latin name Wolfram.**
A) gold **B)** sodium
C) tungsten **D)** tin

22. **What is the latin name and symbol of mercury?**
A) Hydrargyrum (Hg)
B) Natrium (Na)
C) Stabium (Sb)
D) Cuprum (Cu)

23. **What is ratio of sulphur and oxygen?**
A) 1 : 3 **B)** 2 : 1
C) 2 : 3 **D)** 1 : 1

24. **Latest unit of atomic mass is written as .....**
A) 'u' **B)** m
C) a **D)** am

25. **20_3 represents .....**
A) 16 g of oxygen
B) 2 moles of ozone molecule
C) 7 moles of oxygen atoms
D) none

26. **What is the symbol of Rhenium?**
A) Re **B)** At
C) Np **D)** Hf

27. **The name of SnO_3^{2-} (Divalent electro-negative radical) is .....**
A) Stannate **B)** Stannite
C) Boride **D)** Nitride

28. **The name of pentavalent N_2O_5, N^{5+} is .....**
A) Nitrogen **B)** Vanadium
C) Phosphorus **D)** Palladium

29. **The latin name of Argentum is .....**
A) Silver **B)** Gold
C) Tin **D)** Copper

30. **..... are called solids in solid solution.**
A) Elements **B)** Matter
C) Compounds **D)** Alloys

ANSWERS

1. (D)	2. (B)	3. (B)	4. (D)	5. (A)	6. (C)	7. (B)	8. (C)	9. (B)	10. (C)
11. (A)	12. (A)	13. (C)	14. (B)	15. (A)	16. (A)	17. (A)	18. (A)	19. (A)	20. (A)
21. (C)	22. (A)	23. (A)	24. (A)	25. (B)	26. (A)	27. (A)	28. (A)	29. (A)	30. (D)

2. Electrochemical Cell

1. **Which of these chemical reactions is an oxidation-reduction reaction?**
   A) Fe + S → FeS
   B) $CO_2 + H_2O \rightarrow H_2CO_3$
   C) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$
   D) $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$

2. **What happens to the oxidizing agent in an oxidation-reduction reaction?**
   A) It is oxidized as it gains electrons.
   B) It is oxidized as it loses electrons.
   C) It is reduced as it gains electrons.
   D) It is reduced as it loses electrons.

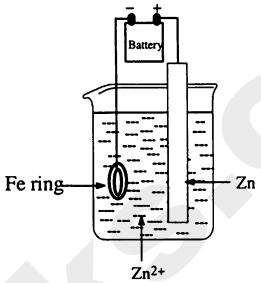
3. **In which substance does bromine have an oxidation number of +1?**
   A) Br_2 **B)** HBr
   C) HBrO **D)** $HBrO_2$

4. **Which statement is true for an electrochemical cell?**
   A) Oxidation occurs at the anode only.
   B) Reduction occurs at the anode only.
   C) Oxidation occurs at both the anode and cathode.
   D) Reduction occurs at both the anode and cathode.

5. **Given the equation: $2Cr(s) + 3Pb^{2+}(aq) \rightarrow 2Cr^{3+}(aq) + 3Pb(s)$, which is the correct reduction half reaction?**
   A) $Cr(s) \rightarrow Cr^{3+}(aq) + 3e^-$
   B) $Cr(s) + 3e^- \rightarrow Cr^{3+}(aq)$
   C) $Pb^{2+}(aq) \rightarrow Pb(s) + 2e^-$
   D) $Pb^{2+}(aq) + 2e^- \rightarrow Pb(s)$

6. **What is the E° for an electrochemical cell with the following reaction?**
   $2Au^{3+} + 3CO \rightarrow 3CO^{2+} + 2Au$
   A) −1.22 V **B)** 1.78 V
   C) 1.22 V **D)** 3.84 V

7. **An iron ring is plated with zinc metal in the apparatus below. Which of the following is true?**



   A) It is a voltaic cell and the reaction is spontaneous.
   B) It is a voltaic cell and the reaction is not spontaneous.
   C) It is an electrolytic cell and the reaction is spontaneous.
   D) It is an electrolytic cell and the reaction is not spontaneous.

8. **What are the oxidation state of vanadium in the ions VO^{2+} and VO_4^{3-} respectively?**
   A) +4 and +5 **B)** +4 and +8
   C) +6 and +5 **D)** +6 and +8

9. **Which one of the following reactions is a redox reaction?**
   A) $Pb^{2+}(aq) + 2Cl^-(aq) \rightarrow PbCl_2(s)$
   B) $AgNO_3(aq) + HCl(aq) \rightarrow AgCl(s) + HNO_3(aq)$
   C) $NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l)$
   D) $2Al(s) + 3Cl_2(g) \rightarrow 2AlCl_3(s)$

10. **Consider the following unbalanced redox equation:**

$\_\_CH_3OH(l) + \_\_Cr_2O_7^{2-}(aq) + \_\_H^+(aq) \rightarrow \_\_CH_2O(aq) + \_\_Cr^{3+}(aq) + \_\_H_2O(l)$

Which of the following sets of numbers will balance the equation?
A) 1, 1, 14, 1, 2, 7 **B)** 3, 1, 8, 3, 2, 7
C) 3, 1, 8, 3, 2, 8 **D)** 3, 1, 14, 3, 2, 8

11. **In which of the following does Sulphur have an oxidation number of +7?**
A) HSO_3^- **B)** SO_3
C) H_2SO_4 **D)** $H_2S_2O_8$

12. **What happens to the reducing agent in an oxidation-reduction reaction?**
A) It is oxidized as it gains electrons
B) It is oxidized as it loses electrons
C) It is reduced as it gains electrons
D) It is reduced as it loses electrons

13. **What is the term for the electrode where oxidation occurs?**
A) Anode
B) Cathode
C) Oxidizing agent
D) Reducing agent

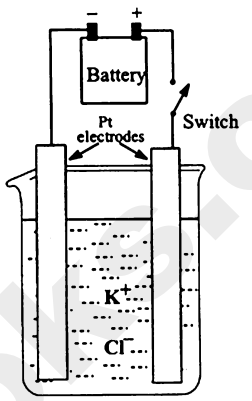
14. **Which of the following is true for an electrolytic cell?**
A) An electric current is produced by a chemical reaction.
B) A nonspontaneous reaction is forced to occur.
C) Electrons flow towards the anode.
D) Electrons flow through the salt bridge.

15. **Which species is the oxidizing agent in the following reaction?**
$Cl_2(aq) + 2I^-(aq) \quad I_2(aq) + 2Cl^-(aq)$
A) Cl_2 **B)** I^-
C) I_2 **D)** Cl^-

16. **Which of the following statements is true for the reaction?**
$2Fe^{3+}(aq) + 2Br^-(aq) \quad 2Fe^{2+}(aq) + Br_2(l)$
A) E° = -1.83 V and it is not spontaneous
B) E° = +0.29 V and it is spontaneous
C) E° = -0.29 V and it is not spontaneous
D) E° = +1.83 V and it is spontaneous.

17. **The cell potential, E°, for an oxidation-reduction reaction was found to equal 1.10 V. What can be said about this reaction?**
A) At equilibrium
B) Endothermic
C) Nonspontaneous
D) Spontaneous

18. **The diagram shows the electrolysis of molten KCl. What occurs when the switch is closed?**



A) Positive ions move toward the anode and gain electrons.
B) Positive ions move toward the anode and lose electrons.
C) Positive ions move toward the cathode and gain electrons.
D) Positive ions move toward the cathode and lose electrons.

19. **Consider the following standard reduction potentials:**

$2H^+ + 2e^-$	H_2	$E^\circ = 0.00$ V
$Sn^{2+} + 2e^-$	Sn	$E^\circ = -0.14$ V
$Cd^{2+} + 2e^-$	Cd	$E^\circ = -0.40$ V

Which pair of substances will react spontaneously?
A) Sn with Cd^{2+}
B) Cd^{2+} with H^+
C) Cd with H_2
D) Cd with Sn^{2+}

20. **What does the reducing agent do in an oxidation-reduction reaction?**
A) Gains electrons from the oxidizing agent
C) Is always reduced
B) Loses electrons to the oxidizing agent
D) Is reduced by the oxidizing agent