1. How many orbitals are in a “d” subshell?
   a) 2
   b) 3
   c) 4
   d) 5

2. Nitrogen gas occupies a volume of 350 ml at 25°C and one atmospheric pressure. How many moles of nitrogen gas will be there? (ideal gas constant = 0.082L atm mol⁻¹K⁻¹)?
   a) 0.014
   b) 1.70
   c) 170
   d) 0.016

3. Zinc “Zn” has atomic number 30 and atomic weight 65.4. A Zn²⁺ cation contains:
   a) 28 ė
   b) 30 ė
   c) 32 ė
   d) 63 ė

4. Basic compounds are defined as those that:
   a) Release hydrogen ions
   b) Release hydroxide ions
   c) Are strong solvents
   d) None of the above

5. The magnesium ion (Mg²⁺, atomic number 12) has the same electron configuration as:
   a) Ar
   b) Sr
   c) Mg
   d) Ne

6. To what final volume must 2000 ml of 8M (HCL) be diluted in order to make
solution whose concentration is 2M?

a) 2000 L  
b) 2 L  
c) 0.5 L  
d) None of the above

7. Which of the following orbitals would be spherically symmetric?

a) d  
b) p  
c) f  
d) s

8. Which pair of the following elements is most likely to form an ionic compound if allowed to react together?

a) Br and Br  
b) K and Cl  
c) Na and K  
d) All of the above

9. Which of the following is an example of heterogeneous mixture?

a) Oil and Water  
b) Alcohol and Water  
c) Salt and Pepper  
d) Both (a) and (c)

10. All elements in the same IA group of the periodic table have the same:

a) Number of electrons  
b) Number of valence electrons  
c) Atomic size  
d) All of the above

11. Alkynes are hydrocarbons which:

a) Contain one single bond and one double bond  
b) Contain one double bond  
c) Contain one triple bond  
d) Both (a) and (c)

12. Which group of the Periodic table is known as Alkaline earth metals?
13. Predict which of the following is the bond formed between Hydrogen and Chlorine atoms?
   a) Ionic
   b) Co-ordinate covalent
   c) Covalent
   d) Molecular

14. Which of the following is the correct formula for Fe (II) oxide?
   a) \( \text{Fe}_2\text{O}_3 \)
   b) \( \text{Fe}_3\text{O}_2 \)
   c) \( \text{FeO} \)
   d) \( \text{FeO}_3 \)

15. The correct electronic configuration of Magnesium ion (atomic number 12) is:
   a) \( 1S^2 2S^2 2P^6 3S^2 \)
   b) \( 1S^2 2S^2 2P^6 \)
   c) \( 1S^2 2S^2 2P^6 3S^1 \)
   d) \( 1S^2 2S^2 2P^6 3S^2 3P^2 \)

16. An indicator is used during a neutralization reaction in order to:
   a) Detect the acid and alkali
   b) Detect the salt
   c) Show exactly that the reacting quantities of acid and alkali are present
   d) None of the above

17. Which one of the following is a weak acid?
   a) \( \text{HCl} \)
   b) \( \text{CH}_3\text{COOH} \)
   c) \( \text{HNO}_3 \)
   d) \( \text{H}_2\text{SO}_4 \)

18. Molecules of two different compounds contain the same number of atoms of each element but have different arrangements of atoms. Which term correctly describes these two substances?
   a) Isomers
19. The density of ethyl alcohol is 0.789 g / ml at 20°C. Calculate the mass of a 30 ml sample?

a) 28 g  
b) 46 g  
c) 23.67 g  
d) 78.2 g

20. Which element forms an oxide that dissolves in water to give a solution with pH less than 7?

a) Sodium  
b) Magnesium  
c) Sulphur  
d) Hydrogen

21. The elements of group VII A form ions with a charge of:

a) +1  
b) -1  
c) -2  
d) +2

22. A copper sample has a mass of 44.65 g and a volume of 5.0 cm³. What is the density of copper, expressed as gram per cubic centimetre (g / cm³)?

a) 10.5 g / cm³  
b) 116 g / cm³  
c) 50 g / cm³  
d) 8.93 g / cm³

23. How many electrons are shared between the atoms in the molecules of methane (CH₄) and of water (H₂O)?

a) Methane 4, water 2  
b) Methane 4, water 4  
c) Methane 8, water 4  
d) Methane 4, water 8

24. Which one of the following compounds is an example of Amines?

a) CH₃ CH₂ NH₂
25. Calculate the number of moles of sulphur in 1.00 Kg of sulphur (where atomic mass of sulphur is 32.06)

a) 31.19 moles
b) 16.7 moles
c) 46.3 moles
d) 68 moles

26. How many iron atoms are present in 3.0 moles of iron metal?

a) $56 \times 10^{23}$ atoms of Fe
b) $18 \times 10^{23}$ atoms of Fe
c) $87 \times 10^{23}$ atoms of Fe
d) $1.2 \times 10^{23}$ atoms of Fe

27. What type of bond formation is caused by electron transfer?

a) Ionic
b) Covalent
c) Coordinate covalent
d) Molecular

28. The correct symbol for Boron is:

a) B
b) Be
c) Ba
d) Br

29. In the periodic table, potassium belongs to the group known as the:

a) Nobel gases
b) Alkaline metals
c) Alkaline earth
d) Transition elements

30. Ammonia reacts with acids because:

a) It is neutral
b) It contains a hydroxide group
c) It contains a pair of electrons
d) None of the above