KITH & KIN INTERNATIONAL COLLEGE

7/11 Kadi Olusanya Street, Owode Ibeshe, Ikorodu, Lagos State.

FIRST TERM EXAMINATION 2025/2026 ACADEMIC SESSION

NAME					
SUBJECT	CHEMISTRY	CLASS	SS 2	DURATION	2HOURS

SECTION A: OBJECTIVE [50 MARKS]

INSTRUCTION: Each question is followed by four options lettered A to D. Find the correct option for each question and shade in pencil on your answer sheet, the answer space which bears the same letter as the option you have chosen.

1. Which of the following elements belongs to Group II of the periodic table?
A. Na
B. Mg
C. Al
D. Cl

2. The electronic configuration of an element is $1s^2 2s^2 2p^6 3s^2 3p^5$. To which group does it belong?
A. Group I
B. Group V
C. Group VII
D. Group VIII

3. In the periodic table, the metallic character of elements increases from:
A. right to left across a period
B. top to bottom in a group
C. bottom to top in a group
D. left to right across a period

4. Which of the following elements is a transition metal?
A. Ca
B. Cu
C. Na
D. K

5. Which property generally increases across a period in the periodic table?
A. Atomic radius
B. Ionization energy
C. Metallic character
D. Electropositivity

6. Which of the following species is acting as the oxidizing agent in the reaction:
$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$?
A. Zn
B. Cu^{2+}
C. Zn^{2+}
D. Cu

7. In the reaction: $2Fe^{3+} + 2I^- \rightarrow 2Fe^{2+} + I_2$, the reducing agent is:
A. Fe^{3+}
B. Fe^{2+}
C. I^-
D. I_2

8. Which of the following is not a redox reaction?
A. $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
B. $Fe^{3+} + e^- \rightarrow Fe^{2+}$
C. $HCl + NaOH \rightarrow NaCl + H_2O$
D. $2Mg + O_2 \rightarrow 2MgO$

9. The discharge of ions during electrolysis depends on their:
A. size
B. ionic radius

C. relative ease of discharge
D. mass number

10. During the electrolysis of dilute H_2SO_4 using platinum electrodes, the gases liberated at the cathode and anode are respectively:
A. H_2 and O_2
B. O_2 and H_2
C. SO_2 and O_2
D. H_2 and SO_2

11. Which law states that the amount of substance deposited during electrolysis is proportional to the quantity of electricity passed?
A. Avogadro's law
B. Faraday's first law
C. Boyle's law
D. Faraday's second law

12. In the electrolysis of copper(II) sulphate solution using copper electrodes, the mass of copper deposited on the cathode is:
A. equal to the mass of copper lost at the anode
B. greater than the mass of copper lost at the anode
C. less than the mass of copper lost at the anode
D. independent of the anode

13. The number of faradays required to deposit 27 g of Al (Ar = 27, Z = 3) from molten $AlCl_3$ is:
A. 1
B. 2
C. 3
D. 9

14. If 96500 C deposits 1.08 g of a metal, what is the equivalent weight of the metal?
A. 1.08
B. 9.0
C. 27.0
D. 108.0

15. In an electrochemical cell, electrons flow:
A. from anode to cathode in the external circuit
B. from cathode to anode in the external circuit
C. from cathode to anode in the electrolyte
D. from anode to cathode in the electrolyte

16. Which of the following is the correct representation of a Daniell cell?
A. $Zn|Zn^{2+} \,||\, Cu^{2+}|Cu$
B. $Cu|Cu^{2+} \,||\, Zn^{2+}|Zn$
C. $Cu^{2+}|Cu \,||\, Zn|Zn^{2+}$
D. $Zn^{2+}|Zn \,||\, Cu|Cu^{2+}$

17. The standard electrode potential (E°) of Zn^{2+}/Zn and Cu^{2+}/Cu are -0.76 V and +0.34 V respectively. The EMF of a Daniell cell is:
A. -1.10 V
B. +1.10 V
C. -0.42 V
D. +0.42 V

18. A primary cell is one in which:
A. the electrodes are rechargeable
B. the reaction is irreversible
C. the electrolyte is permanent
D. the electrodes cannot be corroded

19. Which of the following is a practical application of electrolysis?
A. Electroplating of metals
B. Use in radioactivity
C. Preparation of alloys
D. Polymerization

20. Which of the following increases down a group in the periodic table?
A. Ionization energy

B. Electronegativity
C. Atomic radius
D. Electron affinity

21. Which of these elements is most electronegative?
A. Na
B. Cl
C. K
D. Al

22. Which of the following is correct about oxidation number?
A. Oxidation is decrease in oxidation number
B. Reduction is increase in oxidation number
C. Oxidation is increase in oxidation number
D. Both A and B

23. Which block of the periodic table does iron belong to?
A. s-block
B. p-block
C. d-block
D. f-block

24. Which element is in the same family as oxygen?
A. Nitrogen
B. Sulphur
C. Chlorine
D. Argon

25. A redox reaction is best described as one involving:
A. gain of electrons only
B. loss of electrons only
C. both oxidation and reduction occurring simultaneously
D. transfer of protons

26. During electrolysis of brine, chlorine is liberated at the:
A. cathode
B. anode
C. both electrodes
D. electrolyte

27. Which of the following factors does not affect ionization energy?
A. Nuclear charge
B. Distance of electron from nucleus
C. Shielding effect
D. Catalyst used

28. An element with atomic number 19 will be placed in which group of the periodic table?
A. Group I
B. Group II
C. Group III
D. Group IV

29. A device that converts chemical energy to electrical energy is called:
A. transformer
B. electrochemical cell
C. electrolytic cell
D. voltmeter

30. The inert electrode used in the electrolysis of aqueous copper(II) tetraoxosulphate(VI) is:
A. Copper
B. Carbon
C. Iron
D. Sodium

31. Which of the following elements has the largest atomic radius?
A. Li
B. Na
C. K
D. Rb

32. The family name for Group VII elements is:
A. Halogens
B. Noble gases
C. Alkali metals

D. Alkaline earth metals

33. Which of the following ions will be discharged most readily at the cathode during electrolysis?
A. Na^+
B. K^+
C. H^+
D. Ca^{2+}

34. The oxidation state of sulphur in H_2SO_4 is:
A. +2
B. +4
C. +6
D. 0

35. The periodic law states that:
A. properties of elements are periodic functions of their atomic number
B. atomic mass increases across a period
C. ionization energy increases down the group
D. density of elements remains constant in a group

36. Which of the following metals is used as a sacrificial anode to prevent corrosion?
A. Copper
B. Zinc
C. Silver
D. Gold

37. Which of the following species is reduced in the reaction:
$2Na + Cl_2 \rightarrow 2NaCl$?
A. Na
B. Cl_2
C. NaCl
D. Both Na and Cl_2

38. Which of the following is not a property of transition metals?
A. Variable oxidation states
B. Formation of coloured compounds
C. Formation of complex ions
D. Low melting points

39. Which element is a noble gas?
A. O
B. F
C. Ne
D. S

40. Electroplating of spoons with silver is carried out to:
A. increase their mass
B. make them attractive and prevent corrosion
C. increase electrical conductivity
D. make them heavier

41. Which of the following best explains why alkali metals are very reactive?
A. They have small atomic size
B. They have one electron in their outermost shell
C. They form coloured compounds
D. They have high ionization energy

42. In the electrolytic refining of copper, the pure copper is deposited at the:
A. anode
B. cathode
C. both electrodes
D. electrolyte

43. Which of the following is not a strong oxidizing agent?
A. $KMnO_4$
B. $K_2Cr_2O_7$
C. H_2O_2
D. NaCl

44. Which of the following increases across a period from left to right?
A. Atomic size
B. Metallic character
C. Electronegativity
D. Electropositivity

45. Which of the following is an example of a secondary cell?
A. Dry cell
B. Daniell cell
C. Mercury cell
D. Lead-acid accumulator

46. The family name for Group I elements is:
A. Alkaline earth metals
B. Alkali metals
C. Transition metals
D. Noble gases

47. The colour of copper(II) sulphate solution fades during electrolysis using platinum electrodes because:
A. Cu^{2+} ions are discharged at the cathode
B. SO_4^{2-} ions are discharged
C. water is decomposed
D. O_2 is liberated

48. Which of the following describes reduction?
A. Loss of hydrogen
B. Gain of oxygen
C. Gain of electrons
D. Increase in oxidation number

49. Which of these is a disadvantage of primary cells?
A. They are costly
B. They are rechargeable
C. They are not rechargeable
D. They are very large

50. In the periodic table, elements in the same group have:
A. different number of valence electrons
B. similar chemical properties
C. same number of electron shells
D. different patterns of bonding

SECTION B: THEORY

INSTRUCTION: Answer question number **one (1)** and any other **three (3)** questions in this section. All questions carry equal marks.

1. (a) Define oxidation and reduction in terms of electron transfer. (2 marks)
   (b) Identify the oxidizing agent and reducing agent in the reaction: $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$ (2 marks)
   (c) State two periodic trends observed as you move across Period 3 of the periodic table.

   (3 marks)
   (d) Write the electronic configuration of sulphur (Z = 16). (3 marks)`

2. (a) What is meant by the term "electrolysis"? (2 marks)
   (b) State Faraday's First Law of Electrolysis. (2 marks)
   (c) Calculate the mass of copper deposited when a current of 2.0 A is passed through

copper(II) sulphate solution for 1 hour. (Cu = 63.5, F = 96,500 C mol^{-1}, 1 mol e^- = 1 F)
(4 marks)
(d) Mention two industrial applications of electrolysis. (2 marks)

3. (a) Give one reason why elements in the same group of the periodic table have similar

chemical properties. (2 marks)

(b) State the block (s, p, d, or f) to which each of the following elements belongs:
(i) Na, (ii) Cl, (iii) Fe. (3 marks)
(c) Explain briefly why noble gases are chemically inert. (2 marks)
(d) Write the formula of the ion formed by magnesium and state its electronic configuration.
(3 marks)

4. (a) Define an electrolyte and give one example. (2 marks)
(b) Differentiate between galvanic (voltaic) and electrolytic cells. (3 marks)
(c) Explain briefly why electrochemical cells can be used as sources of electricity. (3 marks)
(d) Mention two practical applications of electrochemical cells. (2 marks)

5. (a) State the trend in atomic radius across a period in the periodic table and explain the reason
for this trend. (3 marks)
(b) State the oxidation number of chlorine in each of the following compounds:
(i) NaCl, (ii) Cl_2, (iii) $HClO_3$. (3 marks)
(c) Write the ionic equation for the reaction between HCl(aq) and NaOH(aq). (2 marks)
(d) Define ionization energy. (2 marks)

6. (a) List two differences between metals and non-metals in terms of their periodic properties.
(2 marks)
(b) In an electrolysis experiment, a current of 4.0 A was passed through molten NaCl for 30
minutes. Calculate the mass of sodium deposited at the cathode.
(Na = 23, F = 96,500 C mol^{-1}) (4 marks)
(c) Explain briefly why graphite can conduct electricity. (2 marks)
(d) State one environmental hazard associated with the disposal of electrochemical cells.
(2 marks)