

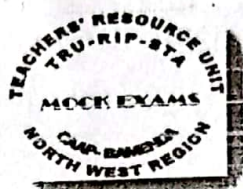
REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

MINISTRE DES ENSEIGNEMENTS SECONDAIRES

CELLULE D'APPUI A L'ACTION PEDAGOGIQUE
ANTENNE REGIONALE DU NORD OUEST

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MARCH 2024



REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTRY OF SECONDARY EDUCATION

TEACHERS' RESOURCE UNIT
REGIONAL BRANCH FOR THE NORTH WEST

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The Teachers' Resource Unit and the Regional Inspectorate of Pedagogy, in collaboration with NWCTA	SUBJECT CODE NUMBER 0715	PAPER NUMBER 1
GENERAL CERTIFICATE OF EDUCATION REGIONAL MOCK EXAMINATION	SUBJECT TITLE CHEMISTRY	
CANDIDATE NAME:		
CANDIDATE NUMBER:.....		
CENTRE NUMBER:		
ADVANCED LEVEL		

Time Allowed: One and a half hours
INSTRUCTIONS TO CANDIDATES:

Mobile phones are **NOT ALLOWED** in the examination room.

1. USE A SOFT HB PENCIL THROUGHOUT THIS EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the Examination begins:

3. Check that this question booklet is headed "Advanced level -0715 code and subject title—CHEMISTRY Paper 1".
4. Insert the information required in the spaces above.
5. Without opening the booklet, pull out the answer sheet carefully from inside the front cover of this booklet. Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.
6. Insert the information required in the spaces provided on the answer sheet using your HB pencil:

Candidate Name, Centre Number, Candidate Number, Subject Code Number, and Paper number

How to answer questions in this examination:

7. Answer ALL the 50 questions in this examination. All questions carry equal marks.
8. Non-programmable calculators are allowed.
9. For each question there are four suggested answers, A, B, C and D. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen. For example, if C is your correct answer, mark C as shown below:
[A] [B] [C] [D]
10. Mark only one answer for each question. If you mark more than one answer, you will score zero for that question. If you change your mind about an answer, erase the first mark carefully, and then mark your new answer.
11. Avoid spending much time on any question. If you find a question difficult, move to the next question. You can come back to this question later.
12. Do all rough work in this booklet using, where necessary, the blank spaces in the question booklet.
13. You must not take this booklet and answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.

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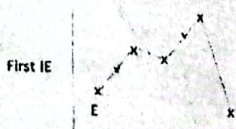
TURN OVER ₁

Question 1-33 (thirty two questions)

Directions: Each of the questions or incomplete statements in this section is followed by four suggested answers. Select the best in each case.

- Which structural information about an organic compound is obtained from UV spectroscopy
 - types of hydrogen atoms present
 - fragmentation pattern
 - types of bonds and functional groups
 - presence of multiple bonds.
- Which one of the following oxides reacts with bases (alkalis) but does not dissolve in water.
 - SnO₂
 - PbO₂
 - GeO₂
 - SiO₂
- Identify the element in period 3 with the highest melting point
 - Sodium
 - Aluminum
 - Silicon
 - Sulphur
- In a nitrate(V) ion, NO₃⁻,
 - the nitrogen atom uses five unpaired electrons for bonding
 - nitrogen promotes one 2s electron to a higher energy level
 - nitrogen forms one dative bond and three covalent bonds
 - there is no electron delocalization
- How many isomers can be obtained from the compound with molecular formula C₂H₂Cl₂
 - 4
 - 3
 - 2
 - 5
- Calculate the concentration in moldm⁻³ of chloride ions in a solution containing 2.22g of calcium chloride, CaCl₂, in 100cm³ of water. (RAMS Ca=40 Cl=35.5)
 - 0.2
 - 0.4
 - 0.1
 - 0.0002

7.



Above is a sketch of first ionization energy against atomic number for some successive elements of the periodic table. Element E is found in group

- 1
 - 2
 - 3
 - 4
- A sample of oxygen gas contains ¹⁶O and ¹⁸O. The peaks in the mass spectrum of the oxygen sample would be at mass points
 - 16 and 18
 - 32 and 36
 - 16, 18, 32, and 36
 - 16, 18, 32, 34, and 36
 - Which of the following compounds would give a yellow precipitate with antiseptic smell when reacted with I₂/NaOH.
 - CH₃CH₂CHO

- CH₃CH₂COCH₂CH₃
- CH₃CH₂CH₂OH
- CH₃CH(OH)CH₃

- The reagent and reaction conditions necessary for the conversion. C₆H₅COCl → C₆H₅CHO are
 - Acidified KMnO₄, reflux
 - Ethanol, room temperature, reflux
 - LiAlH₄ / dry ether, reflux
 - H₂, poisoned palladium catalyst, heat.
- Which of the following statements about the group VII elements is NOT TRUE
 - Electronegativity decreases with increasing atomic number
 - They all show variable oxidation states in their compound
 - They all form acidic hydrides
 - Standard electrode potentials become less positive with increasing atomic number
- Given a cell composed of the following half cells

$$I_2(aq), 2I^-(aq) / Pt \quad E^\ominus = +0.544V$$

$$Fe^{3+}(aq), Fe^{2+}(aq) / Pt \quad E^\ominus = +0.770V$$
 Which of the following species is the strongest reducing agent?
 - I₂
 - Fe³⁺
 - Fe²⁺
 - I⁻
- What happens when cyclohexane (C₆H₁₂) is added to propanone (CH₃COCH₃)
 - there is a slight rise in temperature
 - the vapour pressure decreases slightly
 - the mixture can be separated completely by fractional distillation
 - the dipole-dipole attractions in propanone are broken
- Which statement about the compounds of group two metals is correct
 - BaCO₃ is less thermally stable than SrCO₃
 - BaSO₄ is less soluble than MgSO₄
 - Ca(OH)₂ is less soluble than Mg(OH)₂
 - Ca(NO₃)₂ is more thermally stable than Sr(NO₃)₂
- Which one of the following elements disproportionates in cold dilute alkali
 - Bromine
 - Aluminium
 - Silicon
 - Sodium
- Chromium forms the complex [Cr(C₂O₄)₂Cl₂]³⁻. The oxidation number of chromium in the complex is
 - +2
 - +3
 - +6
 - 3
- What is the formula of aminoethanoic acid in an acidic medium
 - H₃N⁺CH₂COO⁻
 - H₂NCH₂COOH
 - H₃N⁺CH₂COOH
 - H₂NCH₂COO⁻
- Which of the following reactions leads to a reduction in the carbon chain
 - RCONH₂ + H⁺/H₂O, heat
 - RCONH₂ + P₂O₅, heat
 - RCONH₂ + NaNO₂/dil HCl
 - RCONH₂ + Br₂/conc KOH, heat

19. Calculate the P^H of a buffer solution that is made by mixing equal volumes of 0.1M Sodium benzoate and 0.04M Benzoic acid.

(K_a of benzoic acid = $6.4 \times 10^{-5} \text{ mol dm}^{-3}$)

- A) 4.59
B) 3.
C) 8.38
D) 1.67

20. Which one of the following elements has the successive ionization energies given below:
580 ; 1800 ; 2700 ; 11600 ; 14800

- A) Sodium
B) Magnesium
C) Aluminium
D) Silicon

21. Iodine-131 has a half-life of eight days. What fraction of a sample of iodine -131 will be left after 24 days

- A) $\frac{1}{2}$
B) $\frac{1}{4}$
C) $\frac{1}{8}$
D) $\frac{1}{16}$

22. The kinetic data in the table below are for the reaction
 $A + B \rightarrow C$

From this data what are the orders of the reaction with respect to A and B

[A]	[B]	Initial rate/ $\text{mol dm}^{-3} \text{ s}^{-1}$
0.1	0.1	1×10^{-5}
0.1	0.2	4×10^{-5}
0.2	0.1	1×10^{-5}

- A) Order of A = 1 , order of B = 0
B) order of A = 0 , order of B = 2
C) order of A = 0 , order of B = 4
D) order A = 1 , order of B = 2

23. At 20°C the vapour pressure of pure methanol and pure ethanol are 95.0mmHg and 45.0mmHg respectively . A solution assumed to be ideal contains 16.0g of methanol and 92.0g of ethanol. Calculate the partial pressure of methanol in the mixture . (RAM C=12 , O=16 , H=1)

- A) 19 mmHg
B) 36 mmHg
C) 55mmHg
D) 45 mmHg

24. An organic compound contains 87.8% carbon and 12.2% hydrogen . The empirical formula of the compound is

- A) C_3H_5
B) CH_2
C) CH
D) C_6H_{10}

25. In the determination of crystal structures by X-ray diffraction , the X-rays incident on the crystal are diffracted by

- A) atomic nuclear
B) electrons
C) neutrons
D) protons

26. Given the following bond energies in KJ mol^{-1} : C O 1077, O = O 498.3 C = O 805 . Calculate the energy change for the reaction $2\text{CO} + \text{O}_2 \rightarrow 2\text{CO}_2$

- A) +184.3
B) - 1042.3
C) - 567.7
D) + 1042.3

27. Which alcohol may be oxidized to a product which reacts with 2,4-dinitrophenylhydrazine reagent but not with Fehlings solution

- A) Butan-1-ol
B) Butan-2-ol
C) 2-methylpropan-1-ol
D) 2-methylpropan-2-ol

28. Methanol can be produced by the following reaction
 $\text{CO}_{(g)} + 2\text{H}_{2(g)} \rightleftharpoons \text{CH}_3\text{OH}_{(g)} + \text{Energy}$

The conditions that are necessary to maximize the equilibrium yield of methanol are

- A) Low temperature and low pressure
B) High temperature and low pressure
C) Low temperature and high pressure
D) High temperature and high pressure

29. What product is formed when benzene (C_6H_6) reacts with chlorine in the presence of UV light?

- A) 1-chlorobenzene
B) 1,2 dichlorobenzene
C) 1,2,3,4,5,6-hexachlorobenzene
D) 1,2,3,4,5,6-hexachlorocyclohexane

30. For group IV elements , select the correct statement

- A) Inert pair effect is the reluctance of the outermost two s-electrons to take part in bonding.
B) Only carbon and tin exhibit allotropy
C) The stability of the tetrachlorides increases down the group
D) Only carbon undergoes catenation

31. Which of the following best describes the shape of the chlorate(V) ion ClO_3^-

- A) trigonal planar
B) trigonal pyramidal
C) tetrahedral
D) V-shape

32. Which of the following statements is NOT true

- A) one mole methane (CH_4) contains four moles of hydrogen atoms
B) one mole of carbon-12 has a mass of 12g
C) one mole of hydrogen gas contains 6.02×10^{23} atoms of hydrogen
D) one mole of methane contains 75% of carbon by mass (RAM C=12 , H=1)

33. What is the accepted conventional name for $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)_3$

- A) 2,2-dimethylpropane
B) 1,1- dimethylpropane
C) 2,2-dimethylbutane
D) trimethylpropane

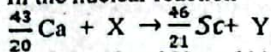
Question 34-44

Directions: for each of the questions below, one or more of the responses is (are) correct. Decide which of the responses is (are) correct. Then choose.

- A) If 1,2 and 3 are correct
B) If 1 and 2 only are correct
C) If 2 and 3 only are correct
D) If 3 only is correct

DIRECTIONS SUMMARISED			
A	B	C	D
1,2, 3 Correct	1 and 2correct	2 and 3 correct	3 only correct

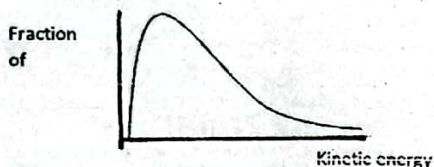
34. In the nuclear reaction



The particles X and Y could be respectively

- 1) ${}_{-1}^0\text{e}$ and ${}_{-1}^0\text{e}$
- 2) ${}_{2}^4\text{He}$ and ${}_{1}^1\text{H}$
- 3) ${}_{-1}^0\text{e}$ and ${}_{2}^4\text{He}$

35. The diagram below represents the distribution of molecular kinetic energies within a gas at a given temperature T.



Which of the following statements is correct?

- 1) Raising the temperature increases the proportion of molecules with energy greater than the activation energy
- 2) The total area under the curve represents the total number of molecules of the gas
- 3) As the gas is cooled, the maximum of the curve is displaced to the left

36. Which of the following could be considered as an electrophilic reaction

- 1) $\text{C}_6\text{H}_{12} + \text{Br}_2 \rightarrow \text{C}_6\text{H}_{11}\text{Br}$
- 2) $\text{C}_6\text{H}_6 + \text{H}_2\text{SO}_4 \rightarrow \text{C}_6\text{H}_5\text{SO}_3\text{H}$
- 3) $\text{C}_6\text{H}_{10} + \text{HBr} \rightarrow \text{C}_6\text{H}_{11}\text{Br}$

37. In calculating the enthalpy of solution of magnesium chloride, the data necessary include

- 1) The lattice enthalpy of magnesium chloride
- 2) The enthalpy of hydration of the component ions
- 3) The ionization energy of magnesium and the electron affinity of chlorine

38. Which of the following species could function as a chelating ligand

- 1) $\text{C}_2\text{O}_4^{2-}$
- 2) $\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2$
- 3) EDTA

39. The standard redox potentials of magnesium and Lead are -2.38V and -0.13V respectively. Correct statements about the cell

- 1) $\text{Mg(s)} / \text{Mg}^{2+}(\text{aq}) // \text{Pb}^{2+}(\text{aq}) / \text{Pb(s)}$ include Magnesium forms the positive terminal of the cell
- 2) If a low resistance voltmeter were connected across the cell, the voltage indicated would be less than E^\ominus for the cell
- 3) Addition of water to the magnesium half cell increases cell potential

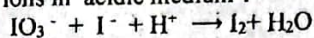
40. Which of the following statements concerning phenylamine is (are) correct?

- 1) it yields nitrogen gas when reacted with nitrous acid 0°C
- 2) it is a weaker base than methylamine
- 3) it reacts with ethanoylchloride to give an amide

41. Which of the following properties of group I elements decreases with increasing atomic number?

- 1) melting point
- 2) first ionization energy
- 3) atomic radius

42. Which of the following statements is(are) correct about the reaction of iodate(V), IO_3^- , and iodide, I^- , ions in acidic medium?



- 1) When balanced the mole ratio of iodate to iodide is 1:5
- 2) The oxidation state of iodine in iodate(V) changes from +5 to 0
- 3) Iodide ions are reduced

43. Which of the following processes is(are) exothermic

- 1) $\text{O}^- + \text{e} \rightarrow \text{O}^{2-}$
- 2) $\text{Mg(s)} + 1/2\text{O}_2 \rightarrow \text{MgO(s)}$
- 3) $\text{Na}^+(\text{g}) + \text{aq} \rightarrow \text{Na}^+(\text{aq})$

44. Which of the following group IV elements have a giant metallic structure

- 1) Carbon
- 2) Germanium
- 3) Tin

45. The reaction of sodiumhydroxide with 2-bromopropane under suitable conditions can lead to the formation of

- 1) Propane
- 2) Propene
- 3) Propan-2-ol

Questions 46 to 50

Summary of directions			
	First statement	Second statement	
A	True	True	Second statement is correct explanation of the first
B	True	True	Second statement is NOT a correct explanation of the first
C	True	False	
D	False	True	

	FIRST STATEMENT	SECOND STATEMENT
46	Lithium behaves differently from the rest of the group I elements	The lithium ion has a small size and a high polarizing effect
47	In dilute aqueous solution hydrofluoric acid is a weaker acid than hydrochloric acid	Hydrochloric acid is a strong monobasic acid
48	Ethanal is more reactive towards nucleophiles than propanone	The carbonyl carbon in propanone is attached to more electron releasing alkyl groups which reduces the carbons positive charge
49	Phenol is a stronger acid than ethanol	The ethanol molecule is stabilized by delocalization which inhibits the donation of a proton by the OH group
50	Aqueous copper(I) ions are more stable than aqueous copper(II) ions	Copper(I) ion has a completely filled 3d subshell

END