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Paix-Travail-Patrie

MINISTERE DES ENSEIGNEMENTS SECONDAIRES

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TEACHERS' RESOURCE UNIT TRU-RIP-STA MOCK EXAMS NORTH WEST REGION

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REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTRY OF SECONDARY EDUCATION

TEACHERS' RESOURCE UNIT
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MARCH 2022

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.**

TURN OVER

1. The relative atomic mass of an element is defined as:
A The mass of an atom of an element relative to 1/12 the mass of a C-12 isotope.
B The mass of an atom of an element relative to the mass of a hydrogen atom.
C The average mass of an element relative to 1/12 the mass of one atom of C-12 isotope.
D The average mass of an atom of an element relative to 1/12 the mass of a carbon-12 isotope.

2. Which of the following equations represent the second ionization energy of magnesium?
A. $Mg_{(aq)} \longrightarrow Mg^{2+}_{(aq)} + 2e$
B. $Mg^{+}_{(aq)} \longrightarrow Mg^{+2}_{(aq)} + e$
C. $Mg_{(aq)} + 2e \longrightarrow Mg^{+2}_{(aq)}$
D. $Mg_{(aq)} \longrightarrow Mg^{+}_{(aq)} + e$

3. The half-life of $^{233}_{91}Pa$ is 28 days. How long would it take for the radioactivity of protactinium, Pa, to reduce to 1/16 of its initial value?
A 112days
B 84days
C 56days
D 28days.

4. An organic compound of relative molecular mass 150 contains the following composition by mass: 32% carbon, 4% hydrogen, and 64% oxygen. Its empirical formula is
A CH_2O_2
B $C_2H_3O_3$
C CHO
D $C_4H_6O_6$ (RAM: C=12; H=1; O=16)

5. Copper has atomic number 29. The electronic configuration of Cu(i) ion is.
A $[Ar]3d^9 4s^2$
B $[Ar]3d^{10} 4s^1$
C $[Ar]3d^9 4s^1$
D $[Ar]3d^{10} 4s^0$

6. Which property increases with increasing atomic number for both alkali metals and the halogens?
A Ionisation energies
B Melting points
C Electronegativities
D Atomic radii.

7. Which of the following statements about the halogen group is correct?
A First ionization energy increases from Fluorine to Iodine
B Fluorine has the smallest tendency to be reduced
C Cl_2 will oxidise I^-
D I_2 is a stronger oxidizing agent than F_2 .

8. Identify the type of organic reaction involved in the reaction below
$C_6H_6 + Cl_2 \longrightarrow C_6H_5Cl + HCl$
A Nucleophilic substitution
B Electrophilic substitution
C Electrophilic addition
D Free radical addition.

9. The shapes of the carbonate (CO_3^{2-}) and chlorate (v) (ClO_3^-) ions are respectively
A trigonal planar and trigonal pyramidal
B trigonal planar each
C trigonal pyramidal each
D trigonal pyramidal and trigonal planar.

10. Which force of attraction is responsible for the dimerization of ethanoic acid?
A dative covalent bonding
B Van der waals forces
C dipole-dipole attraction
D Hydrogen bonding.

11. Which row correctly shows the type of mechanism of each of the two reactions?

	$C_2H_5Br + KCN$	$CH_3COCH_3 + HCN$
A	electrophilic substitution	electrophilic addition
B	electrophilic substitution	nucleophilic addition
C	nucleophilic substitution	electrophilic addition
D	nucleophilic substitution	nucleophilic addition

12. How many isomeric esters have the molecular formula $C_4H_8O_2$?
A 2
B 3
C 4
D 5

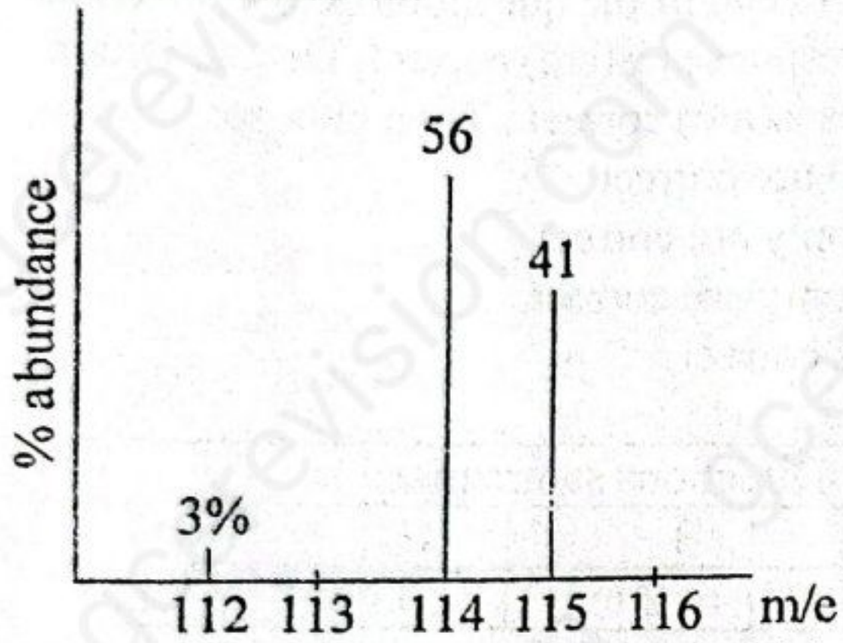
13. PVC is used as a packaging material. What holds the different polymer strands together in a piece of solid PVC?
A Covalent bonds
B Hydrogen bonds
C Ionic bonds
D Van der Waals' forces [

14. Calculate the P^H of 0.2M propanoic acid ($Ka=1.26\times10^{-5}$)
A 2.80
B 2.95
C 2.74
D 0.7

15. Which of the following statements is true
A all oxides of s-block elements are basic
B the thermal stability of the carbonates of the s-block elements increases down both groups I and II
C the solubility of group I sulphates decreases down the group while that of group II sulphates increases down the group.
D Beryllium and magnesium both react with water to form basic hydroxides.

16. Which of the following mixtures will show negative deviation from Raoult's law
A ethanol and water
B benzene and methylbenzene
C methanol and ethanol
D nitric acid and water

17. A sample of element X is analysed using mass spectrometry. The mass spectrum obtained is shown.



What is the relative atomic mass of this sample of element X?
A 113.7
B 114.0
C 114.2
D 114.4

18. An indicator changes colour in the PH range 8.3-10.0. This indicator should be used when titrating a known volume of
A a strong acid with a weak base
B a weak acid with a weak base
C a weak base with a strong acid
D a weak acid and a strong base

19. The standard enthalpy change for the reaction $2NF_{3(aq)} \longrightarrow 2N_{(aq)} + 6F_{(aq)}$ is $\Delta H = +1668KJ$ What is the bond energy of the N-F bond?
A -556KJmol-1
B -278KJmol-1
C +278KJmol-1
D +556KJmol-1

20. Given a cell composed of the following half cells
$Cu^{2+} + e \longrightarrow Cu^{+} \quad E^{\theta} = +0.15V$
$I_2 + 2e \longrightarrow 2I^{-} \quad E^{\theta} = +0.54V$
Which of the following species is the strongest reducing agent
A Cu^{2+}
B Cu^{+}
C I_2
D I^{-}

21. Which of the following carboxylic acid derivatives is likely to be least reactive with respect to acid hydrolysis
A CH_3CONH_2
B CH_3COCl
C $CH_3COOCH_2CH_3$
D $(CH_3CO)_2O$

22. For the group (IV) elements Carbon to Lead; select a **CORRECT** statement
A All the tetrachloride hydrolyse in water
B Stability of the +2 oxidation state decreases down the group
C SnO is amphoteric while SnO_2 is acidic
D The thermal stability of the tetrachloride decreases down the group.

23. The Rutherford gold foil experiment led to the discovery of
A Proton
B Electron
C Neutron
D The position and properties of the nucleus.

24. Which of the following compounds will form a yellow precipitate with iodine and sodiumchlorate (I) solution?
A $CH_3CH(CH_3)CHO$
B $CH_3CH(OH)CH_2CH_3$
C $CH_3CH_2COOCH_3$
D $CH_3CH_2COC_2H_5$

25. How many orbitals are present in the p-subshell of an atom?
A 3
B 6
C 1
D 5

26. Which one of the following elements is most likely to have the following successive ionization energies in $KJmol^{-1}$: 899, 1757, 14848, 21006
A Be
B Al
C Si
D N

27. Two reactions and their enthalpy changes are shown.

$2C_{(s)} + 2H_{2(aq)} \rightarrow C_2H_{4(aq)} \quad \Delta H^{\theta} = +52.2 \text{ kJ mol}^{-1}$

$C_2H_{2(aq)} + H_{2(aq)} \rightarrow C_2H_{4(aq)} \quad \Delta H^{\theta} = -175.8 \text{ kJ mol}^{-1}$

These data can be used to calculate the enthalpy change for the reaction shown.

$2C_{(s)} + H_{2(aq)} \rightarrow C_2H_{2(aq)} \quad \Delta H^{\theta} = X$

What is the value of X?

A $-228.0 \text{ kJ mol}^{-1}$
B $-123.6 \text{ kJ mol}^{-1}$
C $+123.6 \text{ kJ mol}^{-1}$
D $+228.0 \text{ kJ mol}^{-1}$

28. Hydrogen iodide gas decomposes reversibly producing iodine vapour and hydrogen gas.

$2HI \leftrightarrow H_2 + I_2 \quad \Delta H^{\theta} = +X$

The position of the equilibrium for this reaction may be altered by changing the external conditions. Which row correctly describes the change in position of equilibrium?

	effect of increasing the pressure	effect of increasing the temperature
A	Moves to the right	Moves to the right
B	Moves to the right	Moves to the left
C	No change	Moves to the right
D	No change	Moves to the left

29. Cobalt can form the positive ion

$Co(NH_3)_4Cl_2^+$

What is the oxidation number of cobalt in this ion?

A +1
B +2
C +3
D +6

30. Magnesium nitrate, $Mg(NO_3)_2$, decomposes when heated to give a white solid and a mixture of gases. One of the gases released is an oxide of nitrogen, X , Identify the colour of the gas?

A Cream
B Reddish brown
C Yellow
D Red

31. Concentrated sulfuric acid is added to separate solid samples of sodium chloride, sodium bromide and sodium iodide. With which samples does sulfuric acid act as an oxidising agent?

A sodium chloride only
B sodium chloride and sodium bromide
C sodium bromide and sodium iodide
D sodium iodide only

32. Which compound is chiral?

A 1-chloro-3-methylbutane
B 2-chloro-2-methylbutane
C 2-chloro-3-methylbutane
D 3-chloropentane

33. The fifth to eighth ionisation energies of four elements in Period 3 of the Periodic Table are shown below.

Which row refers to chlorine?

	Ionization energies/kJmol^{-1}			
	Fifth	Sixth	Seventh	Eight
A	6280	21200	25900	30500
B	6990	8490	27100	31700
C	6540	9330	11000	33600
D	7240	8790	12000	13800

Questions 34-45

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 , 2 only	2 , 3 only	3 only

34 Which of the following statements about buffer solutions is (are) true;

1. They consist of a weak base and its conjugate acid .
2. They resist sharp changes in P^H upon addition of small amounts of a strong acid or base.
3. They have a P^H of 7

[A B C D]

35. The ozonolysis of propene, $CH_3CH=CH_2$, produces

1. $(CH_3)_2CO$
2. CH_3CHO
3. HCHO

[A B C D]

36. Which of the following compounds would react with acidified potassium dichromate on warming?

1. $CH_3CH(OH)COOH$
2. CH_3OH
3. $(CH_3)_3COH$

[A B C D]

37. The bond .....P..... of the HBr molecule is .....Q..... than that of the HI molecule.
Which pairs of words correctly complete the above sentence?

	P	Q
1	energy	Greater
2	length	Less
3	polarity	Greater

[A B C D]

38. Consider the reaction

$$CH_3COCH_3 + I_2 \longrightarrow CH_3COCH_2I + H^+ + I^-$$

Rate $= K[CH_3COCH_3][H^+]$.
It can be deduced from the rate expression that the reaction is
1. Second order overall
2. Zero order with respect to iodine
3. Unimolecular [A B C D]

39. From the following data
$Zn^{2+}(aq)/Zn(s)$ $E^\theta = -0.76V$
$Fe^{3+}(aq)/Fe^{+2}(aq)$ $E^\theta = +0.77V$
It can be deduced that
1. the standard emf for the cell $Zn(s)|Zn^{2+}(aq)||Fe^{3+}(aq);Fe^{2+}(aq)|Pt(s)$ is -1.53V
2. Fe^{3+} is a more powerful oxidant than Zn^{2+}
3. Zn can reduce Fe^{3+} [A B C D]

40. Consider the reaction

$$[Co(H_2O)_6]^{2+} + 4Cl^- \longrightarrow [CoCl_4]^{2-} + 6H_2O \quad \Delta H = -ve$$

Pink Blue

Which of the following changes to the equilibrium mixture will produce a predominantly pink solution?
1. Addition of concentrated hydrochloric acid
2. Cooling the solution
3. The addition of aqueous silver nitrate. [A B C D]

41. The solubility of an ionic compound depends on its
1. Hydration energy
2. Lattice energy
3. Standard enthalpy change of formation. [A B C D]

42. Which of the following species can function as a chelating ligand
1. $H_2NCH_2CH_2NH_2$
2. $C_2O_4^{2-}$
3. Edta [A B C D]

43. Chlorine reacts with sodium hydroxide in two different ways depending upon the temperature.
Reaction 1 $Cl_2 + 2OH^- \rightarrow Cl^- + ClO^- + H_2O$
Reaction 2 $3Cl_2 + 6OH^- \rightarrow 5Cl^- + ClO_3^- + 3H_2O$
Which statements about these reactions are correct?
1. Reaction 2 requires a higher temperature than reaction 1.
2. The products of reaction 1 show chlorine in two different oxidation states.
3. The products of reaction 2 show oxygen in two different oxidation states. [A B C D]

44. Which of the following statements about phenylamine is (are) true
1. It yields nitrogen gas when reacted with nitrous acid at temperatures less than 5^oC
2. It is a weaker base than methylamine
3. It reacts with ethanoylchloride to give an amide [A B C D]

45 Which of the following processes is(are) exothermic
1. $Br_{(aq)} + e \longrightarrow Br^-$
2. $Br^-_{(aq)} + aq \longrightarrow Br^-_{(aq)}$
3. $Br_{(aq)} \longrightarrow Br^+_{(aq)} + e$ [A B C D]

Questions 46 -50 (five questions)

Directions: Each of the following questions consists of a statement in the left hand column followed by a second statement in the right hand column. Decide whether the first statement is true or false. Decide whether the second statement is true or false. The choose

A: If both statements are true and the second statement is a **CORRECT** explanation of the first statement.

B: If both statement are true but the second statement is **NOT a CORRECT** explanation of the first statement.

C: if the first statement is true but the second statement is false

D: if the first statement is false but he second is true.

	First statement	**Second statement**	
A	True	True	Second statement is a CORRECT explanation of the first
B	True	True	Second statement is NOT a CORRECT explanation of the first
C	True	False	
D	False	True	

46	All D-block elements show variable oxidation states	The 3d and 4s elections are similar in energy and can all be used in bonding
47	Phenol is a stronger acid than ethanol	The phenyl group has a +I effect and promotes the donation a proton by OH group
48	The formate ion ($HCOO^-$) gives a positive test with Tollen's reagent while the oxalate ion $(COO^-)_2$ doesn't	The formate ion contains the H-C=O group which is absent in the oxalate ion.
49	A mixture of propan-1-ol and propan-2-ol can be separated by fractional distillation	Propan-1-ol and propan-2-ol are miscible liquids with close boiling points
50	Magnesium is harder and has a higher melting than sodium	Magnesium is in group II while sodium is in group I

END

GO BACK AND CHECK YOUR WORK