CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD
General Certificate Of Education Examination

0715 CHEMISTRY 1

JUNE 2020 **ADVANCED LEVEL**

Centre Number	GCE REVISION
Centre Name	
Candidate Identification No.	http://www.gcerevision.com
Candidate Name	

Mobile phones are NOT allowed in the examination room.

MULTIPLE CHOICE QUESTION PAPER

One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE 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 **"0715 CHEMISTRY 1 - Advanced Level"**
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil: **Candidate Name, Exam Session, Subject Code and Candidate Identification Number.** 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.

How to answer the questions in this Examination

6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Non-programmable calculators are allowed.
8. Each question has FOUR suggested answers: **A, B, C** and **D**. Decide which answer is appropriate. 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]
9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
10. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
11. Do all rough work in this booklet using the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Questions 1 - 38 (Thirty eight questions).
Directions: Each of the questions or incomplete statements in this section is followed by four suggested answers. Select the best answer in each case.

1. Which one of the following processes is exothermic?
   A $\frac{1}{2}O_2(g) \rightarrow O(g)$
   B $O^-(g) + e \rightarrow O^{2-}(g)$
   C $O(g) + e \rightarrow O^-(g)$
   D $O(g) \rightarrow O^+(g) + e$

2. Gun powder burns with a lilac (purple) flame. The metal in gunpowder that causes this flame colour is?
   A Sodium
   B Caesium
   C potassium
   D calcium

3. Which of the elements below exhibit the "inert-pair effect"?
   A sulphur
   B lead
   C sodium
   D magnesium

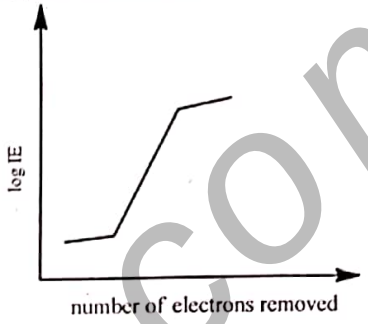
4. Give the name of the reaction that occurs when ethene reacts with aqueous bromine.
   A Electrophilic addition
   B Electrophilic substitution
   C Nucleophilic addition
   D Nucleophilic substitution

5. Choose the apparatus that can be used to easily monitor the rate of reaction between MnO_4^- ion and $C_2O_4^{2-}$ ions in acidic medium.
   A dilatometer
   B Calorimeter
   C Polarimeter
   D Colourimeter

6. What volume and concentration of H_2SO_4 will be needed to exactly neutralize 20 cm^3 of 0.3 M NaOH?
   A 20 cm^3 of 0.3 M H_2SO_4
   B 10 cm^3 of 0.6 M H_2SO_4
   C 20 cm^3 of 0.6 M H_2SO_4
   D 10 cm^3 of 0.3 M H_2SO_4

7. Which of the reagents below can best be used to distinguish between propan-1-ol (1 propanol) and propan-2-ol (2-propanol)
   A I_2/NaOH(g)
   B $H^+/KMnO_4$
   C Conc H_2SO_4
   D Neutral $FeCl_3$

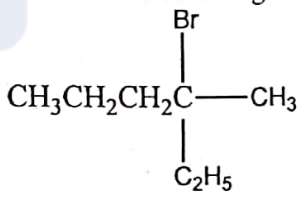
8. The graph below is part of a plot of log ionization energy against number of electrons removed for element X.



In which group of the periodic table is element X found?
   A I
   B II
   C III
   D IV

9. The number and types of particles emitted in the radioactive decay of $^{57}_{25}Mn$ to $^{49}_{23}V$ is (are)
   A 2α-particles
   B 1α-particle and 1β-particle
   C 2α-particles and 1β-particle
   D 2α-particles and 2β-particles

10. Give the IUPAC name of the following compound.



   A 3-bromo-3-methylhexane
   B 2-bromo-2-ethylpentane
   C 4-bromo-4-ethylpentane
   D 4-bromo-4-methylhexane

11. Chlorine may be prepared in the laboratory from concentrated hydrochloric acid by heating it with
   A Concentrated H_2SO_4
   B Manganese (IV) oxide
   C Sodium chloride crystals
   D Lead (II) oxide

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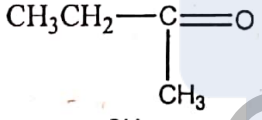
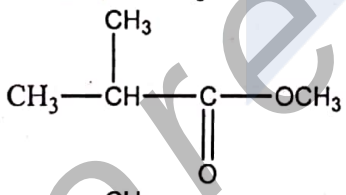
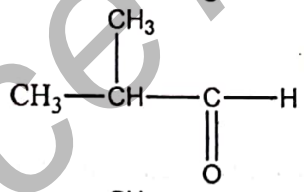
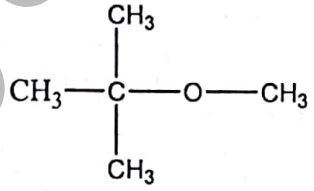
12. Which one of the following elements is most likely to have successive ionization energies in $kJmol^{-1}$ of 786, 1580, 3230, 4360, 16000, 20000 etc
A Al
B Mg
C P
D Si

13. Given the following data:
ΔH_f $[CH_4(g)] = -75$ kJ mol^{-1}
$C(graphite) \rightarrow C(g)$ $\Delta H = +712$ kJ mol^{-1}
$1/2H_2(g) \rightarrow H(g)$ $\Delta H = +215.5$ kJ mol^{-1}

The bond enthalpy in kJ mol^{-1} of the C-H bond in methane is
A +375
B +412
C -375
D -412

14. Which of the hydrides below will be hydrolysed in water to give a basic solution?
A CH_4
B SiH_4
C BH_3
D NaH

15. Choose the organic compound from the list below that will give a yellow precipitate with I_2/NaOH.
A 
B 
C 
D 

16. Which of the following compounds would likely undergo a nucleophilic addition reaction?
A Ethene
B Bromoethane
C Ethanal
D Benzene

17. The reaction $F_2 + 2ClO_2 \rightarrow 2FClO_2$ was shown to give the following results at 250 K:

Exp	$[F_2]$/mol dm^{-3}	$[ClO_2]$/mol dm^{-3}	Rate of disappearance of F_2/mol dm^{-3} s^{-1}
1	0.10	0.01	1.2×10^{-3}
2	0.10	0.04	4.8×10^{-3}
3	0.20	0.01	2.4×10^{-3}

The reaction is
A First order with respect to F_2 and zero order with respect to ClO_2
B Second order with respect to ClO_2 and first order with respect to F_2
C First order with respect to F_2 and first order with respect to ClO_2
D Second order with respect to F_2 and first order with respect to ClO_2

18. When bromoethane is refluxed with KOH in an alcoholic medium, compound Y is formed. Give the identity of Y.
A Ethanal
B Ethene
C Ethanol
D Ether

19. From the principal oxidation states of Sulphur, identify the oxidation state of a sulphur compound which is essentially a reducing agent.
A +4
B 0
C +2
D -2

20. Consider the following two reactions:
$N_2(g) + 2O_2(g) \rightarrow 2NO_2(g)$ $\Delta H = +88$ kJ
$N_2(g) + 2O_2(g) \rightarrow N_2O_4(g)$ $\Delta H = +10$ kJ
What will be the enthalpy change for the reaction: $2NO_2(g) \rightarrow N_2O_4(g)$
A +98 kJ
B +78 kJ
C -78 kJ
D -98 kJ

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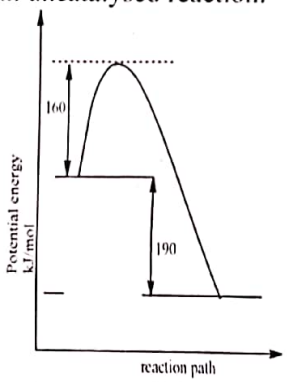
21. The following potential energy diagram is for an uncatalysed reaction.



When a catalyst is used the activation energy of the forward reaction is reduced to 35 kJ mol^{-1}. What is the activation energy of the catalyzed reverse reaction in kJ mol^{-1}?

A 35
B 225
C 125
D 155

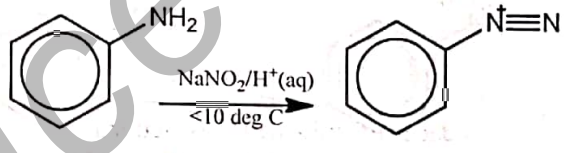
22. The equilibrium constant for the reaction: $PCl_3(g) + Cl_2(g) \leftrightarrows PCl_5(g)$ is 8.0×10^{-3} mol^{-1} dm^3. The equilibrium constant for the **REVERSE** reaction is

A 4.0×10^{-3} mol dm^{-3}
B 8.0×10^{-3} mol dm^{-3}
C 16×10^{-3} mol dm^{-3}
D 1.25×10^{2} mol dm^{-3}

23. Which of the compounds will give an alkane when reacted with soda lime?

A $CH_3CH(Br)CH_3$
B CH_3CH_2COOH
C $CH_3CH_2CH_2NH_2$
D $CH_3CH{=}CH_2$

24. What is the general name given to the following reaction?



A Reduction
B Nitration
C Diazotisation
D Coupling

25. An oxide in Period 3 reacts with NaOH and HCl to form salts. What is the formula of the oxide

A CO_2
B Al_2O_3
C SiO_2
D BeO

26. A salt Z was dissolved in water and the solution gave a white precipitate with both NaOH(aq) and $AgNO_3$(aq). The metal present in Z gives an apple green colour in a flame test. Identify the compound Z from the list below.

A $CuCl_2$
B $SrCl_2$
C $BaCl_2$
D KCl

27. What is the partial vapour pressure of methanol in a Mixture of methanol and ethanol if the mole fraction of ethanol is 0.8 and the total pressure of the mixture is 1 atm?

A 0.8 atm
B 0.2 atm
C 1 atm
D 0.25 atm

28. The Avogadro constant is defined as:

A The number of atoms in exactly 1gof carbon-12
B The number of atoms in exactly 12 g of carbon-12
C The number of atoms in 1/12th of the mass of carbon-12.
D The carbon atoms found in 6.02×10^{23} g of carbon

29. What is the oxidation state of chlorine in HClO

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

30. How are these two compounds, CH_3CH_2OH and CH_3OCH_3, related to each other?

A They both react with PCl^5
B They are allotropes
C They both form hydrogen bonds
D They are isomers

31. Which reagent could be used to distinguish between CH_3COCH_3 and CH_3CHO?
A 2,4-Dinitrophenylhydrazine
B $AgNO_3/NH_3(aq)$
C $I_2/NaOH$
D Neutral $FeCl_3$

32. Using the following half-cell equations and their standard electrode potentials:
$Fe^{3+}(aq) + e \leftrightarrows Fe^{2+}(aq)$ $E^{\ominus} = +0.77$ V
$Cu^{2+}(aq) + 2e \leftrightarrows Cu(s)$ $E^{\ominus} = +0.34$ V
what is the cell diagram?
A $Pt \mid Fe^{2+}(aq), Fe^{3+}(aq) \parallel Cu^{2+}(aq) \mid Cu(s)$
B $Cu^{2+}(aq) \mid Cu(s) \parallel Fe^{2+}(aq), Fe^{3+}(aq) \mid Pt$
C $Cu(s) \mid Cu^{2+}(aq) \parallel Fe^{2+}(aq), Fe^{3+}(aq) \mid Pt$
D $Pt \mid Fe^{3+}(aq), Fe^{2+}(aq) \parallel Cu(s) \mid Cu^{2+}(aq)$

33. How many orbitals are there in a d-subshell of an atom?
A 5
B 3
C 1
D 2

34. Which of the following aqueous mixtures could constitute an acid buffer solution?
A $CH_3COONa(aq)$ and $CH_3COOH(aq)$
B $NH_4Cl(aq)$ and $NH_3(aq)$
C $NH_3(aq)$ and $CH_3COOH(aq)$
D $CH_3COONa(aq)$ and $HCl(aq)$

35. Which of the elements with the electronic configuration given below will form an alkaline oxide?
A $3s^2\ 3p^4$
B $3s^2\ 3p^6$
C $3s^2\ 3p^5$
D $3s^2\ 3p^6\ 3d^{10}\ 4s^1$

36. The boiling point of water is higher than that of methanol because
A The methyl group is electron donating
B The molecular mass of methanol is more than that of water
C The water molecules has more van der Waal's forces than methanol
D Water can form two hydrogen bonds per molecule while methanol can form only one.

37. When boron trifluoride (BF_3) reacts with ammonia (NH_3), the bond formed is
A An ionic bond
B Hydrogen bond
C Dative covalent bond
D Simple covalent bond

38. Which of the following compounds will exhibit geometric isomerism?
A $CH_2=CHCH_3$
B $(CH_3)_2C=CHCH_3$
C $(CH_3)_2C=C(CH_3)_2$
D $CH_3CH_2CH=CHCH_2CH_3$

Questions 39 - 46 (eight questions)
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 all correct
B if1 and 2 only are correct
C if 2 and 3 only are correct
D if 3 only is correct

Directions Summarized			
A	**B**	**C**	**D**
1,2,3 correct	**1,2 only**	**2,3 only**	**3 only**

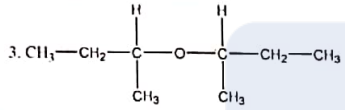
39. An acidified solution of $K_2Cr_2O_7$ is changed to green on warming with
1. propanone
2. propan-1-ol (1-propanol)
3. propan-2-ol (2-propanol)
A
B
C
D

40. A sample of lead isotope $^{209}_{82}Pb$ decays by emitting an alpha particle to form the nuclide W. If the half- life of the lead isotope is 3 hours, which of the following statements is/are correct?
1. W has an atomic mass of 205
2. The atomic number of W is 80
3. After 6 hours, 50% of the lead isotope would have decayed.
A
B
C
D

Go on to the next page

41. An organic liquid, U, which is optically active reacts vigorously with water producing an acidic solution. The compound, U, also produces a white precipitate with aqueous $AgNO_3$. The formula of U could be
1. $CH_3CH_2CH(Cl)CHO$
2. $CH_2(Cl)CH_2COCl$
3. $CH_3CH(Cl)COCl$

A
B
C
D

42. Possible products of the reaction of butan-2-ol (2- butanol) with excess concentrated H_2SO_4 include
1. $CH_3CH{=}CHCH_3$
2. $CH_2{=}CHCH_2CH_3$
3. 

A
B
C
D

43. In calculating the enthalpy change for the process:
$KCl(s) + aq \rightarrow K^+(aq) + Cl^-(aq)$, the datum/data necessary is/are
1. The atomization of potassium and chlorine
2. The ionization energy of potassium and the electron affinity of chlorine
3. The lattice energy of KCl(s)

A
B
C
D

44. Correct statements about Group II (group 2) elements include
1. Magnesium carbonate is stable to heat while $BaCO_3$ is not
2. The solubility of hydroxides in water increase down the group
3. The sulphates become less soluble in water down the group

A
B
C
D

45. Which of the following statement(s) concerning aniline (phenylamine) is (are) true?
1. It reacts with ethanoyl chloride (CH_3COCl) to give an amide
2. It is a weaker base than methylamine (CH_3NH_2)
3. It yields nitrogen gas when reacted with nitrous acid at temperature less than 5 °C.

A
B
C
D

Questions 46 - 50 (Five questions)

1) 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- Then choose:

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

B If both statements are true and 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 the second statement is true.

Summary of Directions			
	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	

	FIRST STATEMENT	SECOND STATEMENT
46.	In $Co(NH_3)_6Cl_3$, the oxidation number of cobalt is +3	The coordination number of cobalt is 3 in $Co(NH_3)_6Cl_3$
47.	Dimethyl amine , $(CH_3)_2NH$, is a weaker base than NH_3	A methyl group is a better electron donor than a hydrogen atom
48.	Neutral iron (III) chloride is used to distinguish between phenols and non-phenolic aromatic compounds	Phenols give a blue-violet complex with neutral iron (III) chloride while the non-phenolic aromatic compounds do not
49.	Sodium ethanoate, CH_3COONa, forms a basic solution when dissolved in water.	CH_3COO^- ions in aqueous solution combine with H^+ ions to formCH_3COOH resulting in a solution with an excess of OH^- ions
50.	HCl has a lower boiling point than HF	HCl is a stronger acid in water than HF