

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD  
General Certificate of Education Examination

0715 CHEMISTRY 1  
JUNE 2019

ADVANCED LEVEL

Centre Number	
Centre Name	
Candidate Identification Number	
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 “Advanced Level - 0715 CHEMISTRY 1”
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.

- An object placed on the path of a cathode ray in a cathode ray tube produces a sharp shadow on the screen placed at the anode. This statement indicates that
  - Electrons behave as a wave
  - Electrons travel in straight lines
  - Electrons have both wave and particle properties
  - Electrons are negatively charged
- Chlorate(I) ions in solution disproportionate on heating according to the equation:  
 $3\text{ClO}^-(\text{aq}) \rightarrow 2\text{Cl}^-(\text{aq}) + \text{ClO}_3^-(\text{aq})$   
 Select the oxidation states of chlorine in each of the three ions.
 

	$\text{ClO}^-$	$\text{ClO}_3^-$	$\text{Cl}^-$
A	+1	+3	-1
B	-1	+3	+1
C	+1	+5	-1
D	-1	+5	+1
- What kind of binding forces hold atoms together in anethanoic acid ( $\text{CH}_3\text{COOH}$ ) molecule?
  - Hydrogen bonding
  - Ionic bonding
  - Dipole-dipole attraction
  - Covalent bonding
- What happens when cyclohexane ( $\text{C}_6\text{H}_{12}$ ) is added to propanone ( $\text{CH}_3\text{COCH}_3$ ),
  - 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
- Why does the rate of a gaseous reaction increase with increase in pressure at constant temperature?
  - The particles have more space to move about
  - More particles have energy that exceeds the activation energy
  - The particles move faster
  - There are more frequent collisions between particles <sup>1 2 3 4 5 6</sup>
- A compound is made up of 86% carbon and 14% hydrogen. What is its empirical formula?  
 (C=12;H = 1)
  - CH
  - CH<sub>2</sub>
  - CH<sub>3</sub>
  - CH<sub>4</sub>
- Solutions of transition metal ions are coloured because
  - The ions have variable oxidation states
  - The energy difference between 3d and 4s orbitals is very close
  - The ions form complexes with different ligands
  - The ions have unpaired d-electrons which absorbs and emit light within the visible region of the electromagnetic spectrum
- Which of the following compounds of sulphur undergoes disproportionation in an acid medium?
  - S<sub>2</sub>Cl<sub>2</sub>
  - Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>
  - Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>
  - Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub>
- Identify the type of reaction in the conversion  
 $\text{CH}_3\text{CH}_3 + \text{Cl}_2 \rightarrow \text{CH}_3\text{CH}_2\text{Cl} + \text{HCl}$ 
  - Nucleophilic substitution
  - Electrophilic addition
  - Free radical substitution
  - Free radical addition
- In which of the species listed below is the number protons, neutrons and electrons
  - $^{27}_{13}\text{Al}$
  - $^{35}_{17}\text{Cl}^-$
  - $^{39}_{19}\text{K}^+$
  - $^{32}_{16}\text{S}^{2+}$
- Text Box: 0.2 g of a volatile liquid on complete evaporation occupied a volume of 30 cm<sup>3</sup> at standard temperature and pressure (0 °C, 1 atm). The relative molecular mass of the liquid can be calculated from the expression
  - $\frac{2240 \times 0.20}{30}$
  - $\frac{24000 \times 0.20}{20}$
  - $\frac{22400}{0.20 \times 30}$
  - $\frac{0.20 \times 23400}{30}$
- In which of the following reactions is the enthalpy change likely to be exothermic ( $\Delta H < 0$ )
  - $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$
  - $\text{CH}_3\text{COOH}(\text{aq}) \rightleftharpoons \text{CH}_3\text{COO}^-(\text{aq}) + \text{H}^+(\text{aq})$
  - $\text{O}^-(\text{g}) + \text{e}^- \rightarrow \text{O}_2^-(\text{g})$
  - $\text{Mg}(\text{g}) \rightarrow \text{Mg}^+(\text{g}) + \text{e}^-$

13. The hydrolysis of ethyl ethanoate is slow in neutral solution but faster when HCl(aq) is added. The function of the HCl is

A	To increase the rate at which ethyl ethanoate is formed in water
B	To ensure that the reaction reaches equilibrium
C	To suppress ionization of ethanoic acid
D	To increase the reaction rate by catalytic action

14. Ammonia is manufactured from nitrogen and hydrogen in the Haber process by the equation



Which condition affects the value of the equilibrium constant,  $K_c$ ?

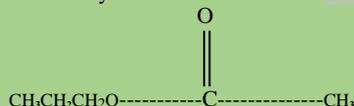
A	Increasing the pressure
B	Adjusting the temperature
C	Removing $\text{NH}_3$ from equilibrium mixture
D	Using a catalyst

15. When aqueous acidified  $\text{AgNO}_3$  was added to a metal halide, a precipitate was formed which dissolved in aqueous ammonia to give a colourless solution. The precipitate re-appeared on adding dilute  $\text{HNO}_3$ . The halide is likely to be

Which statement is correct about the reaction path?

A	NaCl
B	NaBr
C	KI
D	KBr

16. What is the systematic name of the following Compound?



- A Methyl propanoate  
B Pentanone  
C Propyl ethanoate  
D Methyl butanoic acid

17. Bromine reacts with ethene to form 1,2 dibromoethane.

Which is the correct description of the e organic intermediate of the reaction?

- A It carries a negative charge  
B It carries a positive charge  
C It is a free radical  
D It has a double bond

18. Which of the following permits the use of the +4 oxidation state by the Group IV (group 14) elements in the formation of compound?

- A Loss of s and p electrons  
B Loss of s electrons  
C Loss of p electrons  
D Loss of valence s and p electrons

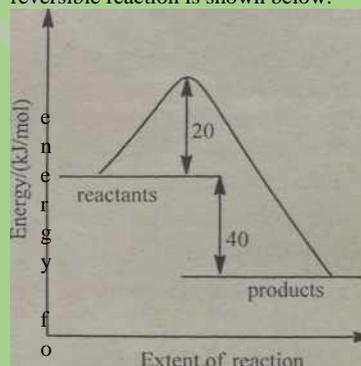
19. Carboxylic acids react with sodium hydrogen carbonate liberating a gas. The gas is  $\text{CO}_2$  because

A It is a colourless gas  
B It turns lime water milky  
C It turns blue litmus red  
D It quenches a glowing splint

20. Which of the following statement is NOT correct for the s-block elements?

A The solubility of Group II (group 2) sulphates increases down the group  
B All Group I (group 1) sulphates are soluble in water  
C Carbonates of Group I elements are thermally stable except  $\text{Li}_2\text{CO}_3$   
D The cationic size of the s-block elements increases down the group

21. The reaction pathway for a reversible reaction is shown below.



which statement is true about the reaction?

- A The enthalpy change for the forward reaction is  $+40 \text{ kJ mol}^{-1}$   
B The enthalpy change for the forward reaction is  $+20 \text{ kJ mol}^{-1}$   
C The enthalpy change for the reverse reaction is  $+20 \text{ kJ mol}^{-1}$   
D The activation

22. Given the following bond energy terms in  $\text{kJ mol}^{-1}$   $E(\text{C}-\text{H}) = 415$ ,  $E(\text{O}=\text{O}) = 497$ ,  $E(\text{C}=\text{O}) = 803$  and  $E(\text{O}-\text{H}) = 463$ . The equation for the complete combustion of methane is  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$  What is the enthalpy change of combustion of methane?

- A  $-1530 \text{ kJ mol}^{-1}$   
B  $-804 \text{ kJ mol}^{-1}$   
C  $-770 \text{ kJ mol}^{-1}$   
D  $-1530 \text{ kJ mol}^{-1}$

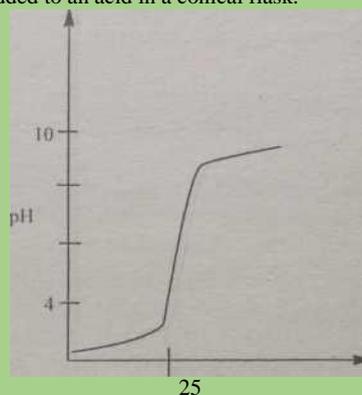
23. Which of the following statements is true for the elements across the second period of the periodic table?
- A The first ionization energy increases generally across the period  
 B The boiling point of the elements increase across the period  
 C The melting point of the elements increase across the period  
 D The atomic radius increase across the period
24. Which one of the following statements is correct about the complex  $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]^+$
- A It has an octahedral shape.  
 B It has a coordination number 4.  
 C It exhibits optical isomerism.  
 D It is tetrahedral in shape.
25. The concentration of 4.0 litres of  $\text{H}_2\text{SO}_4$  needed to repace 5.0 litres of 2.0 M solution is?
- A 10.0  
 B 2.5  
 C 20.0  
 D 5.0
26. Which of the following particles will **NOT** undergo deflection in a magnetic field.
- A Alpha particles  
 B Beta particles  
 C Electrons  
 D Neutrons
27. Which reagent will react with the compound  $\text{CH}_3\text{COCH}_3$ ?
- A Acidified  $\text{KMnO}_4$   
 B  $[\text{Ag}(\text{NH}_3)_2]^+$   
 C Hydrogen cyanide  
 D Acidified  $\text{K}_2\text{Cr}_2\text{O}_7$
28. Which of the following describes the type of structure found in ice?
- A Atoms joined by covalent bonds with no delocalization of electrons  
 B Atoms having some delocalization of mobile electrons  
 C Molecules held together by hydrogen bonds  
 D Molecules held together by weak van der Waal's forces
29. The following standard electrode potentials are given:



Determine the emf of the cell when the two half-cells are coupled. \_\_\_\_\_

A	-0.48
B	-1.04 V
<b>is</b>	+ 0.48 V
D	+ 1.04 V

- 4 30. The graph below shows the variation of pH when abase is added to an acid in a conical flask.



volume ( $\text{cm}^3$ )

Which is the acid/base pair that can give the titration curve?

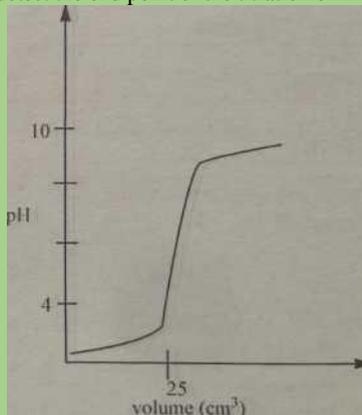
A  $\text{HCl}/\text{NaOH}$

B  $\text{HCl}/\text{NH}_3$

C  $\text{CH}_3\text{CO}_2\text{H}/\text{NaOH}$

D  $\text{CH}_3\text{CO}_2\text{H}/\text{NH}_3$

31. The pH range of an indicator that can be used to detect the end point of the titration of  $\text{HCl}/\text{Na}_2\text{CO}_3$



A 0-1

B 1-2

C 8 - 10

D 2 - 4

32. Which of the following compounds reacts with cone.

$\text{NaOH}$ .

A  $\text{CH}_3\text{CH}_2\text{OH}$

B  $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$

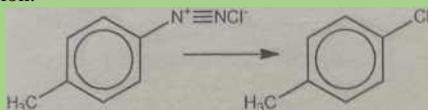
C  $\text{HCHO}$

D  $\text{CH}_3\text{CH}_2\text{CHO}$

33. The Avogadro number is defined as  
 A The number of electron in 12g of C-12 substance  
 B The number of particles in one mole of a substance ( $6.023 \times 10^{23}$  particles)  
 C The number of particles in carbon-12 isotope  
 D The number of atoms in exactly 1/12<sup>th</sup> g of carbon-12

34. On descending Group I (group 1), there is a steady increase in  
 A Molar volume  
 B Boiling point  
 C Ionization energy  
 D In the solubility of the sulphates

35. Identify suitable reagent (s) for the following conversion.



- A Cu(I)Cl/dilHCl  
 B Cl<sub>2</sub>/sun light  
 C Cl<sub>2</sub>/H<sub>2</sub>O  
 D DilHCl
36. The element whose anion has the electronic configuration  $1s^2 2s^2 2p^6 3s^2 3p^6$  belongs to  
 A s-block  
 B d-block  
 C f-block  
 D p-block
37. How can a pure sample of ethanol be obtained from an azeotropic mixture of ethanol and water?  
 A Simple distillation  
 B Fractional distillation  
 C Distillation with a third component  
 D Steam distillation
38. Which of these species cannot act as a ligand?  
 A CH<sub>3</sub>NH<sub>2</sub>  
 B H<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>  
 C C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>NH<sub>2</sub>  
 D CH<sub>3</sub>NH<sub>3</sub><sup>+</sup>

**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 if 1 and 2 only are correct  
 C if 2 and 3 only are correct  
 D if 3 only is correct

**Directions Summarized**

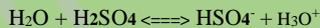
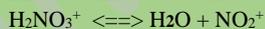
A	B	C	D
1,2,3 correct	1,2 only	2,3 only	3 only

39. Which of the following species are trigonal planar?

- CH<sub>4</sub>
- NH<sub>3</sub><sup>+</sup>
- BF<sub>3</sub>

- A  
 B  
 C  
 D

40. When cone H<sub>2</sub>SO<sub>4</sub> and cone HNO<sub>3</sub> are mixed, the following reaction occurs:



Which species are bases in these reactions according to Bronsted-Lowry theory?

- HSO<sub>4</sub><sup>-</sup>
- HNO<sub>3</sub>
- NO<sub>2</sub><sup>+</sup>

- A  
 B  
 C  
 D

41. Which product(s) will be formed when CH<sub>3</sub>CHO reacts with HCN?

- CH<sub>3</sub>CH<sub>2</sub>CN
- (CH<sub>3</sub>)<sub>2</sub>CHOH
- CH<sub>3</sub>CH(OH)CN

- A  
 B  
 C  
 D

42. The element carbon is different from the other elements in Group IV (group 14) of the periodic table because

- It forms an acid and a neutral oxide
- it is the only element that catenates
- All its oxides are gases

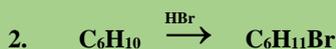
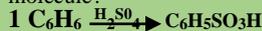
- A ;  
 B  
 C  
 D

43. Which of the following **statement(s)** is (are) correct about the reaction of iron (II) ion and the permanganate (VII) ion?

1. is a redox reaction
2. The oxidation state of manganese in permanganate (VII) ion reduces from +7 to +2
3. Iron (II) is the reducing agent

A  
B  
C  
D

44. Which of the following reaction(s) is (are) initiated by electrophilic attack on the organic molecule?



A  
B  
C  
D

45. The line emission spectrum of atomic hydrogen is

explained as follows:

1. The energy of the electron is quantized
2. The electron moves from one energy level to the other when energy of a particular wavelength is absorbed or emitted.
3. The motion of the electron is restricted to fixed energy levels

A  
B  
C  
D

46. For a catalyzed reversible reaction which statement(s) about the effect of the catalyst on the system is (are) correct?

1. The catalyst alters the mechanism of the reaction
2. The catalyst reduces the activation energy of both the forward and backward reactions
3. The catalyst alters the composition of the equilibrium mixture

A  
B  
C  
D

Questions 47 - 50 (Four 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
47.	When pentanol is warmed with acidified $\text{K}_2\text{Cr}_2\text{O}_7$ , the colour changes from orange to green.	$\text{Cr}^{6+}$ is orange and is reduced to $\text{Cr}^{3+}$ is green.
48.	An azeotropic mixture can be separated by fractional distillation.	For azeotropic mixtures, the liquid and vapour have the same composition.
49.	Theoretical and experimental values of lattice energies of NaCl and KCl are very close.	NaCl and KCl are purely ionic compounds.
50.	Ethanol has a higher boiling point than methoxymethane.	Hydrogen bonding exists between methoxymethane molecules