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MINISTRY OF SECONDARY EDUCATION

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

GCE AL

MARCH 2025

| 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 | | |
| CANDIDATE NAME: ……<br>CANDIDATE NUMBER: ……<br>CENTRE NUMBER: …… | SUBJECT TITLE CHEMISTRY | |
| 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 and - 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.**

**Questions 1 – 37 (Thirty-seven 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 of the following compounds will form hydrogen bonds?
   A. HF
   B. $CHCl_3$
   C. $PH_3$
   D. $SiH_4$

2. Which element when burnt in oxygen produces an oxide which is a reducing agent?
   A. Na
   B. Mg
   C. S
   D. Al

3. Alkenes undergo:
   A. Nucleophilic substitution reactions
   B. Electrophilic substitution reactions
   C. Electrophilic addition reactions
   D. Nucleophilic addition reactions

4. The formula of the most stable chlorides of each of the elements is:
   A. $CCl_2$, $PbCl_2$
   B. $CCl_3$, $PbCl_3$
   C. $CCl_2$, $PbCl_4$
   D. $CCl_4$, $PbCl_2$

5. Select the specie which has a dative covalent
   A. $NH_3$
   B. $SO_3^{2-}$
   C. $CO_3^{2-}$
   D. $NH_4^+$

6. When ethanol is warmed with aqueous acidified dichromate, $H^+/Cr_2O_7^{2-}$
   A. Orange to green
   B. purple to green
   C. yellow to green
   D. pink to green

7. 0.13g of a volatile liquid on evaporation gave a vapour that occupied a volume of $240cm^3$ at 20°and 760mmHg, the relative molecular mass of the liquid is:
   A. 32
   B. 46
   C. 13
   D. 44

8. The general outer electronic configuration of the group V elements is:
   A. $np^5$
   B. $ns^2np^5$
   C. $ns^2np^4$
   D. $ns^2np^3$

9. Which of the following pairs of particles are isoelectronic?
   A. $Na^+$, Na
   B. $Cl^-$, $S^{2-}$
   C. Na, Mg
   D. $Na^+$, Mg

10. The four main operations of the mass spectrometer in order of execution include:
    A. Vapourization, ionization, acceleration, deflection
    B. Vapourization, acceleration, ionization, deflection
    C. Acceleration, vapourization, ionization, deflection
    D. Ionization, acceleration, deflection, vapourization

11. In which of the following species are the bond angles approximately the same?
    A. . $H_2O$ and $H_3O^+$
    B. $NH_3$ and $H_2O$
    C. $NH_3$and $H_3O^+$
    D. $CH_4$ and $H_3O^+$

12. Which of the following changes will result in an increase in the rate of a chemical reaction?
    A. Decrease in temperature
    B. Decrease in pressure
    C. Decrease in activation energy
    D. Decrease in concentration of reactants

13. The coordination number of cobalt in the complex ion $[Co(en)_2Cl_2]$ is:
    A. 2
    B. 4
    C. 5
    D. 6

14. Which of the following tetrachlorides of group IV will not react with water?
    A. $CCl_4$
    B. $SiCl_4$
    C. $SnCl_4$
    D. $PbCl_4$

15. Bromine can be produced from the following reaction;$5Br^-_{(aq)} + BrO^-_{(aq)} + 6H^+_{(aq)} \rightarrow 3Br_{2\,(l)} + 3H_2O_{(l)}$Which two methods could be used to monitor the rate of the reaction?
    A. Conductivityand dilatometry
    B. Colorimetry and dilatometry
    C. Conductimetry and Colourimetry
    D. Titrimetry and dilatometry

16. What is the hydration energy of cesium chloride given that the lattice energy is -6574kj/mol and its heat of solution is +19kj/mol
    A. -6555kj/mol
    B. +6555kj/moi
    C. -6593kj/mol
    D. +6593kj/mol

17. Identify the particle X in the nuclear reaction $^4_2He + {}^{14}_7N \rightarrow {}^1_1H + X$ by giving its mass number and atomic number.
    A. 17 and 8 respectively
    B. 19 and 2 respectively
    C. 19 and 8 respectively
    D. 17 and 10 respectively

18. On addition of $20cm^3$ of distilled water to $80cm^3$ of a $0.05moldm^{-3}$ of hydrochloric acid solution, the concentration of the acid will change to _____
    A. $0.02moldm^{-3}$
    B. $0.2moldm^{-3}$
    C. $0.4moldm^{-3}$
    D. $0.04moldm^{-3}$

19. Which of the following will change the value of Kc?
    A. Concentration changes
    B. Pressure changes
    C. Temperature change
    D. Employing a catalyst

20. Which of the following reagents are the most suitable to distinguish between ethanal ($CH_3CHO$) and propanal ($CH_3CH_2CHO$)
    A. Ammoniacal $AgNO_3$
    B. 2,4-Dinitrophenylhydrazine
    C. $PCl_5$
    D. $D.I_2$ / NaOH

21. The standard redox potential for copper and silver electrodes are +0.34V and +0,80V respectively. What will be the value of the cell emf when the two cells are coupled?
    A. +1.14V
    B. -1.14V
    C. +0.46V
    D. -0.46V

22. The pH of a 0.05M solution of NaOH is:
    A. 14.0
    B. 12.69
    C. 11.25
    D. 13.0

23. A flame test is carried out on a solid sample of $BaCl_2$.What color will be observed on the Bunsen flame?
    A. Forest green
    B. Bluish green
    C. Apple green
    D. Dirty green

24. Consider the conversion of $CH_3CONH_2$ to $CH_3NH_2$.The reagent required for this conversion is:
    A. $LiAlH_4$ / dry ether
    B. $NaNO_2$/HCl, temp <
    C. Red $P_4$ / Zn / Heat
    D. $Br_2$ / KOH

25. What is the environmental consequence of the uncontrolled use of fertilizers?
    A. Acid rain
    B. Low oxygen levels in streams
    C. Ozone depletion
    D. Greenhouse effect

26. When 21.6$cm^3$ of a 0.18$moldm^{-3}$ sulphuric acid neutralized 25.0$cm^3$ of NaOH solution, 0.30g of the salt $Na_2SO_4$ was obtained after evaporation and weighing. (RMM $Na_2SO_4$ =142). The percentage yield for the reaction is:
    A. 50.0
    B. 54.3
    C. 52.3
    D. 53.4

27. Which of the following aqueous mixtures could constitute a basic 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 $HCl_{(aq)}$

28. Given the following standard enthalpy changes in KJ/mol: $\Delta H^\circ_c(C_6H_6)$ = -3267.6; $\Delta H^\circ_f(H_2O)$ = -285.9; $\Delta H^\circ_f(CO_2)$ = -393.5. The standard enthalpy of formation of benzene is:
$6C_{(s)} + 3H_{2(l)} \rightarrow C_6H_{6(l)}$
    A. +48.9
    B. +2016.4
    C. -679.4
    D. -2874.1

29. The position of the equilibrium for the reaction $2SO_{2(g)} + O_{2(g)} \leftrightarrow 2SO_{3(g)}$will shift to the right if there is:
    A. An Increase in pressure
    B. A Decrease in pressure
    C. Addition of finely divided iron
    D. A Change in temperature

30. The atomic number of chromium is 24. The correct electronic configuration of chromium in the compound $[Cr(H_2O)_6]Cl_3$ is:
    A. $[Ar]3d^24s^1$
    B. $[Ar]3d^44s^0$
    C. $[Ar]3d^34s^0$
    D. $[Ar]3d^24s^2$

31. For the reaction R → P: What is the order of the reaction with respect to R, if the rate increases 4 times when the concentration of R also increases 4 times?
    A. First order
    B. Third order
    C. Zero order
    D. Second order

32. What is the mole fraction of benzene in a mixture of equal masses of benzene ($C_6H_6$) and methylbenzene ($C_7H_8$) (RAM, C=12, H=1)?
    A. 0.46
    B. 0.64
    C. 0.54
    D. 0.45

33. Which of the following elements is diagonally related with beryllium?
    A. B
    B. LI
    C. Mg
    D. Al

34. Which one of the following techniques would be most appropriate in identifying the position of hydrogen atoms in an organic compound?
    A. Mass spectrometry
    B. Nuclear magnetic resonance
    C. X-ray diffraction
    D. Infra-red spectroscopy

35. Which of the following compounds exhibits cis-trans isomerism?
    A. $CH_2$=$CHCO_2H$
    B. $CH_2$=$CHCH_3$
    C. $CH_3CH$=$CH_2$
    D. $HO_2CCH$=$CHCO_2H$

36. The line emission spectrum of an element is proof that electrons _____
    A. are in quantized energy Levels
    B. have a negligible mass
    C. are negatively charged
    D. have wavelike properties

37. What kind of isomerism is exhibited by $[Co(NH_3)_5Br]^{2+}SO_4^{2-}$and $[Co(NH_3)_5SO_4]^+ Br^-$?
    A. hydration isomerism
    B. linkage isomerism
    C. ionization isomerism
    D. co-ordinate isomerism

**Questions 38 – 45 (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.**

| SUMMARISED DIRECTIONS | | | |
|---|---|---|---|
| **A** | **B** | **C** | **D** |
| **1, 2 and 3 All Correct** | **1 and 2 Only Correct** | **2 and 3 Only Correct** | **3 Only Correct** |

38. In calculating the enthalpy of solution of potassium chloride, the data necessary include
    1. The lattice enthalpy of potassium chloride
    2. The enthalpy of hydration of component ions
    3. the heat of formation of potassium chloride

39. Which of the following properties of the group I elements decrease(s) with increasing atomic number?
    1. Melting temperature
    2. First ionization energy
    3. Atomic radius

40. The product obtained from the ozonolysis of the alkene $(CH_3)_2C=C(CH_3)_2$ is:
    1. HCHO
    2. $CH_3CH_2CHO$
    3. $CH_3COCH_3$

41. From the following data $Zn^{2+}/Zn$ $E\emptyset = -0.76V$, $Fe^{3+}/Fe^{2+}$ $E^{\emptyset} = +0.77V$ it can be deduced that:
    1. The standard emf for the cell $Zn/Zn^{2+}//Fe^{3+}, Fe^{2+}/Pt_{(s)}$ is -1.53
    2. Zinc is a more powerful reluctant than $Fe^{2+}$.
    3. $Fe^{3+}$ can oxidize zinc under standard conditions

42. Which of the following statements about buffer solutions is (are) true?
    1. They have pH of 7
    2. They consist of conjugate acid and base
    3. They resist changes in pH upon addition of small amounts of a strong acid or base

43. Propan-1-ol and ethanol would differ in their reactions with:
    1. $PCl_5$
    2. $SOCl_2$
    3. $I_2$ in aqueous KOH

44. Which of the following statements about the reaction of iodine with NaOH is (are) correct?
    1. the reaction is a disproportionate reaction
    2. the oxidation number of iodine changes from 0 to +5 and -1
    3. Iodine reacts with alkalis at temperature of about 75°C to give iodide and iodine

45. Which of the following species can function as chelating ligands?
    1. $NH_3$
    2. $NH_2CH_2CH_2NH_2$
    3. EDTA

**Questions 46 – 50 (Five questions).**

***Directions:*** **Each of the 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 and the second statement is False.**
D. **If the first statement is False, but the second statement is True.**

| DIRECTIONS SUMMARISED | | | |
|---|---|---|---|
| **Option** | **First Statement** | **Second Statement** | **Comment** |
| A | TRUE | TRUE | **Second statement is a CORRECT explanation of the first statement.** |
| B | TRUE | TRUE | **Second statement is NOT a CORRECT explanation of the first statement.** |
| C | TRUE | FALSE | |
| D | FALSE | TRUE | |

| | FIRST STATEMENT | SECOND STATEMENT |
|---|---|---|
| 46. | When X-rays are incident on a crystal structure there is diffraction | X-ray diffraction is the bending or scattering of X-rays when incident on a crystal |
| 47. | The halogens show a change in physical state from gas in $F_2$ and $Cl_2$, through liquid in $Br_2$ to solid in $I_2$ and $At_2$ | Down group VII van der Waals forces increase in strength with increase in atomic number. |
| 48. | Oxides of nitrogen and Sulphur are responsible for air pollution | Acid rain is destructive to both animal and plant life |
| 49. | But-1-yne gives a red precipitate when treated with ammoniacal silver nitrate | Ammoniacal silver nitrate is used in distinguishing terminal alkynes from substituted alkynes |
| 50. | Heptane and hexane form an ideal mixture | There is an increase in volume during the formation of the mixture |

**END**

**GO BACK AND CHECK YOUR WORK**