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INDIAN SCHOOL SALALAH

FINAL EXAMINATION, FEBRUARY 2026 (AY 2025-26)

Class: XI **CHEMISTRY (043)** **Date: 12/02/2026**

Time: 3 Hrs. **Maximum Marks: 70**

General Instructions:

Read the following instructions carefully.

a) There are 33 questions in this question paper with internal choice.

b) SECTION A consists of 16 multiple-choice questions carrying 1 mark each.

c) SECTION B consists of 5 very short answer questions carrying 2 marks each.

d) SECTION C consists of 7 short answer questions carrying 3 marks each.

e) SECTION D consists of 2 case- based questions carrying 4 marks each.

f) SECTION E consists of 3 long answer questions carrying 5 marks each.

g) All questions are compulsory.

h) Use of log tables and calculators is not allowed.

[R = 0 .082$dm^3atmK^{-1}mol^{-1}$; R = 8.314 J/K/mol; h = 6.63X10^{-34}jsec, R_H = 1.09 X 10^7 m^{-1}, R_H = -2.18 X 10^{-18} J, mass of Electron = 9.1 X 10^{-31}Kg, Charge on electron = 1.6 X 10^{-19}C, At mass: Mg = 24, H = 1, O =16, Al = 27, Na = 23, N = 14, S = 32, C =12, He = 4, K = 39, Cl = 35.5, Ca = 40, P = 31, log5 = 0.6990, log3 = 0.4771, log2 = 0.3010]

SECTION A

The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

1 Which of the following compound(s) will show cis-trans isomerism? **1**

(i) $(CH_3)_2C=CH–C_2H_5$

(ii) $CH_2=CBr_2$

(iii) $C_6H_5CH=CH–CH_3$

(iv) $CH_3CH=CClCH_3$

(A) (i) and (ii) (B) (iii) and (iv)

(C) (ii) and (iii) (D) (ii) only

2 With increase of temperature, which of these changes? **1**

(A) Molality (B) Weight fraction of solute

(C) Molarity (D) Mole fraction

3 Which of the following is not permissible arrangement of electrons in an atom? **1**

(A) n = 5, l = 3, m = 0, s = + 1/2 (B) n = 3, l = 2, m = – 3, s = – 1/2

(C) n = 3, l = 2, m = – 2, s = – 1/2 (D) n = 4, l = 0, m = 0, s = – 1/2

4 The symbol and IUPAC name for the element with atomic number 120, respectively are **1**

(A) Ubn and unbinilium (B) Ubn and unbiunium

(C) Ubn and unnibium (D) Ubn and unnilium

5 Among the following pairs of compounds, the one that illustrates the law of multiple proportions is

(A) NH_3 and NCl_3 (B) CS_2 and $FeSO_4$

(C) H_2S and SO_2 (D) CuO and Cu_2O

6 Which of the following statements is **incorrect**? **1**

(A) The formation of ionic compounds depends upon the ease of formation of the positive and negative ions from the respective neutral atoms.

(B) Formation of ionic compounds depend upon arrangement of the positive and negative ions in the solid.

(C) Formation of positive ion involves addition of electron(s) while that of negative ion involves removal of electron(s).

(D) None of these

7 According to Fajan's rule, covalent bond is favoured by **1**

(A) Large cation and small anion (B) Large cation and large anion

(C) Small cation and large anion (D) Small cation and small anion

8 Which of the following statements are correct? **1**

(i) The extent of dissociation of an acid depends on the strength and polarity of the H — A bond (where A is an electronegative element.)

(ii) As the strength of H–A bond increases, the energy required to break the bond decreases.

(iii) As the electronegativity difference between the atoms H and A increases, acidity increases.

(A) (i) and (ii) (B) (ii) and (iii)

(C) (i) and (iii) (D) (i), (ii) and (iii)

9 The loss of electron is termed as **1**

(A) oxidation (B) reduction

(C) combustion (D) neutralization

10 The homolytic fission of a covalent bond liberates **1**

(A) Carbonium ions (B) Carbanions

(C) Free radicals (D) Carbenes

11 The oxidation state of Fe in Fe_3O_4 is **1**

(A) +3 (B) +8/3

(C) +6 (D) +2

12 Match the columns **1**

Column-I	Column-II
(A) $CH_2=CH_2 \rightarrow CH_3-CH_3$	(p) H_2, Zn, H^+
(B) $CH_3Cl \rightarrow CH_4$	(q) NaOH, CaO
(C) $CH_3Br \rightarrow CH_3CH_3$	(r) H_2, Pt/Pd
(D) $CH_3COONa \rightarrow CH_4$	(s) Na, dry ether

(A) A – (r), B – (p), C – (s), D – (q) (B) A – (p), B – (s), C – (r), D – (q)

(C) A – (s), B – (q), C – (p), D – (r) (D) A – (q), B – (p), C – (s), D – (r)

13 **Assertion (A)**: Chain isomerism is observed in compounds containing four or more than four carbon atoms. **1**

Reason (R): Only alkanes show chain isomerism.

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

14 **Assertion (A)**: The reaction $CaCO_{3(s)} \rightarrow CaO_{(s)} + CO_{2(g)}$ is an example of decomposition reaction. **1**

Reason (R): Above reaction is not a redox reaction.

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

15 **Assertion (A):** Benzene exhibit two different bond lengths, due to C–C single and C=C double bonds. **1**

Reason (R): Actual structure of benzene is a hybrid of two resonating structures.

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

16 **Assertion (A)**: All isotopes of a given element show the same type of chemical behaviour. **1**

Reason (R): The chemical properties of an atom are controlled by the number of electrons in the atom.

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

SECTION B

This section contains 5 questions with internal choice in one question. The following questions are very short answer type and carry 2 marks each.

17 20 g of $H_{2(g)}$ and 32 g of $O_{2(g)}$ are reacted to produce $H_2O_{(l)}$. Calculate the amount of $H_2O_{(l)}$ formed after completion of reaction. **2**

18 (a) When beryllium is bombarded with alpha particles, extremely penetrating radiations are emitted which cannot be deflected by electrical or magnetic fields. Which subatomic particle is present in these radiations? **2**

(b) Write electronic configuration of $^{52}_{24}Cr$.

19 A. If an electron, a hydrogen nucleus (proton), a helium nucleus (alpha particle), and a neon nucleus are all moving with the same velocity (equal to the velocity of light), which of these particles will have the longest de Broglie wavelength? Give reason. **2**

OR

B. Calculate the uncertainty in the position of an electron, moving with a velocity of 3.0×10^4 m/s, if the velocity is known to an accuracy of 0.011%.

20 (a) Write conjugate acid and conjugate base of H_2O. **2**

(b) Calculate pH of 5×10^{-2} M NaOH.

21 Define ionization enthalpy. Out of N and O which one has more ionization enthalpy and why? **2**

SECTION C

This section contains 7 questions with internal choice in one question. The following questions are short answer type and carry 3 marks each.

22 (a) Calculate the number of atoms in 2 g of H_2. **3**

(b) A compound contains C = 52.17%, H=13.04% and rest are oxygen. Calculate its empirical formula.

23 Calculate the energy required to remove an electron completely from the 2nd orbit of a hydrogen atom. What is the longest wavelength of light that can be used to cause this transition? **3**

24 **A.** (a) Arrange N^{3-}, F^- and O^{2-} in increasing order of ionic radii. **3**

(b) Arrange F, Cl, Br and I in decreasing order of electron gain enthalpy.

(c) How does metallic character changes in a group?

OR

B. (a) Boron shows diagonal relationship with which element and why?

(b) State Mendeleev periodic law.

(c) Write group number and period number of the element having atomic number 27.

25 How will you convert the following? **3**

(a) Ethane to butane.

(b) Propyne to propanone

(c) Ethene to Ethane-1,2-diol

26 (a) Draw the resonance structures for C_6H_5OH. Show the electron shift using curved-arrow notation. **3**

(b) Identify the reagents shown in bold in the following equations as nucleophiles or electrophiles:

$$CH_3COCH_3 + \mathbf{\bar{C}N} \rightarrow (CH_3)_2\,C(CN)(OH)$$

$$C_6H_6 + \mathbf{CH_3\overset{+}{C}O} \rightarrow C_6H_5COCH_3$$

27 Balance the redox equation in acid medium: **3**

$$Cr_2O_{7(aq)}^{2-} + I_{(aq)}^{-} \rightarrow Cr^{3+} + I_2$$

28 Write chemical equation for the following: **3**

(a) Beta elimination

(b) Decarboxylation

(c) Friedel Craft alkylation

SECTION D

The following questions 29 and 30 are case-based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.

29 Equilibrium is a stage when rate of forward reaction is equal to rate of backward reaction. Homogeneous equilibrium involves reactants and products in same physical state. The equilibrium between ions and unionised molecules of weak electrolyte is called ionic equilibrium. Equilibrium constant K changes only with change in temperature. Concentration, pressure, presence of catalyst changes the direction of equilibrium but do not change the value of equilibrium constant.

Answer the following questions:

a. Consider the reaction: $3H_{2(g)} + N_{2(g)} \rightleftharpoons 2NH_{3(g)}$ + heat **1**

(i) What are the favourable conditions of temperature and pressure for the manufacture of ammonia.

OR

(ii) Write expression for equilibrium constant Kp for the above reaction.

b. What is meant by dynamic equilibrium? **1**

c. Ka for acetic acid is 1.8×10^{-5}. What will be the degree of dissociation of 0.01 M of Acetic acid? **2**

30 Functional group is an atom or group of atoms joined in specific manner which is responsible the characteristic chemical properties of the organic compounds, e.g. -OH, -CHO, -COOH. Homologous series contain specific functional group and the member of series are called homologous which can be derived from same general formula. Each successive member differs by $-CH_2-$ and 14u in terms of mass. They have gradation in physical properties.

Answer the following questions:

a .(i) Write structural formula and IUPAC name of second member of ketone family. **1**

OR

(ii) Write IUPAC name of Acetaldehyde.

b. Out of aldehyde and ketone group which one is preferred in IUPAC system. **1**

c. Write functional isomer of C_2H_6O. Write their IUPAC names also. **2**

SECTION E

The following questions are long answer type and carry 5 marks each. All questions have an internal choice.

31 **A.** (a) Calculate number of sigma (σ) and pi (π) bonds in benzene. **5**

(b)Write IUPAC names of the products obtained by addition reactions of HBr to hex-1-ene (i) in the absence of peroxide and (ii) in the presence of peroxide.

(c)An alkene 'A' contains three C – C, eight C – H σ bonds and one C – C π bond. 'A' on ozonolysis gives two moles of an aldehyde of molar mass 44 u. Write structural formula and IUPAC name of 'A'.

OR

B. (a) What are the necessary conditions for any system to be aromatic?

(b) Why does benzene undergo electrophilic substitution reactions easily and nucleophilic substitutions with difficulty?

(c)Out of benzene, m–dinitrobenzene and toluene which will undergo nitration most easily and why? Also write down the IUPAC name of the product formed by the nitration of toluene.

32 **A.** (a) Define standard enthalpy of formation. **5**

(b) The combustion of one mole of benzene takes place at 298 K and 1 atm. After combustion, $CO_{2(g)}$ and $H_2O_{(1)}$ are produced and 3267.0 kJ of heat is liberated. Calculate the standard enthalpy of formation, $\Delta_f H^o$ of benzene. Standard enthalpies of formation of $H_2O(l)$ and $CO_{2(g)}$ are –393.5 $kJmol^{-1}$ and –285.83 $kJmol^{-1}$ respectively.

OR

B. (a) State Hess's Law of Constant Heat Summation.

(b) Define molar heat capacity. Calculate the number of kJ of heat necessary to raise the temperature of 60.0 g of aluminium from 35°C to 55°C. Molar heat capacity of Al is 24 J $mol^{-1}K^{-1}$.

33 **A.** Write the molecular orbital configurations of O_2 and O_2^+ and calculate their bond orders. Between O_2 and O_2^+, which is more stable and why? Also, state the magnetic character of both species with reasons. **5**

OR

B. (a) Draw shapes of NH_3 and H_2O molecules. Bond angle in water is less than that of ammonia. Why?

(b)Apart from tetrahedral geometry, another possible geometry for CH_4 is square planar with the four H atoms at the corners of the square and the C atom at its centre. Explain why CH_4 is not square planar?