



Reg. No. :

125

Name :

FIRST YEAR HIGHER SECONDARY MODEL EXAMINATION, FEBRUARY 2024

**Part – III
CHEMISTRY
Maximum : 60 Scores**

Time : 2 Hours
Cool-off Time : 15 Minutes

General Instructions to Candidates :

- There is a 'Cool off time' of 15 minutes in addition to the writing time.
- Use 'cool off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Give equations wherever necessary.
- Malayalam version of the questions is also provided.
- Electronic devices except non programmable calculators are not allowed in the Examination Hall.

വിദ്യാർത്ഥികൾക്കുള്ള പൊതുനിർദ്ദേശങ്ങൾ :

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിട്ട് 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും.
- 'കൂൾ ഓഫ് ടൈം' ചോദ്യങ്ങൾ പരിചയപ്പെടാനും ഉത്തരങ്ങൾ ആസൂത്രണം ചെയ്യാനും ഉപയോഗിക്കുക.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ, എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നൽകിയിട്ടുണ്ട്.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.



Score

(4×1=4)

Answer any 4 questions from 1 to 5. Each carries 1 score.

1. Write the number of significant figures in 0.0052.
2. Name any one scale of electronegativity of elements.
3. The hybridisation of carbon atom in C_2H_6 is _____
4. The hydrolysis product of which among the following salts will have pH less than 7.
 - a) NaCl
 - b) Na_2CO_3
 - c) CH_3COONa
 - d) NH_4Cl
5. Identify the structural isomerism present between $CH_3OC_3H_7$ and $C_2H_5OC_2H_5$.

Answer any eight questions from 6 to 15. Each carries 2 scores.

(8×2=16)

6. State and illustrate the law of definite proportions.



7. Write any two limitations of Rutherford's nuclear model of atom.
8. i) Write the de Broglie equation. (1)
- ii) Name the quantum number which is used to represent shape of the orbitals. (1)
9. i) Give the shape of PCl_5 molecule. (1)
- ii) PCl_5 Molecule is highly reactive. Why? (1)
10. i) Define entropy. (1)
- ii) Predict the change in entropy when a liquid crystallises into a solid. (1)
11. i) Write the expression for equilibrium constant for the following chemical reaction.
$$\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$$
 (1)
- ii) Write any two important features of equilibrium constant. (1)
12. i) Mention the colour change that happens to the solution when a Zn rod is dipped in an aqueous solution of copper nitrate taken in a beaker. (1)
- ii) Write the equation for the chemical reaction taking place in the above process. (1)



13. i) Name the electron displacement effect possible in the compound $\text{CH}_3 - \text{CH}_2 - \text{Cl}$. (1)

ii) Define the above electron displacement effect. (1)

14. Write the IUPAC names of the following compounds.

i) $(\text{CH}_3)_2\text{C}(\text{C}_2\text{H}_5)_2$ (1)

ii) $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_2 - \text{CH}_3}{\text{CH}} - \text{CH}_2 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_2 - \text{CH}_3$ (1)

15. What is Wurtz reaction ? Give an example.

Answer any eight questions from 16 to 26. Each carries 3 scores.

(8×3=24)

16. i) Distinguish between molecular formula and empirical formula. (2)

ii) Write the relationship between molecular formula and empirical formula. (1)

17. i) State Pauli exclusion principle. (1)

ii) Sketch the shape of 1s orbital. (1)

iii) How many nodes are present in the 1s orbital ? (1)




18. i) What is diagonal relationship ? (1)
- ii) The elements in the second period of the periodic table show anomalous behaviour. Give reason. (2)
19. i) Define electron gain enthalpy. (1)
- ii) How does it vary in a group and in a period. (2)
20. i) Write any two postulates of VSEPR theory. (2)
- ii) Explain the shape of H_2O molecule using VSEPR theory. (1)
21. i) State the first law of thermodynamics. (1)
- ii) What is meant by an adiabatic process ? (1)
- iii) Write any two examples for state functions. (1)
22. Explain the following :
- i) Conjugate acid-base pair. (1)
- ii) Ionic product of water. (1)
- iii) Buffer solution. (1)



Score

23. i) Define oxidation and reduction in terms of oxidation number. (2)
- ii) Find the oxidation number of Mn in KMnO_4 and Cr in $\text{K}_2\text{Cr}_2\text{O}_7$. (1)
24. i) Name any one type of adsorption chromatography. (1)
- ii) Match the separation technique given in column A with the mixtures given in Column B. (2)

Column A		Column B	
I.	Distillation	a.	Glycerol from spent lye
II.	Fractional distillation	b.	Aniline and Water
III.	Distillation under reduced pressure	c.	Fractions of crude oil
IV.	Steam distillation	d.	Aniline and Chloroform

25. i) Write any one method to prepare alkanes from carboxylic acids. (1)
- ii) Draw the sawhorse projection formula for the conformations of ethane. (2)
26. Complete the following reactions (major products only) :
- i) $\text{CH}_3 - \text{CH}_2 - \text{Cl} \xrightarrow{\text{alc. KOH}}$ (1)
- ii) $\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{HBr} \longrightarrow$ (1)
- iii)  + $\text{Cl}_2 \xrightarrow{\text{anhydrous AlCl}_3}$ (1)



Answer any four questions from 27 to 31. Each carries 4 scores.

27. i) Write any two postulates of Bohr's model of hydrogen atom. (2)
- ii) A microscope using suitable photons is employed to locate an electron in an atom within a distance of 0.1 \AA . What is the uncertainty involved in the measurement of its velocity? (2)
28. i) Write the molecular orbital configuration of oxygen molecule. (1)
- ii) Predict the magnetic nature of oxygen molecule. (1)
- iii) Calculate the bond order of oxygen molecule. (2)
29. i) State Hess's law of constant heat summation and mention any one of its application. (2)
- ii) Calculate the standard enthalpy of the reaction ($\Delta_r H^\circ$). (2)



$$\Delta_r H^\circ \text{ CaCO}_3 = -1206.9 \text{ kJ mol}^{-1}, \Delta_r H^\circ \text{ CaO} = -635.1 \text{ kJ mol}^{-1},$$

$$\Delta_r H^\circ \text{ CO}_2 = -393.5 \text{ kJ mol}^{-1}.$$



Score

- 30.** i) Write the Lewis concept of acids and bases. (2)
- ii) Give an example each for Lewis acid and Lewis base. (1)
- iii) Define pH. (1)
- 31.** i) What are nucleophiles and electrophiles ? Give an example for each. (3)
- ii) Write any one method to detect the presence of sulphur in an organic compound. (1)
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