



Class No. :

FY 1025

Name :

**FIRST YEAR HIGHER SECONDARY SECOND TERMINAL
EXAMINATION, DECEMBER 2022**

**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. The molecular formula of glucose is $C_6H_{12}O_6$. Its empirical formula is

2. The number of neutrons in $^{80}_{35}\text{Br}$ is

a) 35

b) 80

c) 45

d) 115

3. The group 16 elements are also known as

a) Halogens

b) Nitrogen family

c) Boron family

d) Chalcogens

4. Write the hybridisation of carbon atom in ethane molecule.

5. Which of the following is not a state function ?

a) Work

b) Entropy

c) Enthalpy

d) Gibb's energy



Score
(8×2=16)

Answer any 8 questions from 6 to 15. Each carries 2 scores.

6. Who proposed the law of conservation of mass ? State the law.
7. Define the following terms.
 - i) Molarity
 - ii) Molality.
8. Write any two drawbacks of Bohr model of atom.
9. Calculate the energy associated with the First orbit of He^+ .
10. i) State Mendeleev's periodic law. (1)

ii) How many groups and periods are present in the modern periodic table ? (1)
11. Mention the variation of ionisation enthalpy of elements in groups and periods of the periodic table.
12. Explain the shape of H_2O molecule using VSEPR theory.
13. Are all the five bond lengths in PCl_5 molecule equivalent ? Justify your answer.
14. What are extensive properties ? Give an example.
15. Write Gibbs equation and explain the terms involved in it.



Score

(8×3=24)

Answer any 8 questions from 16 to 25. Each carries 3 scores.

16. i) Write the number of significant figures in the following :

a) 0.0052

(½)

b) 126,000

(½)

ii) Distinguish between homogeneous and heterogeneous mixtures.

(2)

17. A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What are its empirical and molecular formulas.

18. What are the observations made by Rutherford in the α -particle scattering experiment ?

19. i) Draw the boundary surface diagram of 2px orbital.

(1)

ii) How many unpaired electrons are present in nitrogen atom and name the rule in determining it ?

(2)

20. i) Define electron gain enthalpy.

(1)

ii) Chlorine has high negative value of electron gain enthalpy than fluorine. Explain.

(2)

21. i) What is meant by diagonal relationship ?

(1)

ii) The elements of second period in the periodic table show anomalous properties. Give reason.

(2)

22. Write the postulates of VSEPR theory.

23. i) Define lattice enthalpy. (1)
- ii) The resultant dipole moment of NH_3 (4.90×10^{-30} cm) is greater than that of NF_3 (0.8×10^{-30} cm) inspite of the higher electronegativity of fluorine atom. Explain. (2)
24. i) What is bond order of a molecule ? (1)
- ii) How the bond order of a diatomic covalent molecule is related to its bond length ? (1)
- iii) Calculate the bond order of F_2 molecule. (1)
25. i) State Hess's law of constant heat summation. (1)
- ii) Calculate the standard enthalpy of the reaction

$\text{CaCO}_{3(s)} \rightarrow \text{CaO}_{(s)} + \text{CO}_{2(g)}$ using the following data :

$$\Delta H_f^\circ \text{CaO}_{(s)} = -635.09 \text{ kJmol}^{-1}$$

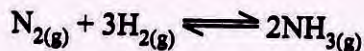
$$\Delta H_f^\circ \text{CaCO}_{3(s)} = -1206.92 \text{ kJmol}^{-1}$$

$$\Delta H_f^\circ \text{CO}_{2(g)} = -393.51 \text{ kJmol}^{-1} \quad (2)$$

Answer any 4 questions from 26 to 30. Each carries 4 scores.

(4×4=16)

26. Dinitrogen and dihydrogen react with each other to produce ammonia according to the following equation.



- i) Calculate the mass of ammonia produced if 2.00×10^3 g dinitrogen reacts with 1.00×10^3 g of dihydrogen. (2)
- ii) Which one of the two reactants remain unreacted and what would be its mass ? (2)



Score

27. i) Write the Schrödinger equation. (1)
- ii) Name the four quantum numbers. (2)
- iii) Using s, p, d, f notations, describe the orbital with the following quantum numbers.
- a) $n = 2, l = 1$. (½)
- b) $n = 5, l = 3$. (½)
28. i) Write the molecular orbital configuration of oxygen molecule. (2)
- ii) Draw the energy level diagram of molecular orbitals in the formation of oxygen molecule. (2)
29. i) Write the electronic configuration of Cr ($Z = 24$) and Cu ($Z = 29$). (2)
- ii) Explain the following :
- a) Aufbau principle. (1)
- b) Pauli exclusion principle. (1)
30. i) What are transition elements ? (1)
- ii) Write the general outer electronic configuration of transition elements. (1)
- iii) Write any two properties exhibited by transition elements. (2)