

Bhavan's Tripura Vidyamandir
1st Terminal Examination: (2025-2026)

Class:- 11

Time:- 3 Hours

Name of the student:

Subject:- Chemistry

Total :- 70 Marks

Roll: Sec:

General instructions

- 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 study questions carrying 4 marks each.
- f. SECTION E consists of 3 questions carrying 5 marks each.
- g. **All questions are compulsory.**

SECTION A

1. The number of significant figures in 10.3406g is
a. 2 b. 3 c. 1 d. 6
2. What is the mass per cent of carbon in carbon dioxide?
a. 0.034% b. 27.27% c. 3.4% d. 28.7%
3. Find empirical formula of the compound if M=68 % (atomic mass=34) and remaining 32% oxygen.
a. MO b. M₂O c. MO₂ d. M₂O₃
4. The molarity of one litre solution of 22.2 g CaCl₂ will be
a. 0.4M b. 0.2M c. 0.8M d. 0.6M
5. Which of the following series of transition in the spectrum of hydrogen atom fall in visible region?
a. Balmer series b. Paschen series c. Bracket series d. Lyman series.
6. An electron can move only in those orbits for which its angular momentum is integral multiple of
a. $h/4\pi$ b. $h/2\pi$ c. $h/\sqrt{2}\pi$ d. $h-2\pi$
7. Successive filling of 3s and 3p orbitals give rise to the third period. The number of elements present in this period are
a. 2 b. 4 c. 6 d. 8
8. Which of the following is not an actinoid?
a. Curium b. Californium c. Uranium d. Terbium.
9. Which of the following has octet around central atom?
a. PF₅ b. SF₆ c. CCl₄ d. BF₃
10. Bond order of which among the following molecules is zero?
a. F₂ b. O₂ c. Be₂ d. Li₂
11. Which of the following free radicals is the most stable?
a. Primary b. Methyl c. Secondary d. Tertiary
12. An example of electrophile is
a. NO₂ b. NH₃ c. NO₂⁺ d. H₂O.

Directions: These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

- (a) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
 - (b) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
 - (c) If the Assertion is correct but Reason is incorrect.
 - (d) If both the Assertion and Reason are incorrect.
13. **Assertion:** violet colour is the most deviated one.
Reason: the shorter is the wave-length the greater is the deviation.
 14. **Assertion:** second period consist of 8 elements
Reason: number of elements in each period is twice the number of atomic orbitals available in the energy level that is being filled.

15. **Assertion:** the dipole moment helps to predict whether the molecule is polar or non-polar.
Reason: the dipole moment helps to predict the geometry of molecules.
16. **Assertion:** butane and 2-methyl butane are homologous.
Reason: butane is a straight chain alkane while 2-methyl butane is a branched -chain alkane.

SECTION B

17. Explain law of multiple proportions with an example.

OR

Explain the law of constant proportion with an example.

18. Give the main features of Thomson's model for an atom.
19. The atomic number of an element is 16. Determine its position in accordance to its electronic configuration.
20. Why NH_3 has high dipole moment than NF_3 though both are pyramidal?
21. What is electrophile and nucleophile? Give example.

SECTION C

22. Round up the following up to three significant figures:
i. 34.216 ii. 10.4107 iii. 0.04597
23. Calculate the number of atoms in each of the following
i. 52 moles of Ar ii. 52u of He iii. 52 g of He.
24. Using s,p,d,f notations describe the orbital with the following quantum numbers
i. $n=2, l=1$ ii. $n=3, l=2$ iii. $n=5, l=3$
25. Explain the following
i. Be has higher 1st ionisation enthalpy than B
ii. O has lower 1st ionisation enthalpy than N and F.
26. Draw the geometry and shape of the following molecule
i. NH_3 ii. SF_4 iii. ClF_3
27. Calculate the bond order of : N_2 , O_2 , Ne
28. Draw the structure of the following molecule:
i. Aniline ii. Anisole iii. Nitrobenzene.

OR

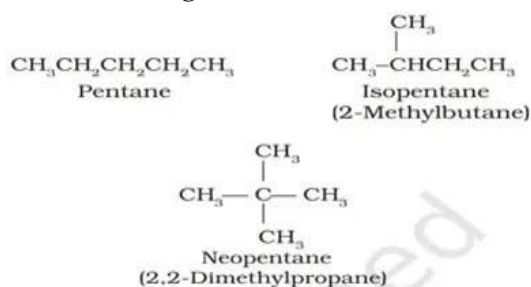
- i. draw the cis and trans isomer of hex-2-ene and compare their boiling point.
- ii. What is functional group? Give example.
- iii. Draw the structure of molecule: toluene.

SECTION D

Read the following passages and answer the questions that follow:

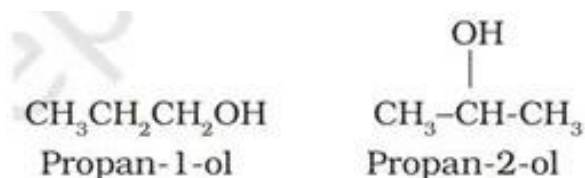
29. The phenomenon of existence of two or more compounds possessing the same molecular formula but different properties is known as isomerism. Such compounds are called as isomers. The following flow chart shows different types of isomerism.

Structural Isomerism Compounds having the same molecular formula but different structures (manners in which atoms are linked) are classified as structural isomers. Some typical examples of different types of structural isomerism are given below:

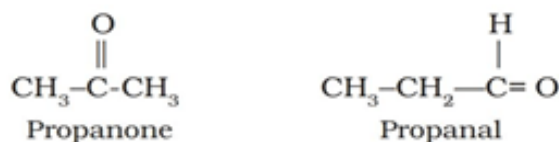


(i) Chain isomerism: When two or more compounds have similar molecular formula but different carbon skeletons, these are referred to as chain isomers and the phenomenon is termed as chain isomerism. For example, C_5H_{12} represents three compounds:

(ii) Position isomerism: When two or more compounds differ in the position of substituent atom or functional group on the carbon skeleton, they are called position isomers and this phenomenon is termed as position isomerism. For example, the molecular formula C_3H_8O represents two alcohols:



Functional group isomerism: Two or more compounds having the same molecular formula but different functional groups are called functional isomers and this phenomenon is termed as functional group isomerism. For example, the molecular formula C_3H_6O represents an aldehyde and a ketone:



(iv) Metamerism: It arises due to different alkyl chains on either side of the functional group in the molecule. For example, $C_4H_{10}O$ represents methoxy propane ($CH_3OC_3H_7$) and ethoxyethane ($C_2H_5OC_2H_5$).

- a. draw the probable isomer of butane.
- b. name the type of isomer shown by but-1-ene and but-2-ene.
- c. write the isomer of formula C_2H_6O and name the type of isomer.

OR

Write the isomer of C_3H_6O and name the type of isomer.

30. The covalent bond may be classified into two types depending upon the types of overlapping : (i) Sigma(σ) bond, and (ii) pi(π) bond

i) Sigma (σ) bond: This type of covalent bond is formed by the end to end (head-on) overlap of bonding orbitals along the internuclear axis. This is called as head-on overlap or axial overlap. These can be formed by any one of the following types of combinations of atomic orbitals.

s-s overlapping: In this case, there is overlap of two half-filled s-orbitals along the internuclear axis.

s-p overlapping: This type of overlap occurs between half-filled s-orbitals of one atom and half-filled p-orbitals of another atom.

p-p overlapping : This type of overlap takes place between half-filled p-orbitals of the two approaching atoms.

(ii) π bond : In the formation of π bond the atomic orbitals overlap in such a way that their axes remain parallel to each other and perpendicular to the internuclear axis. The orbitals formed due to sidewise overlapping consists of two saucer type charged clouds above and below the plane of the participating atoms.

- a. what type of hybridization is shown by each carbon atom in ethyne molecule.
- b. count the total number of sigma and pi bond present in benzene.
- c. which bond is more stronger: sigma or pi. Give reason.

OR

Explain the hybridization of ethane molecule.

SECTION E

31. i. calculates the mass per cent of different elements present in sodium sulphate.
ii. Calculate the amount of water produced by the combustion of 16g of methane.
iii. Calculate the molecular mass of glucose.

OR

- i. calculate the mass percent of different elements present in ethanol.
ii. Calculate the amount of carbon di oxide producer by the combustion of 32 g of methane.
iii. Calculate the molecular mass of acetic acid.
32. i. what are isoelectronic species. Give example.
ii. How would you justify the presence of 18 elements in the 5th period of the periodic table?
iii. Give two examples of transition elements.

OR

- i. what is ionisation enthalpy . Give example.
ii. Compare 1st and 2nd ionisation enthalpy between sodium and magnesium atom.
iii. Give two examples of inner transition elements.
33. i. writes the resonance structure of (a) CH_3COO^- (b) $\text{C}_6\text{H}_5\text{NH}_2$
ii. Explain why $(\text{CH}_3)_3\text{C}^+$ is more stable than CH_3CH_2^+ and CH_3^+ is the least stable cation.

OR

- i. define homologous series. Give example.
ii. write two properties of covalent compound.
iii. How many sigma and pi bond present in $\text{CH}_2=\text{C}=\text{CHCH}_3$