

(i) Printed Pages : 7 Roll No.

(ii) Questions : 8 Sub. Code :

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Exam. Code :

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Bachelor of Science (FYUP) 2nd Semester

(2056)

CHEMISTRY

Paper : General Chemistry-2

Time Allowed : Three Hours] [Maximum Marks : 67

Note :— (i) Question No. 1 consists of Multiple Choice Questions (MCQs) and is a compulsory question.

(ii) Question No. 2 consists of short-answer type questions and is also compulsory.

(iii) Units I-III each contain two questions with an internal choice. Attempt one question from each unit.

(iv) Attempt a total of five questions - two compulsory questions (Q.1 and Q.2) and three questions from Units I-III.

Compulsory UNIT (19 Marks)

1. Attempt the following multiple-choice questions:

(a) Which model best explains the electrical conductivity of metals?

(i) Valence Bond Model

(ii) Electron Sea Model

(iii) Molecular Orbital Model

(iv) Crystal Field Theory

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- (b) The strength of London dispersion forces generally increases with;
- (i) Decreasing molecular size
 - (ii) Increasing polarizability
 - (iii) Decreasing number of electrons
 - (iv) Increasing electronegativity
- (c) The paramagnetism of oxygen is explained by:
- (i) Valence bond theory
 - (ii) Molecular orbital theory
 - (iii) VSEPR theory
 - (iv) Lewis theory
- (d) The maximum number of stereoisomers possible for a compound with n chiral centres is:
- (i) 2^n
 - (ii) n^2
 - (iii) $n!$
 - (iv) $2n$
- (e) Compounds that are stereoisomers but not mirror images are called:
- (i) Enantiomers
 - (ii) Diastereomers
 - (iii) Structural isomers
 - (iv) Conformers
- (f) Which halogen shows greater selectivity in substitution reactions?
- (i) F
 - (ii) Cl
 - (iii) Br
 - (iv) I

(g) Which gas law states that pressure is inversely proportional to volume at constant temperature?

(i) Charles' Law (ii) Boyle's Law

(iii) Graham's Law (iv) Dalton's Law

(h) The temperature above which a gas cannot be liquefied by pressure alone is called:

(i) Absolute temperature (ii) Critical temperature

(iii) Reduced temperature (iv) Inversion temperature

(i) Which of the following is a state function?

(i) Work (ii) Heat

(iii) Path (iv) Internal Energy 1×9

2. Answer the following short-answer questions:

(a) What do you mean by doping? Give examples.

(b) Give two differences between the hydrogen bond and the covalent bond.

(c) What is molecular chirality? Give examples.

(d) Draw Fischer projection of lactic acid.

(e) Write the Van der Waals equation of state. 2×5

UNIT-I

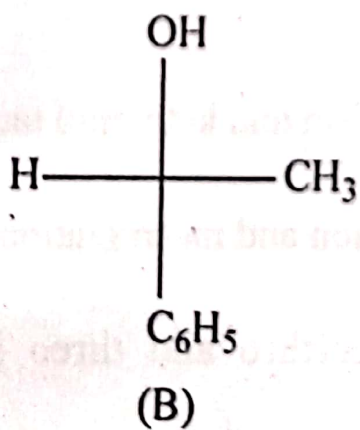
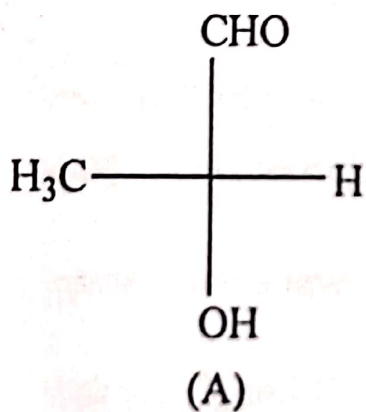
3. (a) Discuss the formation of the hydrogen molecule based on valence bond theory.
- (b) What is hybridization? Discuss the structures of PF_5 , BF_3 , and BeCl_2 .
- (c) What are the conditions for the linear combination of atomic orbitals?
- (d) Draw the molecular orbital diagram of N_2 . Calculate its bond order in N_2 and N_2^+ . 4,4,4,4
4. (a) Write a note on brittleness and conduction of electricity in ionic solids.
- (b) Discuss the structure of NaCl .
- (c) Calculate the radius ratio for the trigonal site.
- (d) Write a note on Schottky defects. Discuss the conditions causing Schottky defects. 4,4,4,4

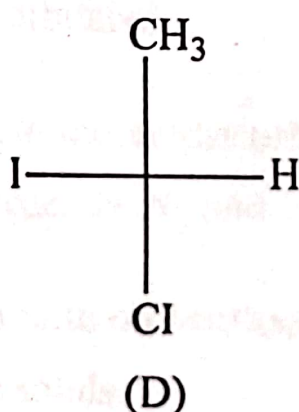
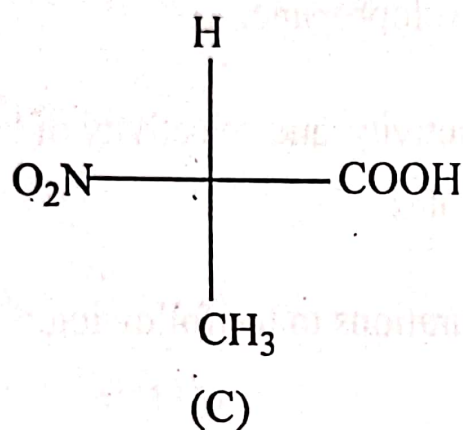
UNIT-II

5. (a) Write a note on Sabatier and Senderen's reaction.
- (b) Discuss halogenation in alkanes giving examples.

- (c) Discuss ring strain in cyclopropane.
- (d) Explain orientation, reactivity, and selectivity of hydrogen atoms in organic molecules. 4,4,4,4

6. (a) Assign R and S configurations to the following.





- (b) Explain functional isomerism and keto-enol tautomerism.
- (c) Write briefly about inversion and racemization.
- (d) Differentiate between erythro and threo isomerism.
Give examples. 4,4,4,4

UNIT-III

7. (a) Explain the postulates of the kinetic theory of gases.
- (b) Derive the most probable velocity from Maxwell's distribution law.

- (c) Explain the concept of collision number and mean free path.
- (d) Discuss the Joule-Thomson effect and explain its importance in the liquefaction of gases. 4,4,4,4
8. (a) Explain the types of thermodynamic systems. Discuss open system, closed system, and isolated system with suitable examples.
- (b) State and explain the First Law of Thermodynamics. Discuss its mathematical expression.
- (c) Explain Joule's law of internal energy and its significance.
- (d) What are C_p and C_v ? Derive the relationship between C_p and C_v for an ideal gas. 4,4,4,4