22CHU410

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Fourth Semester)

Branch – **CHEMISTRY**

GENERAL CHEMISTRY - IV

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. The unit cell with $a \neq b \neq c$ and $\alpha=\beta=\gamma=90$ refers to _____ crystal system.
   (i) Hexagonal (ii) Trigonal
   (iii) Triclinic (iv) Orthorhombic

2. Secondary amines can be prepared by:
   (i) Reduction of nitro compounds (ii) Reduction of isonitriles
   (iii) Reduction of nitriles (iv) Oxidation of N-substituted amides

3. Among the following _____ is optical active.
   (i) n-propanol (ii) 2-chlorobutane (iii) n-butanol (iv) 4-hydroxyheptane

4. Enzyme catalysis is an example of _____.
   (i) Induced catalysts (ii) Auto catalysts
   (iii) Heterogeneous catalysts (iv) Homogeneous catalysts

5. Which of the following compound is considered for calculating the octane number?
   (i) n-heptane (ii) n-hexane (iii) iso-octane (iv) iso-butane

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6. a State and explain the law of rational indices.
   OR
   b Explain the crystal structure of NaCl.

7. a Discuss the preparation of alkyl and aryl amines.
   OR
   b Show the amine salts as phase transfer catalyst.

8. a Explain the concept of isomerism with examples.
   OR
   b i) Differentiate Enantiomers and Diastereomers with an example (2.5 Marks).
   ii) Write the examples for of E/Z isomers (1.5 Marks).

9. a Differentiate the physical adsorption and chemical adsorption.
   OR
   b Compare homogeneous and heterogeneous catalysis.

10. a Brief the cetane number with its example.
    OR
    b Describe the method of production of biogas.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11. a i) Derive the Bragg's equation.
ii) Explain the crystal structure of CsCl. (3+3)

OR

b Discuss about Bravais lattices.

12. a Identify and interpret the separation method for Separating primary, Secondary and tertiary amines in a mixture.

OR

b Discuss the preparation and chemical reactions of nitroalkanes.

13. a i) Describe the walden inversion with suitable example. (3 Marks)
ii) Explain the Asymmetric synthesis and give an example. (3 Marks)

OR

b i) Illustrate the geometrical isomerism with examples. (3 Marks)
ii) Discuss the Atropisomerism with suitable examples. (3 Marks)

14. a Explain the unimolecular surface reaction using Langmuir theory.

OR

b Derive Michaelis menten equation for enzyme catalytic mechanism.

15. a Interpret the cracking of fuels. Discuss about the catalytic cracking and advantages in detail.

OR

b Outline the processes of manufacture of water gas and producer gas.

Z-Z-Z END