SET-A

SRM Institute of Science and Technology
Delhi-NCR Campus, Modinagar
CYCLE TEST – II

Branch: AIML | **Session/Sem: 2022-23/I**
Subject: Chemistry | **Code: 21CYB101J**
Duration: 1hr 40 mins | **Max. Marks: 50 marks**

Part A
Attempt all questions (1x10=10 marks)

1. Which of the following properties is NOT a function of state? (Marks: 1; BL: 1; CO: 2; PO: 1)
(a) Enthalpy (b) Internal Energy (c) Entropy (d) Concentration

2. The correct order of relative strength of halogen acids is (*HSAB concept*) (Marks: 1; BL: 1; CO: 2; PO: 1)
(a) HCl < HF < HBr < HI (b) HF < HCl < HBr < HI
(c) HI < HBr < HCl < HF (d) HI < HCl < HBr < HF

3. The intermediate formed in the SN1 mechanism is (Marks: 1; BL: 1; CO: 3; PO: 1)
(a) free radical (b) carbocation (c) carbanion (d) No intermediate formed

4. The type of isomerism shown by Butan-1-ol and Butan-2-ol is (Marks: 1; BL: 1; CO: 3; PO: 1)
(a) functional isomerism (b) chain isomerism (c) position isomerism (d) metamerism

5. The rate of reaction in E2 mechanism depends on the concentration of (Marks: 1; BL: 1; CO: 3; PO: 1)
(a) only substrate (b) only base (c) neither substrate nor base (d) substrate and base both

6. The conformation with 0° dihedral (torsional) angle is known as (Marks: 1; BL: 1; CO: 3; PO: 1)
(a) Staggered conformation (b) Eclipsed conformation (c) Gauche conformation (d) None of these

7. The entropy of the system increases in the order (Marks: 1; BL: 1; CO: 2; PO: 1)
(a) Gas < Liquid < Solid (b) Solid < Liquid < Gas (c) Gas < Solid < Liquid (d) Liquid < Solid < Gas

8. A process is in the equilibrium state when (Marks: 1; BL: 1; CO: 2; PO: 1)
(a) $\Delta G > 0$ (b) $\Delta G < 0$ (c) $\Delta G = 0$ (d) none of these

9. Which of the following is highly reactive? (Marks: 1; BL: 1; CO: 3; PO: 1)
(a) C_5H_{10} (b) C_3H_4 (c) C_4H_4 (d) C_6H_{12}

10. Pick out the reagent suitable for oxidation reactions (Marks: 1; BL: 1; CO: 3; PO: 1)
(a) $KMnO_4$ (b) $LiAlH_4$ (c) $NaBH_4$ (d) H_2

Part B
Attempt all questions (10 x 4=40 marks)

11. (a) Differentiate between characteristics of hard acids and soft acids. (Marks: 5; BL: 2; CO: 2; PO: 2)

(b) Discuss enthalpy and internal energy. (Marks: 5; BL: 2; CO: 2; PO: 1)

OR

12.(a) Define entropy. Show its mathematical expression and comment on its physical significance. (Marks: 5; BL: 1; CO: 2; PO: 1)

(b) Discuss briefly about Gibb's free energy and Helmholtz free energy. (Marks: 5; BL: 2; CO: 2; PO: 1)

13. (a) Explain chain and metamerism with suitable example. (2.5+2.5) (Marks: 5; BL: 2; CO: 3; PO: 1)

(b) What do mean by racemization and racemic mixture? Explain with the help of an example. (3+2) (Marks: 5; BL: 2; CO: 3; PO: 1)

OR

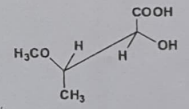
14.(a) Define centre of symmetry with example. (2+2) (Marks: 4; BL: 1; CO: 3; PO: 1)

(b) What is the reaction of halogens and hydrogen with cycloprapane? (2+2) (Marks: 4; BL: 1; CO: 3; PO: 1)

(c) How alkenes are oxidized using $KMnO_4$? (Marks: 2; BL: 1; CO: 3; PO: 1)

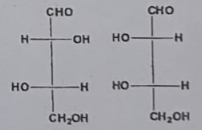
15.(a) Explain the conformational analysis of n-butane with potential energy diagram. (Marks: 8; BL: 2; CO: 3; PO: 2)

(b) Convert the following structure to Fischer projection. (Marks: 2; BL: 2,3; CO: 3; PO: 2)

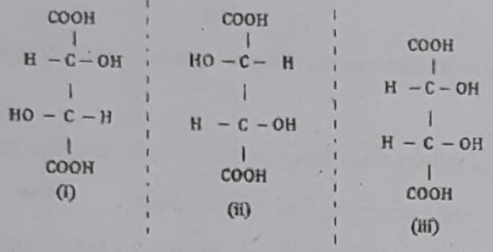


OR

16.(a) Differentiate between enantiomers and diastereomers and find out the relation between following pair of molecules. (Marks: 5; BL: 3,4; CO: 3; PO: 2)



(b) Assign absolute configuration R or S to the following structures using Cahn-Ingold-Prelog rules. (Marks: 5; BL: 3,4; CO: 3; PO: 2)



17. Describe about addition reactions with its types. Illustrate their free radical mechanism. (4+6)

(Marks: 10; BL: 2; CO: 3; PO: 1)

OR

18 (a) Draw the synthetic scheme of *paracetamol* and comment on its uses. (2+3)

(Marks: 5; BL: 2,3; CO: 3; PO: 1)

(b) What is the use of Dieckmann condensation reaction? Discuss its mechanism. (1+4)

(Marks: 5; BL: 2; CO: 3; PO: 1)