

# Parvatibai Chowgule College of Arts and Science

(AUTONOMOUS)

BSc Examination January/February 2022

Semester: I

Subject: Chemistry

Title: General Organic and Inorganic Chemistry (Core)

Duration : 2 Hours

Total Marks : 45

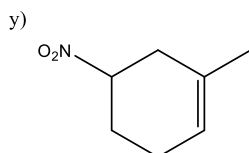
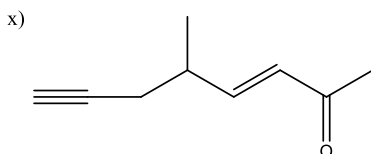
**Instructions :**

- I. All Questions Are Compulsory.
- II. Figures To The Right Indicate Full Marks.
- III. Use Of Calculators Is Allowed.

**Q1)** Answer *any three* of the following.

(3x3=9)

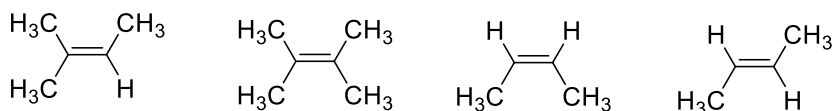
a) i) Give the structure of (*E*)-4-methoxypent-2-enoic acid. Write the IUPAC names for the following compounds.



ii) Explain the formation of ethane using the hybridisation concept.

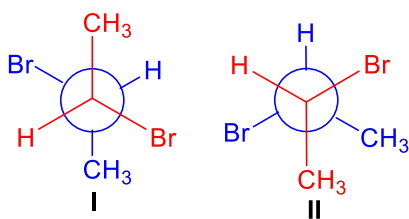
iii) Explain the stability of different conformations of cyclohexane using energy profile diagram.

iv) Give any 4 physical properties of alkenes. Arrange the following compounds in increasing order of their stability.



**Q2)** Answer *any two* of the following.

a) i) Convert the following Newmann formulae into Fisher formulae, assign R/S configuration to the stereogenic centres and state the relationship between I & II. **3**



- ii) How isolation of intermediates helps in the determination of reaction mechanism? 3
- b)i) Explain the following with suitable reactions. 3
- x) Corey-House synthesis
- y) Wurtz reaction
- ii) Convert 1-methylcyclohex-1-ene to 2-methylcyclohexan-1-ol. Also identify the type of reaction involved. 3
- c)i) Explain geometrical isomerism with respect to alkenes and oximes. 3
- ii) Explain Zaitsev rule with a suitable example. 3
- Q3)** Answer *any two* of the following.
- a) i) With a balanced chemical reaction, explain the action of ammonia on alkali metals. 3
- ii) With a balanced chemical reaction, give the preparation of diborane from ionic hydrides and  $\text{BCl}_3$ . Also, with a balanced chemical reaction, explain, what happens when diborane is heated at  $250^\circ\text{C}$ . 3
- b) i) Explain why lithium forms large number of complexes. Write the balanced chemical reaction of alkali metal with bidentate ligand. 3
- ii) What are orthosilicates? Explain the structure of topaz. 3
- c) i) Give the biological importance of  $\text{Na}^+$  and  $\text{K}^+$  ions. 3
- (ii) Write the resonance hybrid structures of  $\text{S}_4\text{N}_4$ . 3
- Q.4)** Answer *any one* of the following.
- a) i) A cyclic organic intermediate **X** with molecular formula  $\text{C}_6\text{H}_4$  on reaction with  $\text{H}_2\text{O}$  gives an aromatic compound **Y**, whereas on reaction with  $\text{NH}_3$  gives another aromatic compound **Z**. Write the above two reactions and identify the structures of **X**, **Y** & **Z**. Also give a method of preparation of compound **X**. 5
- ii) 1-Ethylcyclohexene on reaction with ozone in zinc dust gives a compound P. However, when it reacts with ozone in the presence of  $\text{H}_2\text{O}_2$  it gives Q. Write the above reactions and identify all the products. Also give the preparation of 1-ethylcyclohexene from the corresponding halo compound. 4
- iii) Discuss the structure of  $\text{ClF}_3$  with hybridization. 3
- b)i) 4-Bromo-4-methylbutane when treated with aqueous  $\text{NaOH}$  gives an alcohol whereas it gives two alkenes when reacted with potassium ethoxide at  $70^\circ\text{C}$ . 2-pentene on reaction with  $\text{Br}_2$  in  $\text{CCl}_4$  gives a dihalide. Write the reactions and identify the products in both the

above-mentioned reactions. Also write the two stereoisomers of 2-pentene.

ii) 3-Methylbutene on hydration in acidic medium gives two alcohols (one major and the other minor). But when it is subjected to oxymercuration-demercuration it gives only one product. Write the two reactions and identify all the products. **4**

iii) Explain the basic properties of halogens. **3**

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