Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
(Autonomous)
End Semester Examination: Jan.2022
Faculty: Science and Technology

Program: (BScGen03)   Semester: I   SET: C
Program (Specific): General B. Sc.   Course Type: CC theory
Class: F.Y. B.Sc.   Max. Marks: 35
Name of the Course: Organic and Inorganic chemistry
Course Code: 22-CH-102   Time: 2Hr
Paper: II

Instructions to the candidate:

1) *There are 4 sections in the question paper. Write each section on separate page.*
2) *All Sections are compulsory.*
3) *Figures to the right indicate full marks.*
4) *Draw a well labelled diagram wherever necessary.*

SECTION: A

Q1) Explain the following.   **5**

   i)   **Carbocation**
   ii)   **Heterolysis**
   iii)   **Covalent bond**
   iv)   **Hydrocarbons**
   v)   **Bond length**

Q2) Answer Any <u>FOUR</u> of the following.   **4**

   i)   **pi bond is weaker than sigma bond. Explain.**
   ii)   **What are alkenes?**
   iii)   **State Saytzeff rule.**
   iv)   **What is C=C double bond length in ethene molecule?**
   v)   **What is the geometry of sp^3 hybridization?**
   vi)   **What is the bond angle in sp hybridization?**

SECTION: B

Q3) Answer Any <u>FOUR</u> of the following.   **8**

   i)   **Draw resonating structures of aniline.**
   ii)   **Distinguish between electrophile and nucleophile.**

iii)   What is the action of Br_2 / CCl_4 on ethylene?
iv)   What is the difference between sp^3d^2 and d^2sp^3 hybridization?
v)   Draw the structure of BF_3.
vi)   Draw the structure of $[Mn(Cl)_4]^{2-}$.

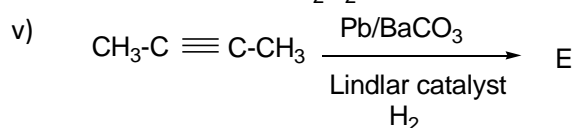## SECTION: C

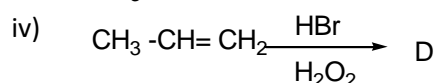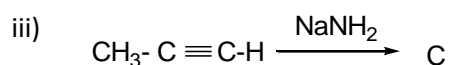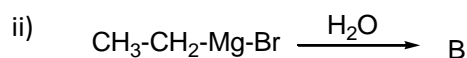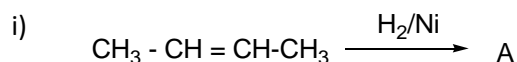**Q4) Answer Any <u>FOUR</u> of the following.**   **8**

i)   Acetic acid is weaker than chloroacetic acid. Explain.
ii)   Distinguish between Inductive and Resonance effects with suitable example.
iii)   How will you prepare ethane from ethylene?
iv)   How will you prepare trans-2- butene from acetylene?
v)   Draw the structure of $[Ni(CN)_4]^{2-}$ and mention its geometry.
vi)   What are the limitations of VSEPR theory?

SECTION: D

Q5) Attempt any <u>TWO</u> of the following   **10**

i)   What is hybridization? Discuss the structure and shape of acetylene molecule using hybridization concept.

ii)   Identify the products.

    i) $CH_3 - CH = CH-CH_3 \xrightarrow{H_2/Ni} A$

    ii) $CH_3-CH_2-Mg-Br \xrightarrow{H_2O} B$

    iii) $CH_3- C \equiv C-H \xrightarrow{NaNH_2} C$

    iv) $CH_3 -CH= CH_2 \xrightarrow[H_2O_2]{HBr} D$

    v) $CH_3-C \equiv C-CH_3 \xrightarrow[\substack{Lindlar\ catalyst \\ H_2}]{Pb/BaCO_3} E$

iii)   Explain the geometry of $Fe(CO)_5$ using hybridization concept.
iv)   Explain Pauling Slatter Theory and need of hybridization.