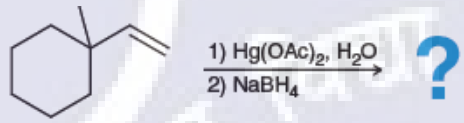
1. Attempt any five: 1*5=5 Marks

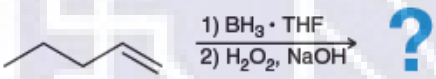
i. The reaction intermediate produced by homolytic cleavage of bond is called

(a) Carbanion (b) free radical (c) carbene (d) carbocation

ii. Predict the product for reaction



iii. Predict the product in the given reaction

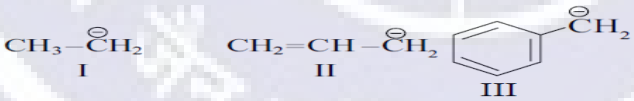


iv. Which of the following carbenes is more stable?

(a) CH_2 (singlet) (b) CH_2 (triplet)

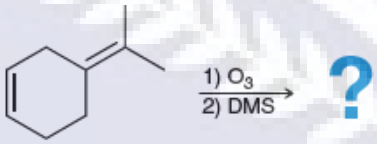
(c) both are equally stable (d) stability of carbenes is unpredictable

v. Which of the following orders is correct for the stability of these carbanions?



(a) I > II > III (b) III > II > I (c) II > III > I (d) II > I > III

vi. Predict the products of the following reaction:



2. Discuss any two: 2.5*2=5 Marks

i. Mechanism of E1, E2, E1cb reactions
ii. Diels-Alder reaction
iii. hydroboration-oxidation reaction of alkene

1. Attempt any five: 1*5=5 Marks

i. The standard enthalpy of formation of a substance
   a) Is always positive
   b) Is always negative
   c) Is zero
   d) May be positive, negative or zero.

ii. The adiabatic process is:
   a) Isoenthalpic
   b) Isoentropic
   c) Isobaric
   d) Isochoric

iii. Which is an extensive property?
   a) G (Gibbs energy)
   b) T (Temperature)
   c) P (Pressure)
   d) Ƞ (Viscosity)

iv. For a real gas, $(\partial E/\partial V)_T$ is
   a) Zero
   b) Positive
   c) Negative
   d) None of the above

v. When a gas is compressed adiabatically, its temperature
   a) Decreases
   b) Remains constant
   c) Increases
   d) None of the above

vi. The entropy of the system in an irreversible process is
   a) Increased
   b) Decreased
   c) Remain constant
   d) None of the above

2. State Hess' Law of constant heat summation and explain some of its important applications. 5 Marks

Or

Establish the following relationships 2.5*2=5 Marks

(2) $T_1 V_1^{\gamma-1} = T_2 V_2^{\gamma-1}$

(1) $P_1 V_1^{\gamma} = P_2 V_2^{\gamma}$