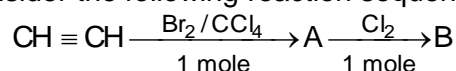
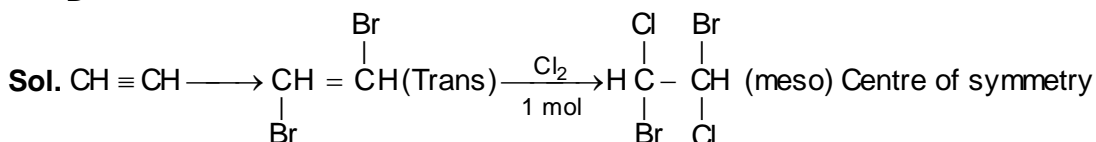


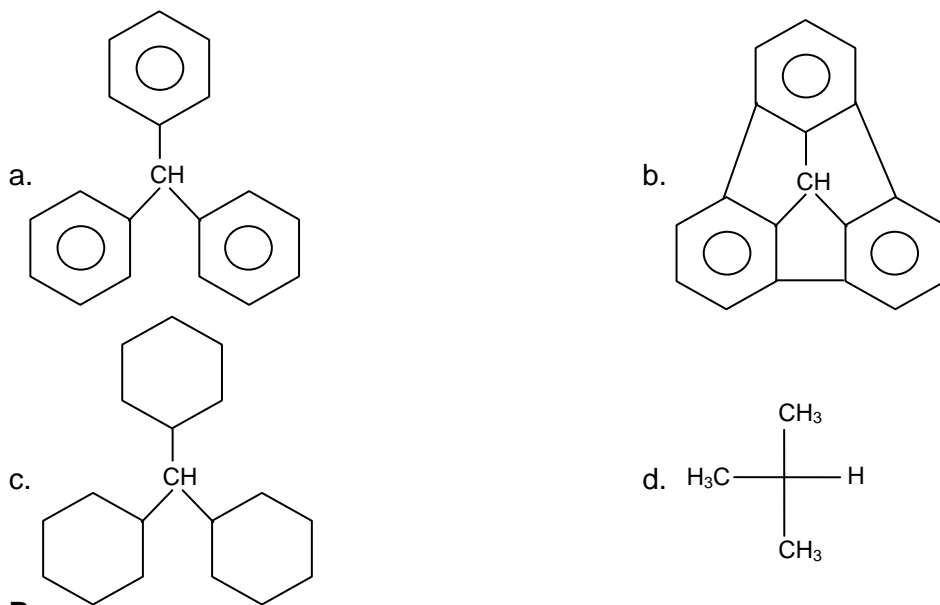
4. Consider the following reaction sequence. The products (A) and (B) are, respectively,



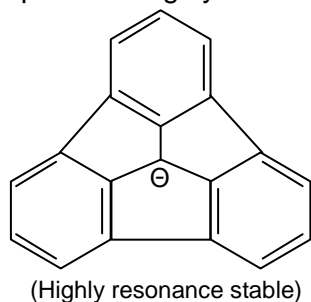
- 1,2 – dibromoethene and 1,2 – dibromo – 1, 2 – dichloroethane
  - trans – dibromoethene and ( $\pm$ ) 1, 2 – dibromo – 1, 2 - dichloroethane
  - cis – dibromoethene and meso -1, 2 –dibromo – 1, 2 – dichloroethane
  - trans – dibromoethene and meso -1, 2 –dibromo -1, 2 – dichloroethane
- D**



5. Identify the compound which contain most acidic hydrogen:



**Sol.** Anion of the compound is highly stable as all three rings are in same plane.



6. In the Kjeldahl's method for estimation of nitrogen present in a soil sample, ammonia evolved from 0.75 gm of sample neutralized 10 ml of 1 M H<sub>2</sub>SO<sub>4</sub>. The percentage of nitrogen in the soil is

- a. 37%                                      b. 45%                                      c. 73%                                      d. 41%

**A**

**Sol.** % N =  $\frac{N_1 V_1}{10} \times \frac{14}{W} = \frac{1 \times 2 \times 10}{10} \times \frac{15}{0.75} = 37\%$

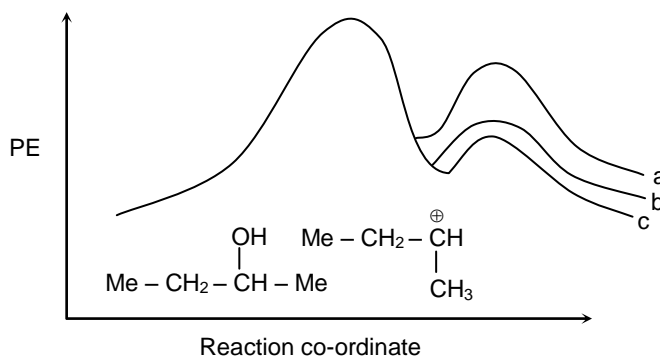
7. Which carbocation is the most stable?



**A**

**Sol.** Stability of C<sup>+</sup> ∝ extent of conjugation

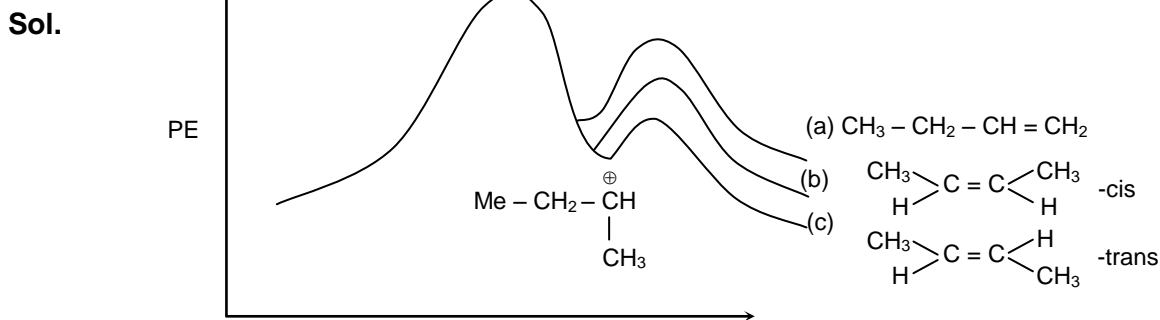
8. Energy profile diagram for dehydration of 2-butanol using conc. H<sub>2</sub>SO<sub>4</sub> is given below:



Product (b) of above reaction is

- a. 1-butene                                      b. cis-2-butene                                      c. Trans-2-butene                                      d. Iso-butene

**B**



Hence (a) is 1-butene  
 b is cis-2-butene & c is trans 2-butene

**SECTION – B (Assertion and Reason) Negative Marking [-1]**

This Section contains **10 multiple choice questions**. Each question has four choices A), B), C) and D) out of which **ONLY ONE** is correct. **10 × 4 = 40 Marks)**

- (a) If both assertion and reason are true and reason is the correct explanation of assertion.  
 (b) If both assertion and reason are true and reason is not correct explanation of assertion  
 (c) If assertion is correct but reason is incorrect  
 (d) If assertion is incorrect but reason is correct

1. **Assertion:**  $3^\circ$  carbocation  $[(\text{CH}_3)_3\text{C}^\oplus]$  is more stable than  $2^\circ$  carbocation  $[(\text{CH}_3)_2\text{CH}^\oplus]$  and  $2^\circ$  carbocation is more stable than the  $1^\circ$  carbocation  $(\text{CH}_3\text{CH}_2)^\oplus$ .

**Reason:** Greater the number of hyperconjugative structures, more is the stability of carbocation.

- a. (a)                      b. (b)                      c. (c)                      d. (d)

**A**

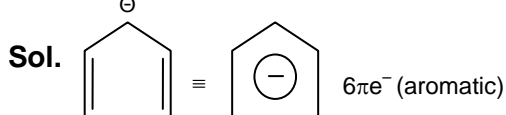
**Sol.** Both assertion and reason are correct and reason is the correct explanation of assertion.

2. **Assertion:** Cyclopentadienyl anion is much more stable than allyl anion.

**Reason:** Cyclopentadienyl anion is aromatic in nature.

- a. (a)                      b. (b)                      c. (c)                      d. (d)

**A**



3. **Assertion:** Nitration of Benzene followed by Chlorination with  $\text{Cl}_2$  &  $\text{FeCl}_3$  give meta chloronitrobenzene.  
**Reason:** Nitro group on benzene will deactivate Benzene for electrophilic attack.

- a. (a)                      b. (b)                      c. (c)                      d. (d)

**B**

**Sol.** Nitro group is meta directing

4. **Assertion (A):** In Duma's method, organic compound is heated with  $\text{CuO}$  and then with  $\text{Cu}$ .  
**Reason (R) :** It is done to avoid the oxidation of organic nitrogen into nitrogen oxides.

- a. (a)                      b. (b)                      c. (c)                      d. (d)

**A**

**Sol.** It is method of estimation of nitrogen.  $\text{Cu}$  is used to convert nitrogen oxide to  $\text{N}_2$

5. **Assertion(A):** Cyclohexane -1, 2 -diol does not show geometrical isomerism.  
**Reason (R):** It has two chiral carbon.

- a. (a)                      b. (b)                      c. (c)                      d. (d)

**D**

**Sol.** Cyclohexane-1,2-diol has two geometrical isomer; cis = meso; Trans-d/l

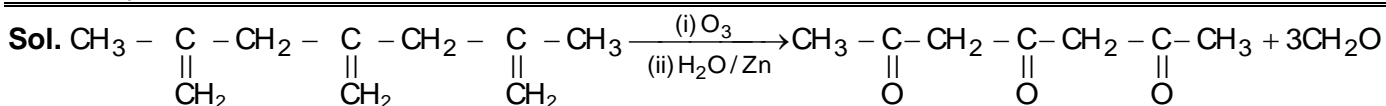
6. **Assertion (A):** Propyne is more acidic than propene.  
**Reason (R):** The conjugate base of propyne  $(\text{CH}_3 - \text{C} \equiv \text{C}^\ominus)$  is more stable than that of propene  $(\text{CH}_3 - \text{CH} = \overset{\ominus}{\text{C}}\text{H})$ .

- a. (a)                      b. (b)                      c. (c)                      d. (d)

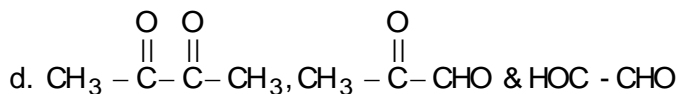
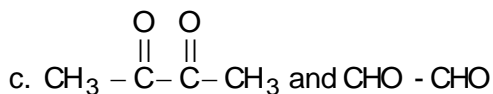
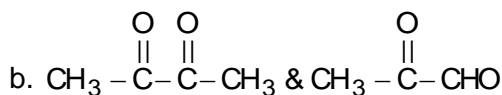
**A**

**Sol.** -ve charge on more E.N atom is more stable

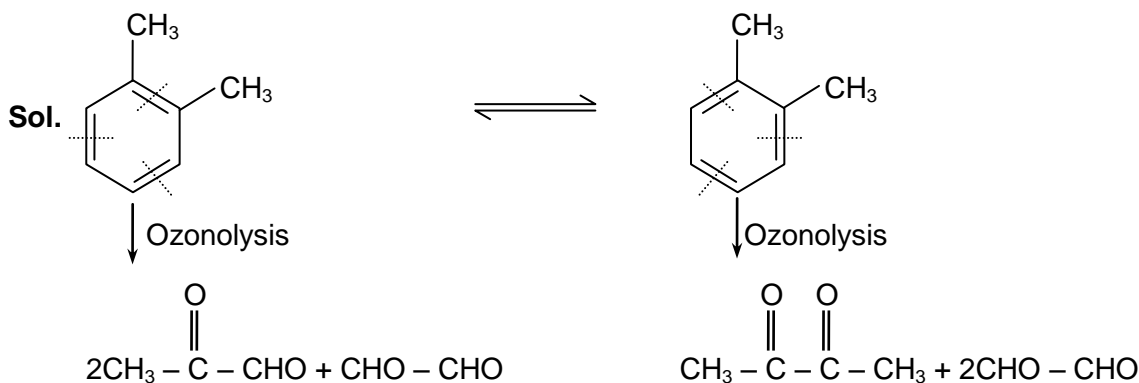




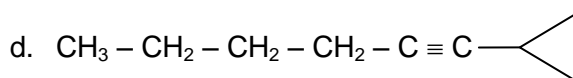
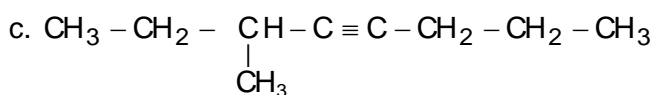
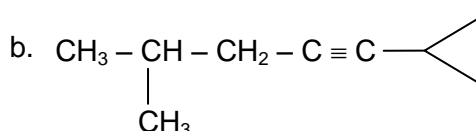
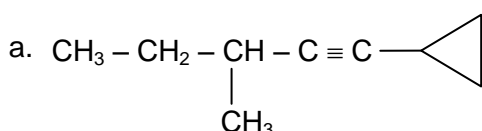
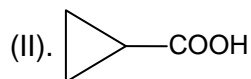
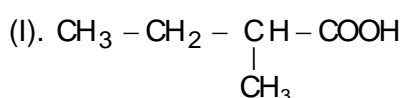
2. o-xylene on ozonolysis will give:



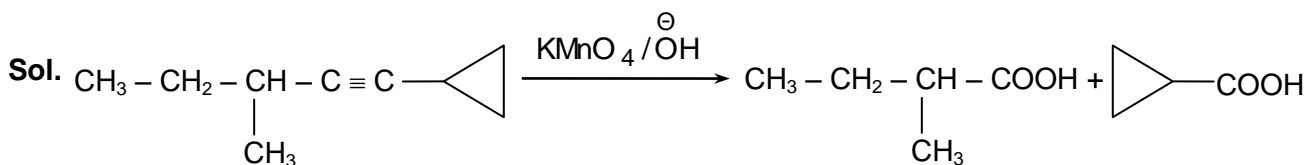
D



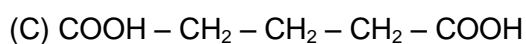
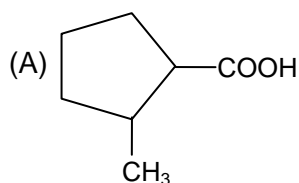
3. Which of the following alkynes will give following two products (I) and (II) on oxidative cleavage with hot  $\text{KMnO}_4 / \text{OH}^-$ ?

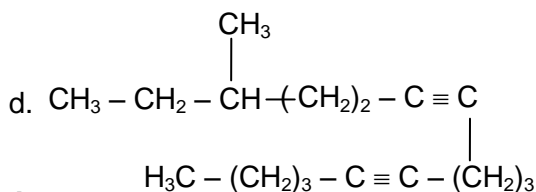
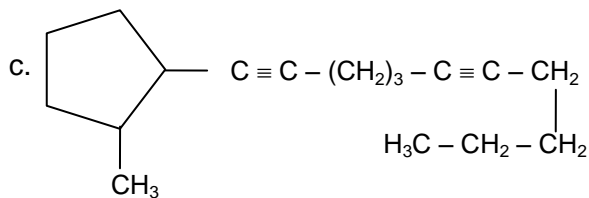
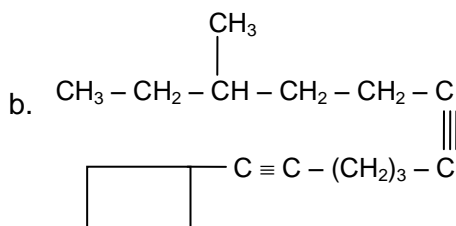
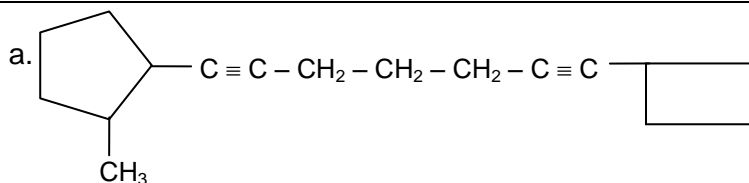


A



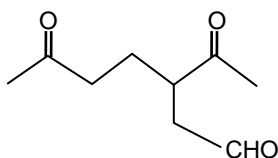
4. Which of the following alkynes will give following three products (A), (B) and (C) on oxidative cleavage by hot  $\text{KMnO}_4 / \text{OH}^-$ ?



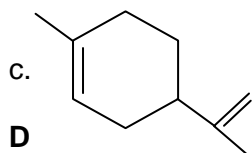
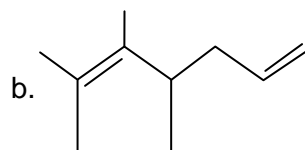
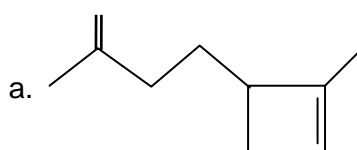


**A**

5. Compound (A) on hydrogenation consumed 2 mol. equivalents of hydrogen and produces a saturated hydrocarbon. When A is treated with ozone, followed by reductive work up, two products are isolated : formaldehyde and the diketone structure of which is given below :



Compound (A) can be represented as :



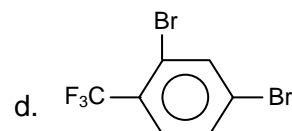
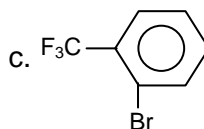
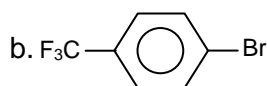
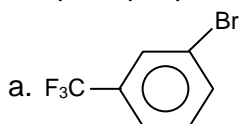
d. All of these

**D**

### Comprehension – 2

The 5 ring H's of monosubstituted benzenes  $\text{C}_6\text{H}_5\text{G}$  are not equally reactive. During the introduction of E into  $\text{C}_6\text{H}_5\text{G}$ , the 'G' determines the orientation of E. An electron donating G is o, p director, whereas an electron withdrawing G is meta director. Most of the meta directors are ring deactivating groups

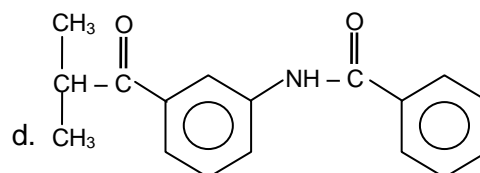
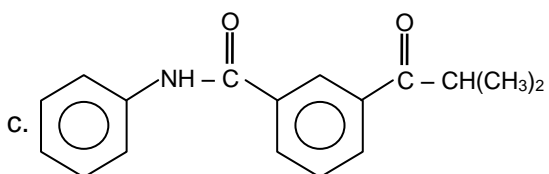
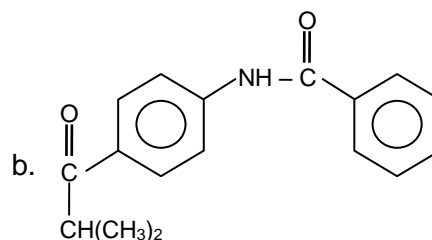
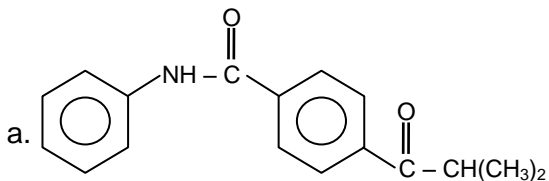
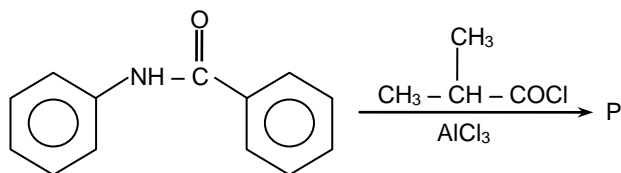
6. The principal product of monobromination of  $\text{C}_6\text{H}_5\text{CF}_3$  is



**A**

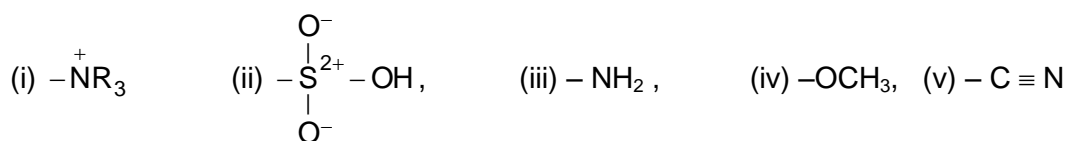
**Sol.** –  $\text{CF}_3$  group is meta directing due to reverse Hyperconjugation

7. What will be the major product formed in following reaction



**B**

8. Identify the meta directors among the following.



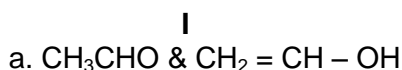
- a. (i) and (v)      b. (i), (ii) and (v)      c. (i), (ii) and (iv)      d. (i) and (ii)

**B**

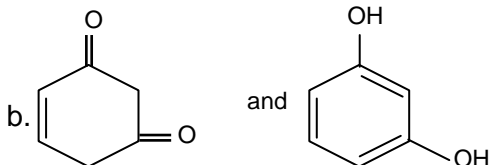
**SECTION - D (More than One Answer) No Negative Marking**

This Section contains 6 questions. Each question has four choices A), B), C) and D) out of which **ONE OR MORE** may be correct. **(6 × 5 = 30 Marks)**

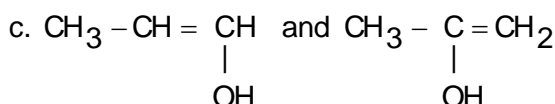
1. Find correct Match



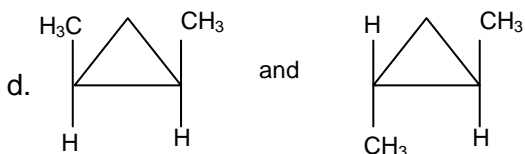
**II**  
Functional Isomers



Tautomers



Tautomers



Geometrical Isomer

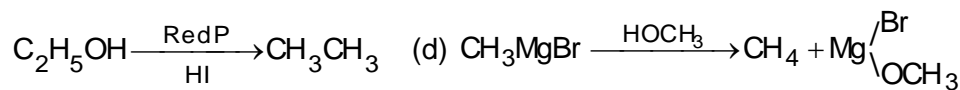
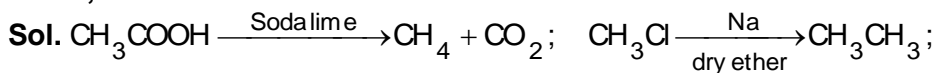
**A,B,D**



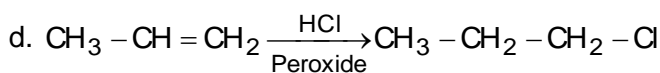
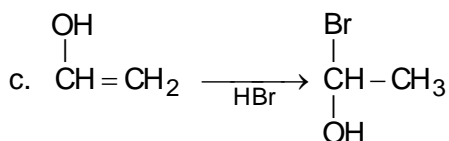
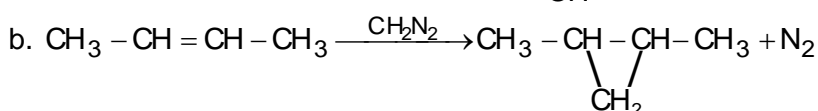
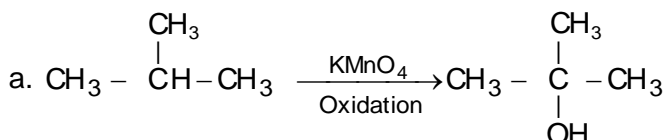
2. Which of the following will not give methane

- a. Decarboxylation of ethanoic acid  
 b. Wurtz reaction of methyl chloride  
 c. Reduction of ethanol with Red P and HI  
 d. Reaction of  $\text{CH}_3\text{MgBr}$  with  $\text{CH}_3\text{OH}$

**B,C**



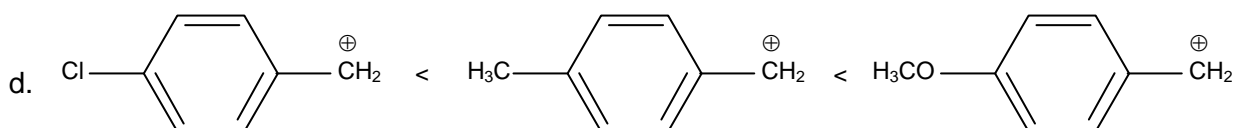
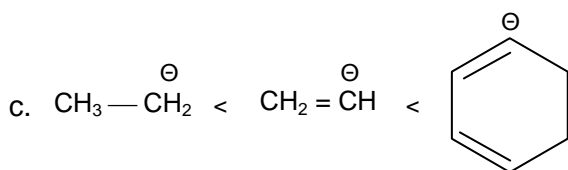
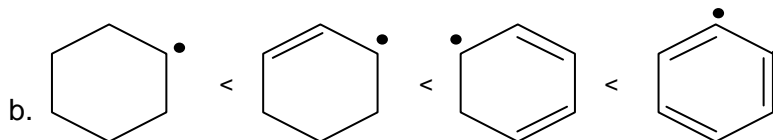
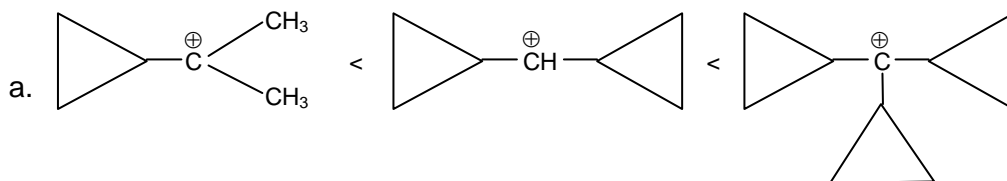
3. Which of the following reaction product is/are correct



**A,B,C**

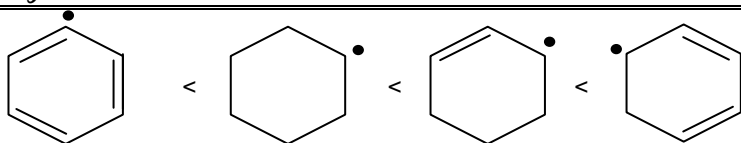
**Sol.** Antimarkovnikoff's Rule is not observed with HCl

4. Which of the following order of stability is correct?

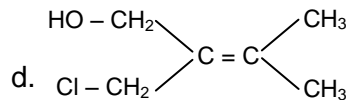
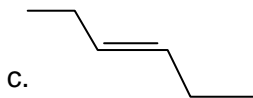
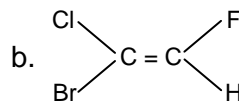
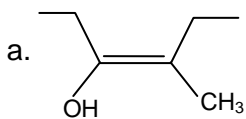


**A,C,D**

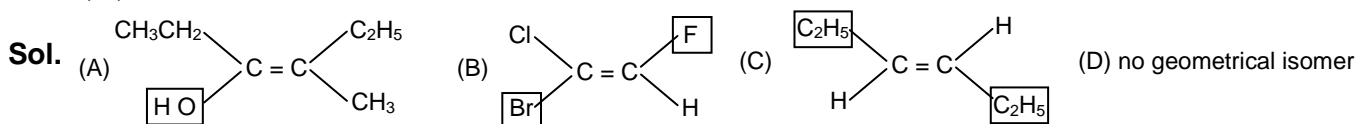
**Sol.** Correct order is



5. Which of the following geometrical isomer have E-configuration.



**A,B,C**



6. Which of the following compounds have two chiral centre

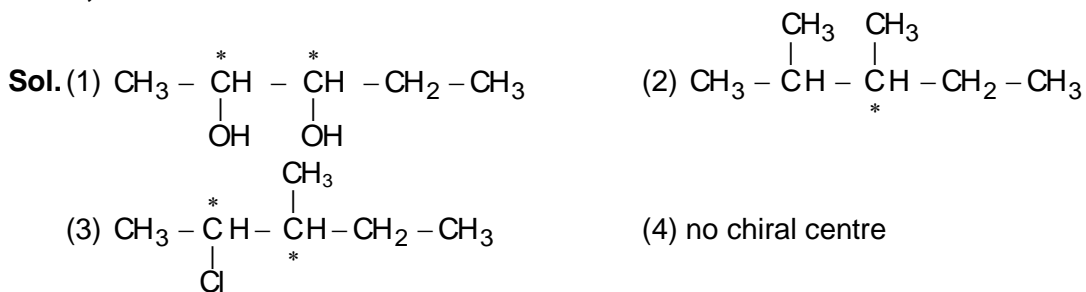
a. Pentane-2,3-diol

b. 2,3-Dimethylpentane

c. 2-Chloro-3-methylpentane

d. 1,4-Dichlorocyclohexane

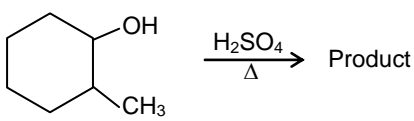
**A,C**



**SECTION – E (Matrix Type) No Negative Marking**

This Section contains **2 questions**. Each question has four choices (A, B, C and D) given in **Column I** and five statements (p, q, r, and s) in **Column II**. **(2 × 8 = 16 Marks)**

1. Match the column (I) with column (II). **One or more than One Match**

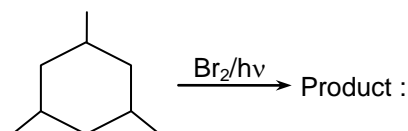
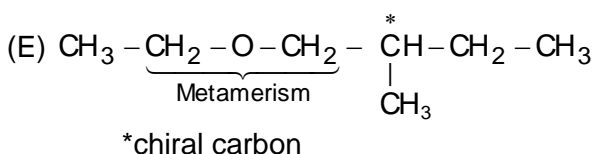
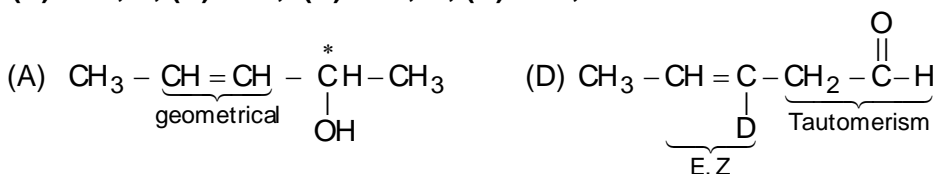
Column (I) Reaction		Column (II) Nature of products formed	
(a)	$\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} - \text{CH} = \text{CH}_2 \xrightarrow{\text{H}_2\text{O}/\text{H}^+} \text{Pr oduct}$	(p)	Product formed are according of Markovni koff's Rule
(b)	$\text{CH}_3 - \underset{\text{Cl}}{\overset{\text{CH}_3}{\text{C}}} - \text{CH}_2 - \text{CH}_3 \xrightarrow[\Delta]{\text{alc. KOH}} \text{Pr oduct}$	(q)	Rearrangement takes place
(c)	$\text{CH}_3 - \underset{\text{Cl}}{\overset{\text{CH}_3}{\text{CH}}} - \text{CH}_2 - \text{CH}_2 \xrightarrow[\Delta]{\text{CH}_3 - \overset{\text{CH}_3}{\text{C}} - \text{O}^{\ominus}\text{K}^+} \text{Pr oduct}$	(r)	Major Product are formed according to Hoffman rule
(d)		(s)	Major Products follow sytzeff's rule

Sol. **A → p, q B → s, C → r, D → q,s**

2. In the following matrix some organic Compounds are given in Column-A which have to be matched with type of isomerism in Column-B. **One or more than One Match**

Column – I Compounds		Column – II Type of Isomerism can be shown	
(A)	$\text{CH}_3 - \text{CH} = \text{CH} - \underset{\text{OH}}{\text{CH}} - \text{CH}_3$	(P)	Geometrical isomerism
(B)	$\text{ClFC} = \text{CBrI}$	(Q)	Tautomerism
(C)	$\text{CH}_3 - \text{CH} = \underset{\text{D}}{\text{C}} - \text{CH}_2 - \overset{\text{O}}{\parallel}{\text{C}} - \text{H}$	(R)	Metamerism
(D)	$\text{CH}_3 - \text{CH}_2 - \text{O} - \text{CH}_2 - \underset{\text{CH}_2}{\underset{\text{CH}_3}{\text{CH}}} - \text{CH}_3$	(S)	Optical isomerism

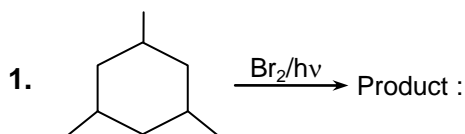
Sol. **(A) → P, S; (B) → P; (C) → P, Q; (D) → R, S**



**SECTION – F (Integer Type) No Negative Marking**

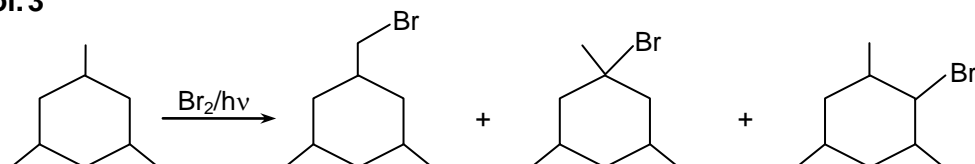
This Section contains **6 Questions**. The answer to each question is a **Single Digit Integer** ranging from 0 to 10. The correct digit below the question number in the OMR is to be bubbled.

**6 × 5 = 30 Marks**



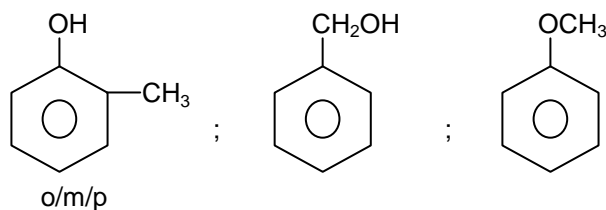
How many monobrominated products will be obtained by above reaction? (only structural)

**Sol.3**

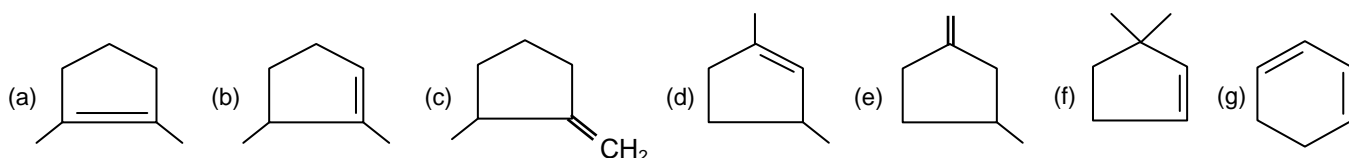


2. How many aromatic, isomers with Benzene are possible for  $\text{C}_7\text{H}_8\text{O}$  molecular formula

**Sol.5**



3. How many alkenes, from following are more stable than  ;

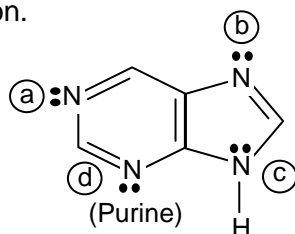


**Sol.5**

**a, b, d, e, g**

g is a conjugated diene (more stable) & a, b, d & e have more Hyperconjugation.

4. The purine hetrocycle occurs mainly in the structure of DNA. Identify number of 'N' atoms having localized lone pair of electron.



**Sol.3; a, b, d** (In C; lone pair is in conjugation)

5. How many of the following do not have chain Isomer.

$\text{C}_2\text{H}_6$ ,  $\text{C}_3\text{H}_6$ ,  $\text{C}_4\text{H}_6$ ,  $\text{C}_4\text{H}_8$ ,  $\text{C}_3\text{H}_8$ ,  $\text{C}_2\text{H}_2$ ,  $\text{C}_3\text{H}_8\text{O}$ ,  $\text{C}_6\text{H}_{14}$ ,

**Sol.5;**  $\text{C}_2\text{H}_6$ ;  $\text{C}_3\text{H}_6$ ;  $\text{C}_3\text{H}_8$ ,  $\text{C}_3\text{H}_8\text{O}$ ;  $\text{C}_2\text{H}_2$ . Chain isomer can exist for compound with 4 carbon.

6. The number of  $\pi$ -bonds in the product formed by passing acetylene through dilute sulphuric acid containing mercuric sulphate is:

**Sol. 1**

