

+1

GRAND TEST - VI

TEST - 28

TOPIC

**IUPAC NAMING, G.O.C.
AND ISOMERISM**

Test Date: 5.1.2018 (Friday)
Time: 10:30 AM to 12:45 PM

Empowered By:

TEST SERIES

PCB
QUANTUM⁺ Plus

PCM
INTELLIQUEST



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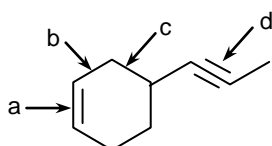
READ THE INSTRUCTIONS CAREFULLY

1. The test is of **2 hour 15 minutes** duration.
2. The maximum marks are **346**.
3. This test consists of **82 questions**.
4. Keep Your **mobiles switched off** during Test in the Halls.

Level – 1**SECTION – A (Single Correct Choice Type) Negative Marking [-1]**

This Section contains **45 multiple choice questions**. Each question has four choices A), B), C) and D) out of which **ONLY ONE** is correct. (Mark only One choice) **45 × 4 = 180 Marks**

1. Consider :



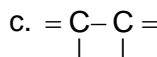
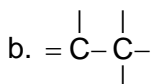
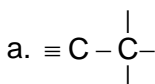
The correct increasing order of bond length of the bonds marked is

- a. $a < b < c < d$ b. $d < a < b < c$ c. $d < a < c < b$ d. $d < c < a < b$

B

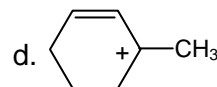
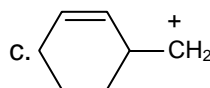
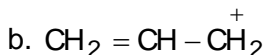
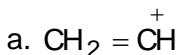
Sol. 'd' refers to triple bond while 'a' refers to a double bond. Bond length of $C \equiv C$ (d) $<$ $C = C$ (a). Bond marked as 'b' is a $sp^2 - sp^3$ bond while the bond marked as 'c' is $sp^3 - sp^3$ bond while the bond marked as 'c' is $sp^3 - sp^3$ bond and bond length of $sp^2 - sp^3$ C – C bond (b) is less than the $sp^3 - sp^3$ C – C bond (c).

2. C – C single bond length would be minimum in:

**D**

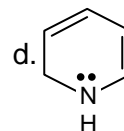
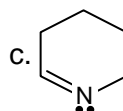
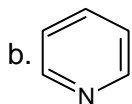
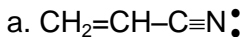
Sol. Both carbon atoms are sp hybridized.

3. Most stable carbocation is

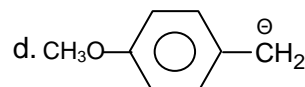
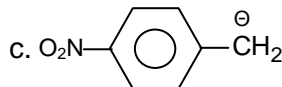
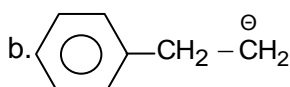
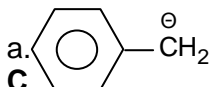
**D**

Sol. tert. allylic carbocation is most stable.

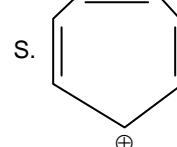
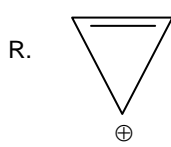
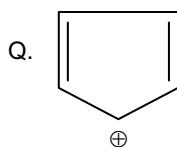
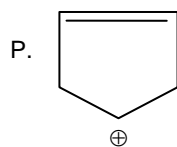
4. In which of the following lone-pair shown is involved in resonance.

**D**

5. The most stable carbanion among the following is

**C**

6. The stability order of the following carbocations is



- a. $P > Q > R > S$ b. $R > S > Q > P$ c. $S > R > P > Q$ d. $Q > R > S > P$

C

Sol. S – Aromatic most stable with maximum conjugation

R – Aromatic but less conjugation

Q – Antiaromatic; least stable

7. Which of the following is incorrect order of nucleophilicity?

- a. $\ddot{\text{N}}\text{H}_3 > \text{H}_2\ddot{\text{O}}:$ b. $\text{OH}^- > \text{SH}^-$ c. $\text{I}^- > \text{Br}^-$ d. $\text{CH}_3^- > \text{NH}_2^-$

B

Sol. Nucleophilicity $\propto \frac{1}{\text{E.N}}$

8. Among the following the most stable is

- a. $\text{F}_3\text{C}-\text{CH}_2^+$ b. $\text{Cl}_3\text{C}-\text{CH}_2^+$ c. CF_3^+ d. $\text{CH}_3-\text{CH}_2^+$

C

Sol. Due to back-bonding ($p\pi - p\pi$)

9. Which of the following gives a single monochloroderivative

- (i) Benzene (ii) Cyclohexane (iii) Ethane (iv) neopentane

- a. (i) & (ii) b. (iii) & (iv) c. ii, iii, iv d. All

D

10. Which of the following groups is/are meta directing and deactivating for benzene

- (i) $-\text{NO}_2$ (ii) $-\text{C}\equiv\text{N}$ (iii) $-\text{O}-\text{N}=\text{O}$ (iv) $-\text{C}(\text{CH}_3)_3$ (v) $-\text{CH}_2\text{Cl}$ (vi) $-\text{NH}_3^+$

- a. (i), (ii), (iii) & (iv) b. (i), (ii), (iv), (v) & (vi) c. (i), (ii), (vi) d. all

C

Sol. $-\text{C}(\text{CH}_3)_3$ is meta directing & activating; $-\text{O}-\text{N}=\text{O}$ is o & p directing & activating

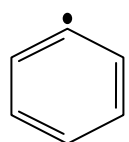
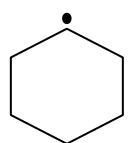
$-\text{CH}_2\text{Cl}$ is o & p but deactivating

11. In which of the following pair Ist intermediate is more stable than II

- a. CF_3^- & CCl_3^-

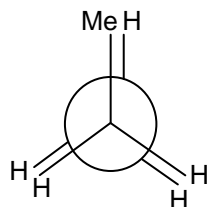
- b. $\cdot\text{CCl}_2$ & $\ddot{\text{C}}\text{Cl}_2$

- c. $\begin{array}{c} \cdot \\ \text{CH} \\ | \\ \text{CH}_3 \end{array} - \text{CH} = \text{CH}_2$ & $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ | \\ \cdot \end{array}$

- d.  & 

C

12. Following eclipsed form of propane is repeated, after rotation of:

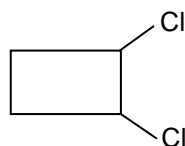


- a. 60° b. 120° c. 180° d. 360°

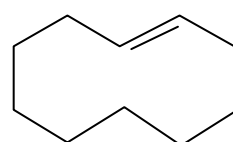
B

Sol. after 120° rotation, same structure will repeat.

13. Which of the following will not form geometrical isomers?

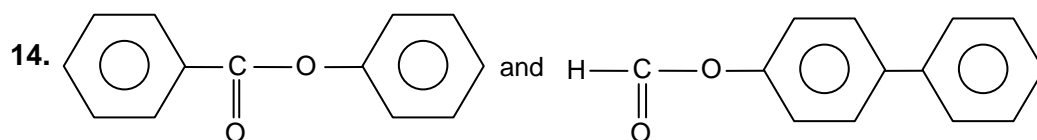
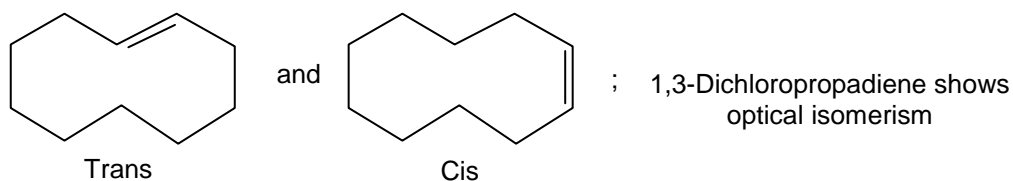
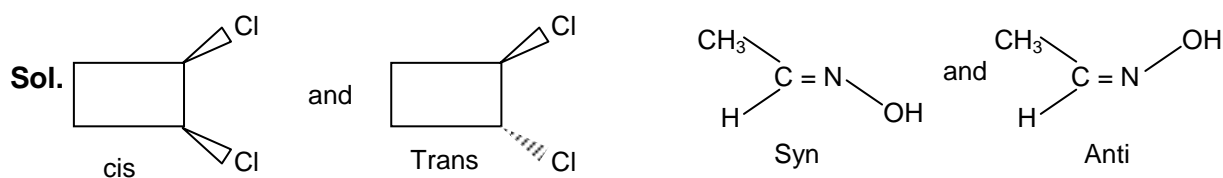
- a. 

- b. $\text{CH}_3\text{CH}=\text{NOH}$

- c. 

- d. $\text{CH}_3-\text{CH}=\text{C}(\text{CH}_3)_2$

D



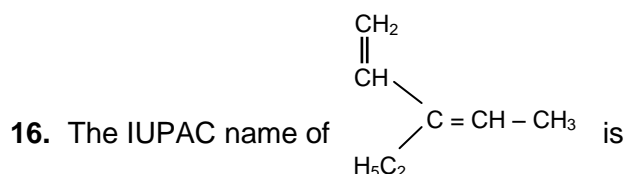
- a. position isomers b. chain isomers c. functional isomers d. metamers

D

15. Which of the following group is meta-directing due to Reverse hyperconjugation effect.

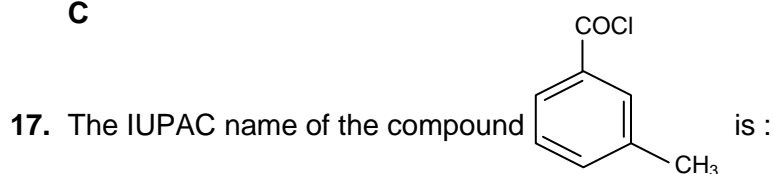
- a. $-\text{CH}_3$ b. $-\text{C}(=\text{O})\text{OH}$ c. $-\text{CCl}_3$ d. Cl

C



- a. 3-vinyl-3-ethyl-2-propene b. 3-Ethyl-3-vinylprop-2-ene
c. 3-Ethylpenta-1, 3-diene d. none

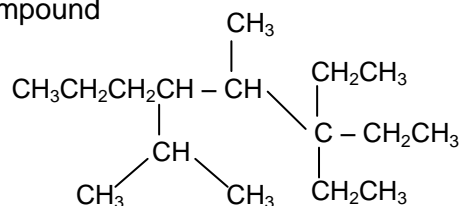
C



- a. Toluene carbonyl chloride b. 3-Methyl benzene carbonyl chloride
c. 5-Methyl benzoyl chloride d. 5-Methyl benzene carbonyl chloride

B

18. The IUPAC name of the compound



- a. 3, 3-Diethyl-4-methyl-5-isopropyl octane b. 3, 3-Diethyl-5-isopropyl-4-methyl octane
c. 4-Isopropyl-5-methyl-6,6-diethyl octane d. 6,6-Diethyl-4-isopropyl-5-methyl octane

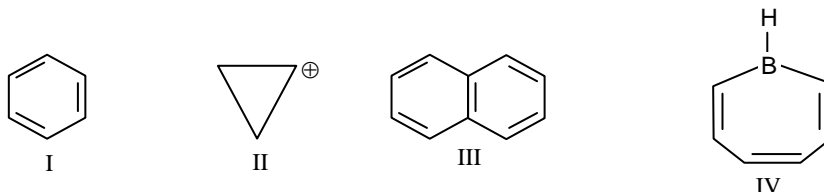
B

19. Among the following carbon radicals, the stability decreases in the order

- $(\text{CH}_3)_3\text{C}\cdot > \text{CH}_2 = \text{CH} - \text{CH}_2\cdot > (\text{CH}_3)_2\text{CH}\cdot > \text{CH}_3\text{CH}_2\cdot$
- $(\text{CH}_3)_3\text{C}\cdot > (\text{CH}_3)_2\text{CH}\cdot > \text{CH}_2 = \text{CH} - \text{CH}_2\cdot > \text{CH}_3\text{CH}_2\cdot$
- $\text{CH}_2 = \text{CH} - \text{CH}_2\cdot > (\text{CH}_3)_3\text{C}\cdot > (\text{CH}_3)_2\text{CH}\cdot > \text{CH}_3\text{CH}_2\cdot$
- $(\text{CH}_3)_3\text{C}\cdot > (\text{CH}_3)_2\text{CH}\cdot > \text{CH}_3\text{CH}_2\cdot > \text{CH}_2 = \text{CH} - \text{CH}_2\cdot$

C

20. Which of the following chemical systems is/are nonaromatic?



- II
- IV
- II and IV
- None of the above

A

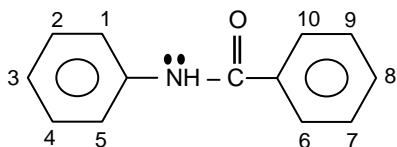
21. Which of the following is the correct order of decreasing stability?

- $\text{CH} \equiv \text{C}^\ominus > \text{CH}_2 = \text{CH}^\ominus > \text{CH}_3^\ominus$
- $\text{CH}_3^\ominus > \text{CH}_2 = \text{CH}^\ominus > \text{CH} \equiv \text{C}^\ominus$
- $\text{CH}_3^\ominus > \text{CH} \equiv \text{C}^\ominus > \text{CH}_2 = \text{CH}^\ominus$
- $\text{CH}_2 = \text{CH}^\ominus > \text{CH} \equiv \text{C}^\ominus > \text{CH}_3^\ominus$

A

Sol. negative charge on more electronegative atom is more stable.

22. Which of the following position is reactive for electrophilic attack



- 1, 3, 8
- 1, 3, 5
- 10, 8, 6
- 1, 3, 6

B

23. The compound $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$ have

- Twelve 1° hydrogen atoms only
- Two 2° and twelve 1° hydrogen atoms
- Two 3° hydrogen atoms only
- Twelve 1° - and Two 3° -hydrogen atoms

D

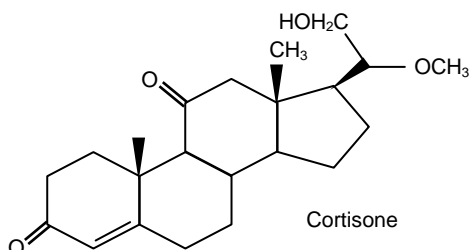
24. Which of the following resonating structures is most unstable?



B

Sol. (b) is most unstable because both parts of cycle are Anti aromatic

25. The functional groups present in Cortisone are:



- a. Ether, alkene, alcohol
b. Alcohol, ketone, alkene, ether
c. Alcohol, ketone, ester
d. Ether, amine, ketone

B

26. Which of the following alkenes is the most stable?



C

Sol. Conjugated dienes are most stable

27. The type of isomerism exhibited by the compounds with formula $C_4H_{10}O$ is/are

- a. chain and position
b. functional and position
c. metamerism
d. chain, position, functional and metamerism

D

Sol. Alcohol & ether are functional isomer

28. Compound $C_4H_{11}N$ can exhibit

- a. Position isomerism
b. Metamerism
c. Functional isomerism
d. All the three

D

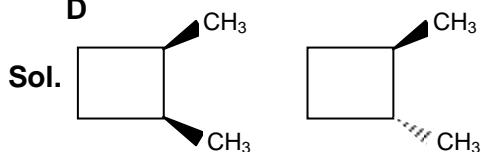
Sol. $CH_3CH_2-CH_2-CH_2-NH_2$; $CH_3-\overset{NH_2}{\underset{|}{CH}}-CH_2-CH_3$; $CH_3CH_2NH-CH_2CH_3$; $CH_3-\overset{H}{\underset{|}{N}}-C_3H_7$;

$(CH_3)_2N-C_2H_5$; $CH_3-\overset{CH_3}{\underset{NH_2}{\underset{|}{CH}}}-CH_2$; $CH_3-\overset{CH_3}{\underset{NH_2}{\underset{|}{C}}}-CH_2$ (Primary, secondary & tert. Amines are functional isomer)

29. Which of the following can exhibit geometrical isomerism:-

- a. Ethene
b. Propane
c. 1-Butene
d. Dimethyl cyclobutane

D



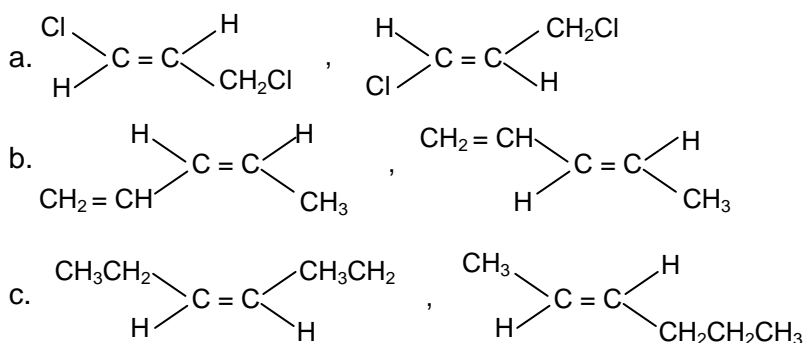
30. The Z-isomer from the following is

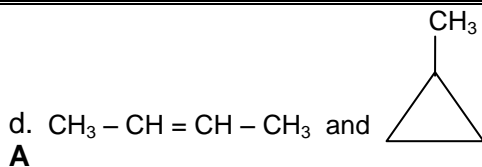
- (i) $\begin{array}{c} H_3C-C-H \\ || \\ H_7C_3-C-C_2H_5 \end{array}$ (ii) $\begin{array}{c} H_3C-C-H \\ || \\ H_5C_2-C-C_3H_7 \end{array}$ (iii) $\begin{array}{c} Cl-C-Br \\ || \\ H-C-F \end{array}$ (iv) $\begin{array}{c} Cl-C-Br \\ || \\ F-C-H \end{array}$

- a. only (i)
b. only (iii)
c. only (i) & (iii)
d. both (i) & (iv)

C

31. Which of the following pair of structures represent the same compound?

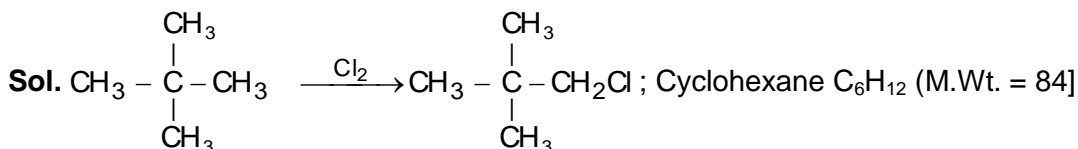




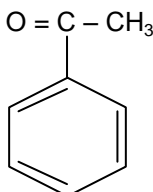
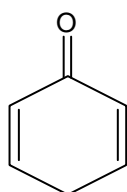

32. An alkane (molecular weight 72) upon chlorination gives one monochlorination product. The alkane is

- a. 2-Methylbutane
b. n-Pentane
c. 2, 2-Dimethylpropane
d. Cyclohexane

C

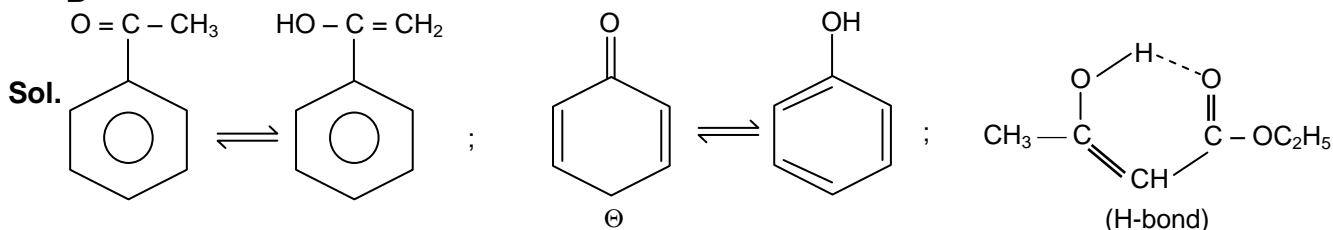


33. Which of the following will show Tautomerism

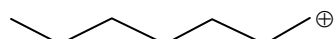
- (i)  (ii)  (iii) $(\text{CH}_3)_3\text{C} - \text{CHO}$
(iv)  (v) $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_2\text{COOC}_2\text{H}_5$

- a. i, ii, iii
b. i, ii, v
c. i, ii, iii, iv
d. i, iv, v

B



34. The most stable carbocation among the following

- a.  b. 
c.  d. 

C

Sol. Both C and D are tertiary carbocations but D is less stable than C due to the presence of an electron withdrawing group.

35. The principal functional group in the compound $\text{ClCH}_2\text{CH}(\text{OH})\text{CH}_2\text{COCH}_2\text{NO}_2$ is

- a. $-\text{Cl}$ b. $-\text{NO}_2$ c. $-\text{OH}$ d. $>\text{C}=\text{O}$

D

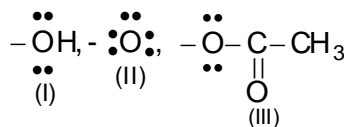
Sol. $>\text{C}=\text{O}$ group is the principle functional group of these.

36. The ortho/para directing group for benzene, among the following is:

- a. $-\text{COOH}$ b. $-\text{CN}$ c. $-\text{COCH}_3$ d. $-\text{NHCOCH}_3$

D

Sol. NHCOCH_3 is o, p – directing while all others are m – directing.



- # B

a. $\text{CH}_3 - \text{O} - \text{CH}_2^+$ b. $\text{CH}_2 = \text{CH} - \text{CH}_2^+$ c. $\begin{array}{c} \text{CH}_2 - \text{CH}_2^+ \\ | \\ \text{F} \end{array}$ d. $\begin{array}{c} \text{CH}_2 - \text{CH}_2^+ \\ | \\ \text{OH} \end{array}$

A

39. Phenol exists in 100% enol form. The reason is

- # A

a. $\text{CH}_3 - \text{CH}_2 - \underset{\text{Cl}}{\text{CH}} - \text{COOH}$

b. $\text{CH}_3 - \underset{\text{Cl}}{\text{CH}} - \text{CH}_2 - \text{COOH}$

c. $\underset{\text{Cl}}{\text{CH}_2} - \text{CH}_2 - \text{CH}_2 - \text{COOH}$

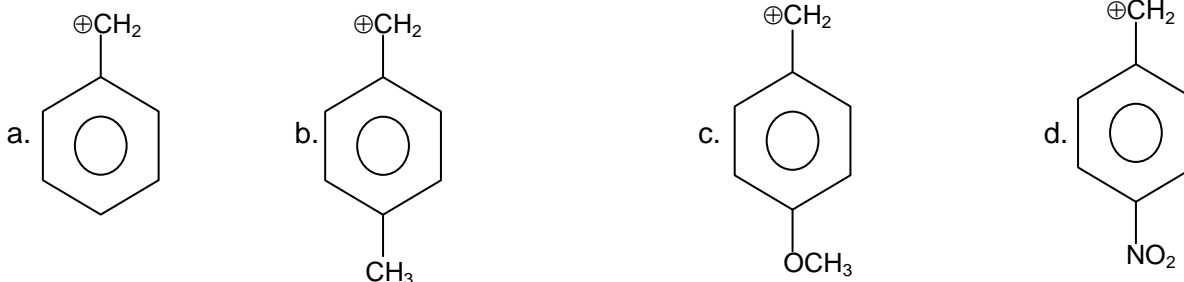
d. $\text{CH}_3 - \underset{\text{Br}}{\text{CH}} - \text{CH}_2 - \text{COOH}$

A

a. CH_3^- b. $\text{CH}_3 - \text{C}^-(\text{CH}_3)_2$ c. $\text{CH}_2 = \text{CH} - \text{CH}_2^-$ d. 

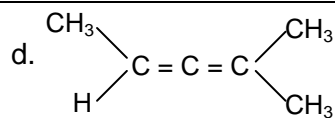
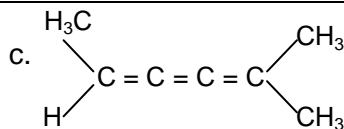
D

42. Identify the least stable carbocation.



D

a. 



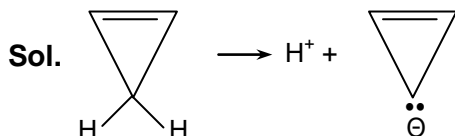
A

44. Removal of a proton (H^+ , deprotonation) from cyclopropene is more difficult than from propene because

- a. the cyclopropenyl cation is produced
c. The allyl cation is not resonance-stabilized

- b. the cyclopropenyl anion is anti-aromatic
d. the allyl anion is not resonance-stabilized

B



45. The correct order of reactivity in addition of HBr:

- a. $CH_2 = CH_2 < CH_3 - CH = CH_2 < (CH_3)_2C = CH_2$
c. $CH_2 = CH_2 < (CH_3)_2C = CH_2 < CH_3 - CH = CH_2$

- b. $CH_2 = CH_2 > CH_3 - CH = CH_2 > (CH_3)_2C = CH_2$
d. $CH_2 - CH = CH_2 < CH_2 = CH_2 < (CH_3)_2C = CH_2$

A

Sol. Alkenes normally give electrophilic addition reaction so more the stable intermediate higher the reactivity of initial species.

LEVEL - 2

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

This Section contains **5 multiple choice questions**. Each question has four choices A), B), C) and D) out of which **ONLY ONE** is correct. **5 × 4 = 20 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:** has higher b.p. than but for m.pt., it is the reverse.

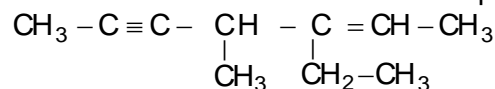
Reason: has greater heat of hydrogenation than .

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

B

Sol. The correct reason is that cis but-2-ene has higher dipole moment so it is more polar and has higher b.pt. while the trans isomer due symmetrical nature has more m.p.

2. **Assertion:** IUPAC name of the compound



is 3-Ethyl-4-methylhept-2-en-5-yne

Reason: Double bond is given preference over triple bond, if both gets same position from both ends.

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

A,D

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

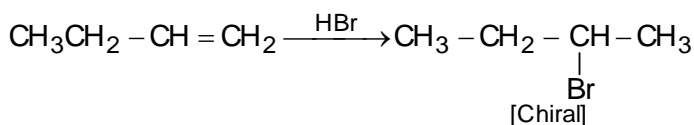
3. **Assertion:** Addition of HBr to 1-butene gives two optical isomers.

Reason: The product contains one asymmetric carbon.

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

A

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



4. **Assertion:** $\text{R} - \text{C} \equiv \text{O}^+$ is more stable than $\text{R} - \text{C}^+ = \text{O}$.

Reason: In first structure oxygen is positively charged.

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

B

5. **Assertion (A):** Benzene is obviously an unsaturated hydrocarbon because it has far less hydrogen than the equivalent saturated hydrocarbon C_6H_{14} , but benzene is too stable to be an alkene.

Reason (R): Resonance theory suggests that molecules which are hybrids of two or more equivalent Lewis structures are more stable than those having no resonance.

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

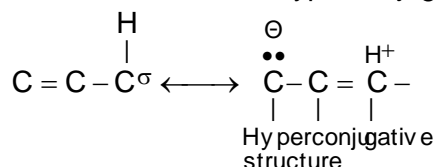
A

SECTION – C (Paragraph Type) Negative Marking [-1]

This Section contains **3 paragraphs**. Each of these questions has four choices A), B), C) and D) out of which **ONLY ONE** is correct. **10 × 4 = 40 Marks**

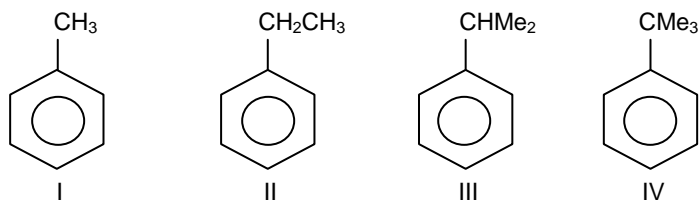
Passage – 1

Hyperconjugation or no bond resonance is an important method to stabilize a molecule by delocalizing σ and π electrons in conjugation. Presence of at least one allylic hydrogen is the necessary and sufficient condition to exhibit hyperconjugation



In the structure I, there seems to be bond between C and H^+ but remains intact with the negatively charged carbon skeleton, hence this is also called as 'no bond resonance'.

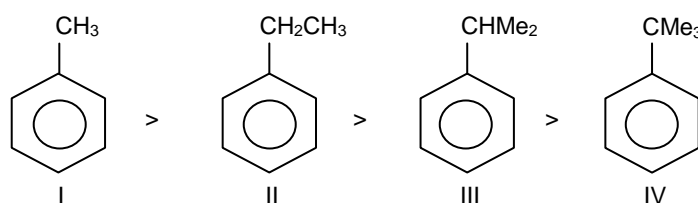
1. The decreasing order of reactivity of the following compounds towards electrophilic substitution reaction is



- a. I > II > III > IV b. IV > III > II > I c. II > III > IV > I d. I = II > III > IV

A

Sol.



Number of
hyperconjugative
structures

3

2

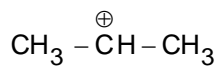
1

0

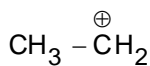
2. The decreasing order of stability of alkyl carbocations is:



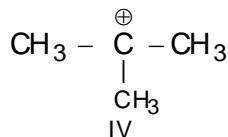
I



II



III



IV

a. I > II > III > IV

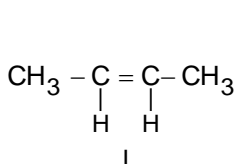
b. IV > II > III > I

c. II > III > IV > I

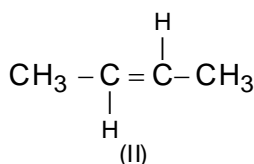
d. I = II > III > IV

B

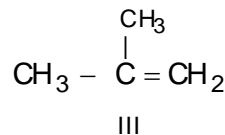
3. In the case of following alkenes, the decreasing order of stability



I



(II)



III

a. I > II > III

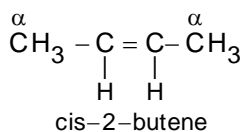
b. III > II > I

c. I = II > III

d. III > I > II

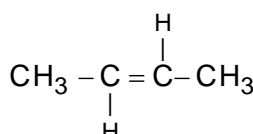
B

Sol.



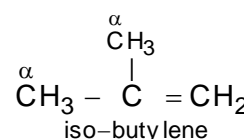
cis-2-butene

I



trans-2-butene

II



iso-butylene

III

Number of
hyperconjugative
structures

6

6

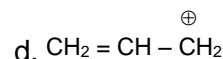
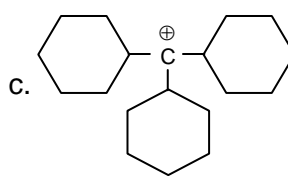
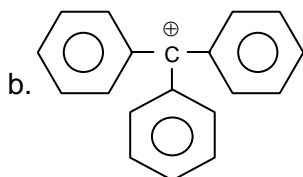
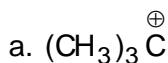
6

♦ Since $\mu_{\text{cis}} > \mu_{\text{trans}}$, trans-2-butene (II) is more stable than cis-2-butene (I).

♦ cis-2-butene gives 2°-carbocation (less stable) while isobutylene (III) gives a 3°-carbocation (more stable).
Hence III is more stable than I and II.

∴ the correct order of stability is $\text{III} > \text{II} > \text{I}$ & reverse will be the order of reactivity.

4. Which one among the following carbocations has the longest life?



B

Sol. Maximum resonance stabilisation

Comprehension – 2

A pair of isomers having same structural formula but different three dimensional arrangements are stereoisomers. Three stereoisomers are

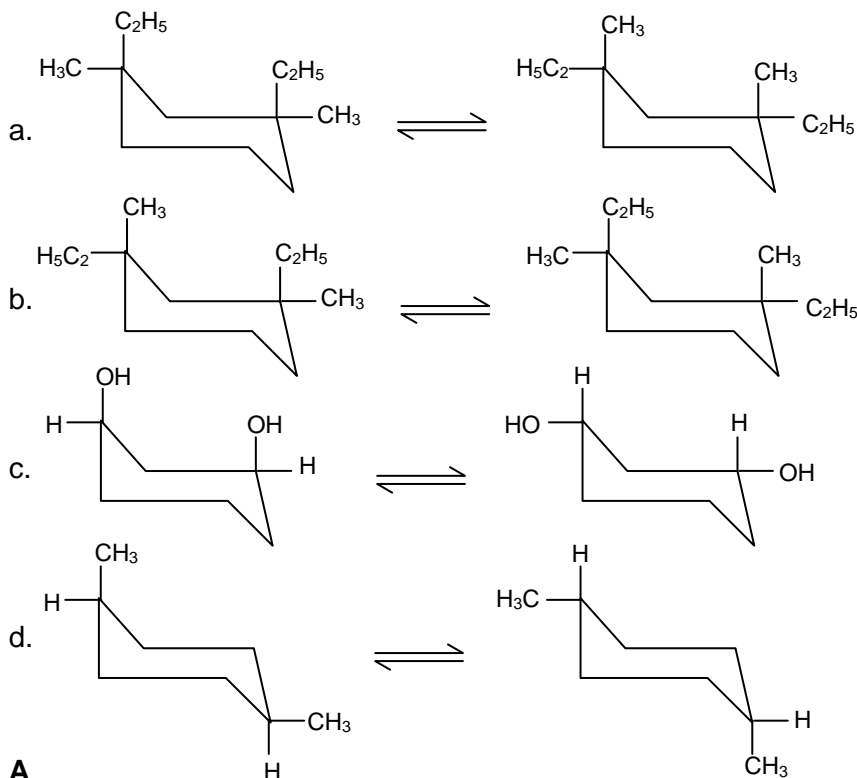
(a) Conformational Isomers

(b) Geometrical Isomers

(c) Optical isomers

Infinite Number of conformational isomers are possible due to free Rotation around single bond.
Geometrical isomerism is due restricted rotation around multiple bond or in cyclic compound.
Dissymmetry is responsible for optical isomerism.

5. In which of the following, equilibrium is more shifted to forward direction



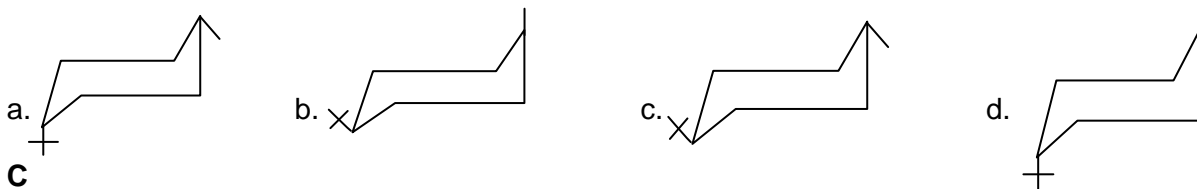
A

6. Which of the following has chiral carbon



D

7. Which of the following is the most stabilized conformer of ?



C

Comprehension – 3

A lower heat of hydrogenation indicates a more stable alkene. Refer to the table given below to answer the questions given below

Alkene	Molar heat of hydrogenation
ethylene	137 kJ
Propene	126 kJ
1-butene	127 kJ
cis-2-butene	120 kJ
trans-2-butene	116 kJ
cis-2-pentene	120 kJ
2-methyl-2-butene	113 kJ
2, 3-dimethyl-2-butene	111 kJ

8. Which of the following alkenes is the most stable?

- a. Ethylene b. cis-2-butene c. 2-methyl-2-butene d. 2, 3-dimethyl-2-butene

D

Sol. According to the table 2, 3-dimethyl-2-butene is the most stable alkene because it has the lowest heat of hydrogenation. This follows the rule that the most substituted alkene is the most stable.

9. What would be the predicted molar heat of hydrogenation for trans-2-pentene?

- a. 111 kJ b. 116 kJ c. 120 kJ d. 124 kJ

B

Sol. The trend observed for 2-butene would hold for 2-pentene. Since the heat of hydration for cis-2-pentene is the same as cis-2-butene, the hydration of trans-2-pentene should be the same as that of trans-2-butene.

10. Why does cis-2-butene have a molar heat of hydrogenation of 120 kJ while trans-2-butene has 116 kJ?

- a. The cis isomer is more stable than the trans due to steric interactions.
b. The trans isomer is more stable than the cis due to less steric interactions
c. The double bond in the trans isomer has more potential energy
d. Trans-2-butene has a higher molecular weight.

B

Sol. The lower heat of hydrogenation of the trans isomer indicates that it is more stable ruling out answers A and C. Molecular weight has nothing to do with bond stability and both isomers have the same molecular weight ruling answer D. Answer B makes sense. When the larger substituents are on the same side of the double bond there is steric interaction which decreases the stability of the molecules.

SECTION – D (More than One Answer) No Negative Marking

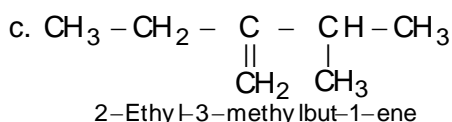
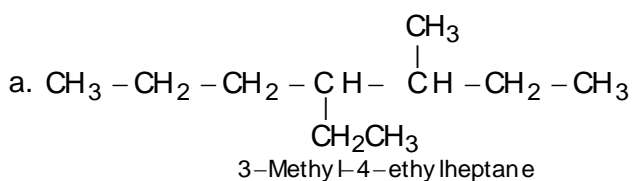
This Section contains **10 questions**. Each question has four choices A), B), C) and D) out of which **ONE OR MORE** may be correct. **(10 × 5 = 50 Marks)**

1. The correct statements for carbocations are

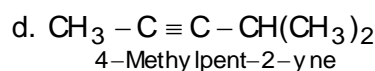
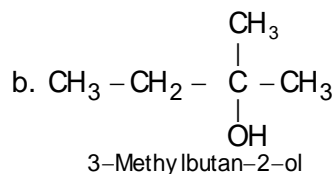
- a. paramagnetic b. sp^2 hybridised
c. diamagnetic d. formed by heterolytic cleavage

B,C,D

2. Name of some compounds are given which one is not correct in IUPAC system?



A,B



3. Which of the following statement is correct:-

- a. Alkene act as electrophile
b. Addition of electrophile on alkene is faster than alkyne due to formation of stable intermediate carbonium ion.
c. SCN^\ominus is an amphoteric nucleophile
d. Carbene is a neutral electrophile

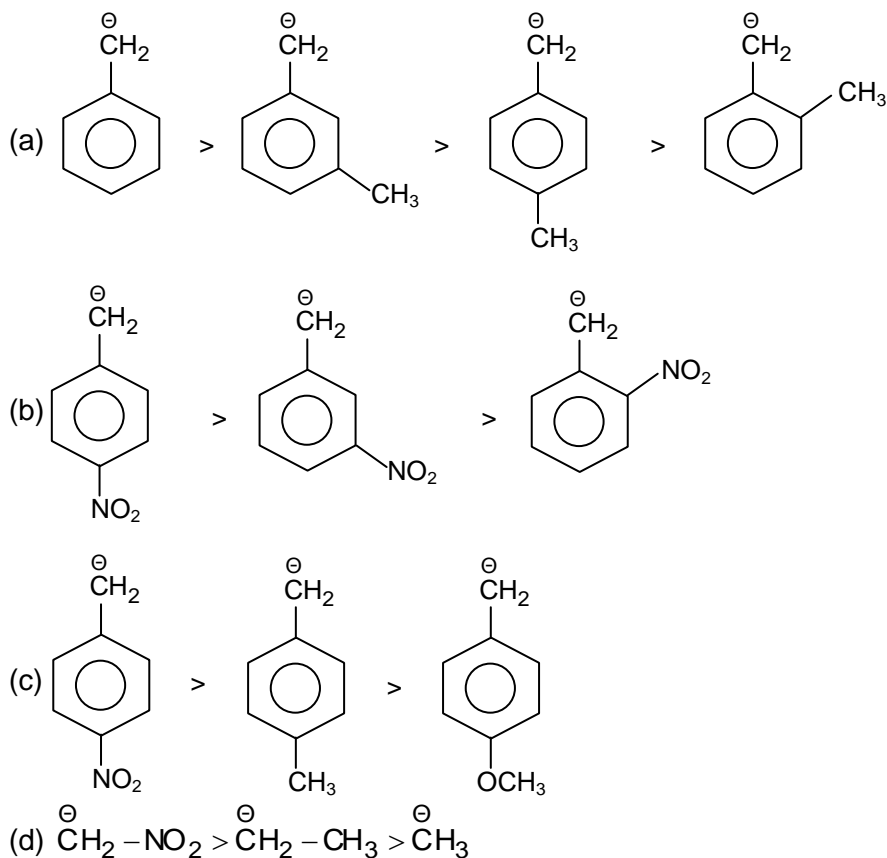
B,C,D

4. Which of the following is meta directing group for benzene?



A,B

5. Which of the following is correct order of stability of intermediate



A,C

6. Which of the following represents functional isomers?

- a. Alcohols and ether
b. Nitroalkanes and alkyl nitrites ($\text{R} - \text{O} - \text{N} = \text{O}$)
c. Aldehyde and Ketone
d. Glucose and fructose

A,B,C,D

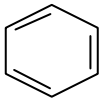
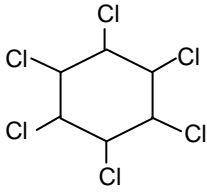
7. Some pairs of acids are given below. Select the pair in which second acid is stronger than first

- a. $\text{CH}_3\text{CO}_2\text{H}$ and $\text{CH}_2\text{FCO}_2\text{H}$
b. $\text{CH}_2\text{FCO}_2\text{H}$ and $\text{CH}_2\text{ClCO}_2\text{H}$
c. $\text{CH}_2 - \text{OH}$; $\text{CH}_2 - \text{OH}$
 Cl NO_2
d. $\text{CH}_3 - \text{CH}_2 - \underset{\text{F}}{\text{CH}}\text{COOH}$ & $\text{CH}_3 - \underset{\text{F}}{\text{CH}} - \text{CH}_2 - \text{COOH}$

A, C

Sol. With the increase in $-\text{I}$ of group acidic strength increases.

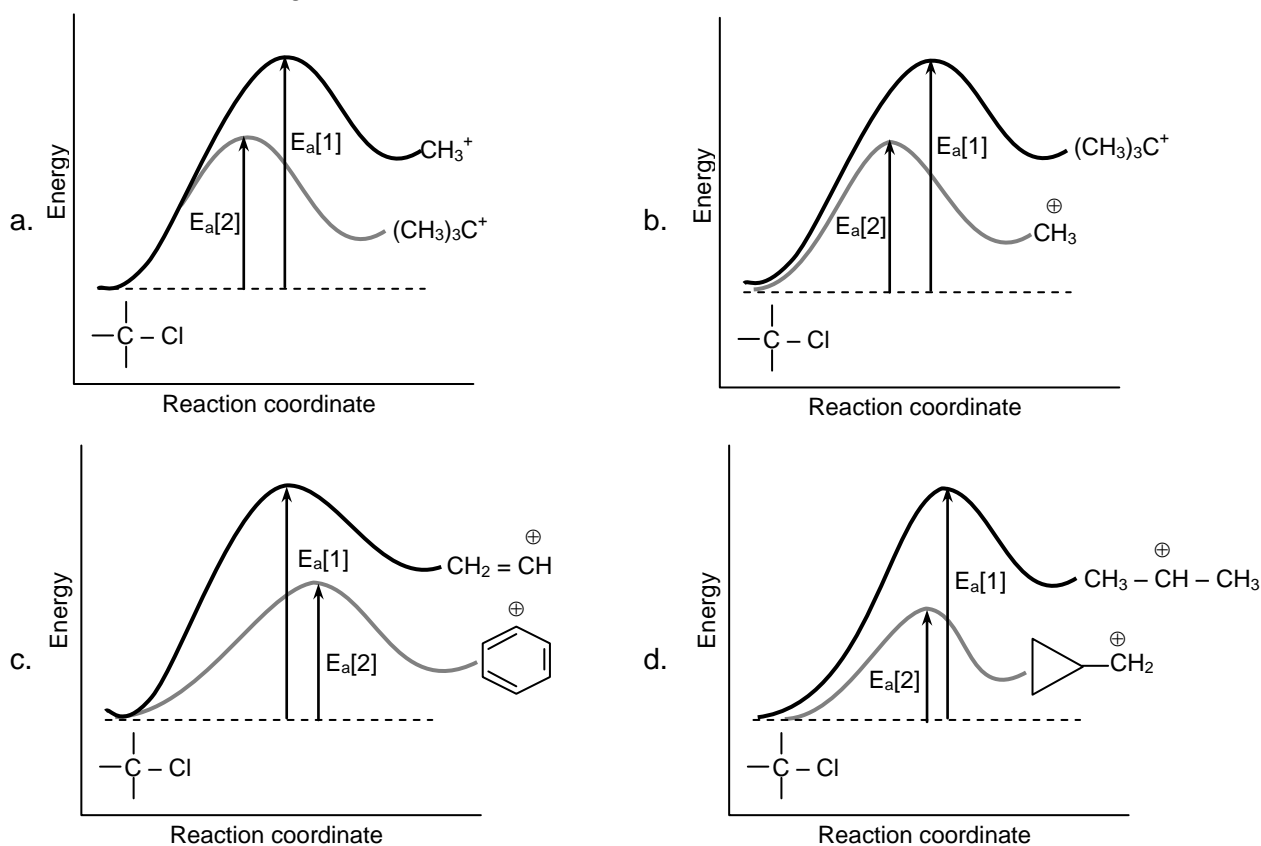
8. Which of the following reaction is not correctly matched.

- a.  $\xrightarrow[h\nu]{\text{Cl}_2}$  [Free radical Addition]
- b. $\text{CH}_3 - \underset{\text{CH}_3}{\underset{|}{\text{C}}} = \text{CH}_2 \xrightarrow{\text{HCl}} \text{CH}_3 - \underset{\text{Cl}}{\underset{|}{\text{C}}} - \text{CH}_3$ [electrophilic Addition]
- c. $\text{CH}_3 - \underset{\text{Cl}}{\underset{|}{\text{CH}}} - \text{CH}_3 \xrightarrow[\text{KOH}]{\text{aq.}}$ $\text{CH}_3 - \underset{\text{OH}}{\underset{|}{\text{CH}}} - \text{CH}_3$ [electrophilic substitution]
- d. $\text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow[\text{Peroxide}]{\text{HBr}}$ $\text{CH}_3 - \text{CH}_2 - \underset{\text{Br}}{\underset{|}{\text{CH}_2}}$ [electrophilic Addition]

C, D


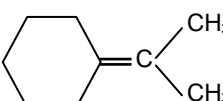
Sol. C is nucleophilic substitution; D is free Radical addition

9. Which of the following is correct?



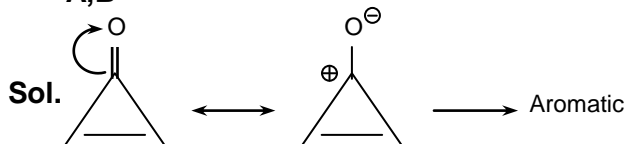
A, D

10. Which of these statements are correct?

- a. Dipole moment of  is greater than $\text{Ph} - \overset{\text{O}}{\parallel}{\text{C}} - \text{Ph}$
- b. Acetone behaves as electrophile as well as nucleophile
- c.  can show geometrical isomerism

d. RO^\ominus is better nucleophile than RS^\ominus

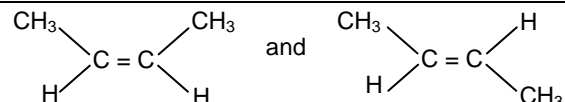
A,B



SECTION – E (Matrix Type) No Negative Marking

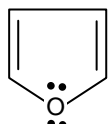
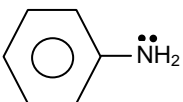
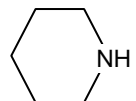

This Section contains **2 questions**. Each question has four choices (A, B, C and D) given in **Column I** and five statements (p, q, r, and s) in **Column II**. **(2 × 8 = 16 Marks)**

1. Match Column – I with Column – II. (One or More than One Match)

Column – I		Column – II	
(A)	$\text{CH}_3 - \text{CH}_2 - \text{O} - \text{CH}_2\text{CH}_3$ and $\text{CH}_3 - \text{O} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$	(p)	Tautomers
(B)	CH_3CHO & $\text{CH}_2 = \text{CH} - \text{OH}$	(q)	Metamers
(C)	CH_3COOH and HCOOCH_3	(r)	Functional Isomers
(D)		(s)	Geometrical Isomers

Sol. A → Q; B → P & R; C → R; D → S

2. Match the column – I with column – II. (One or More than One Match)

Column – I		Column – II	
(A)		(p)	All atoms sp^2 hybridised
(B)		(q)	Heterocyclic
(C)		(r)	Antiaromatic
(D)		(s)	Homocyclic

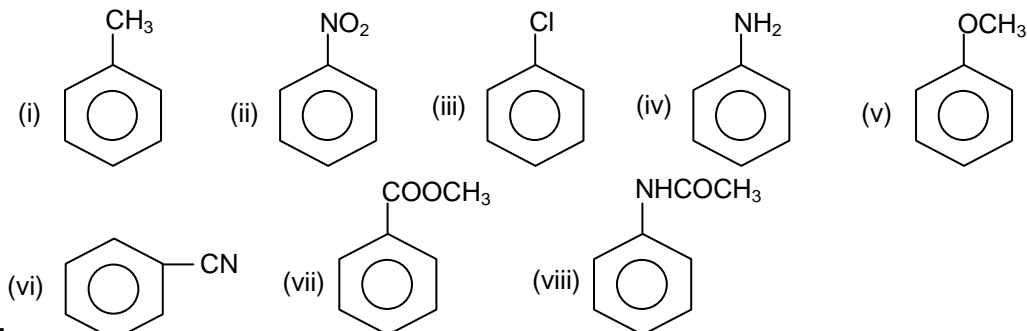
Sol. A → p, q; B → p, s; C → q; D → p, r, s

SECTION – F (Integer Type) No Negative Marking

This Section contains **10 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.

10 × 4 = 40 Marks

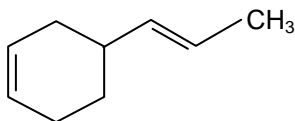
1. How many of the following are o,p-directly and activating group.



Sol.4

i; iv; v; viii

2. How many C – H group in the following will participate in Hyperconjugation



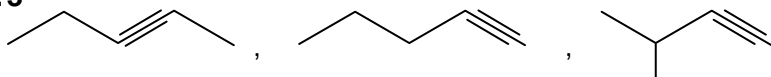
Sol.8

3. How many primary carbon atoms are there in $\text{CH}_3 - \text{CH}_2 - \text{CH}(\text{CH}_3)\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}_3$?

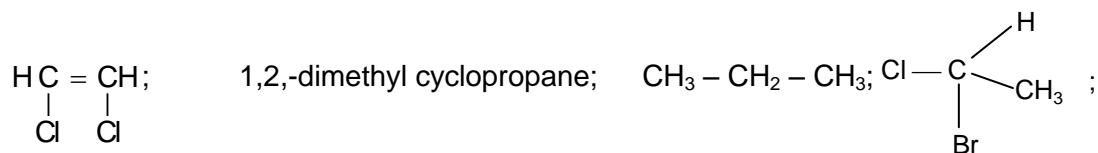
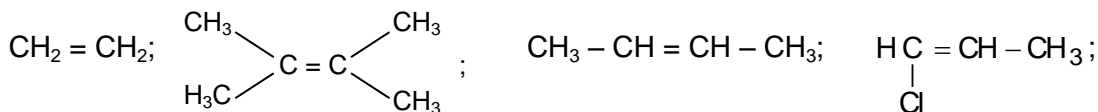
Sol.5

4. The number of alkynes possible with molecular formula C_5H_8 is:

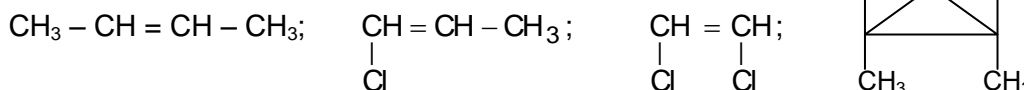
Sol.3



5. How many of the following will show Geometrical Isomerism.



Sol.4



6. A gaseous mixture contains first four members of homologous series of alkane ($\text{C}_n\text{H}_{2n+2}$). How many compounds (total number of isomers) are possible in this gaseous mixture?

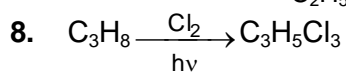
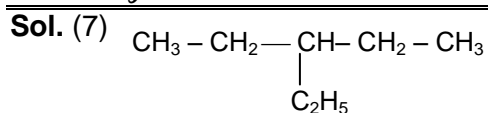
Sol.5

$\text{CH}_4 \Rightarrow$ only one structure ; $\text{C}_2\text{H}_6 \Rightarrow$ only one structure

$\text{C}_3\text{H}_8 \Rightarrow$ only one structure

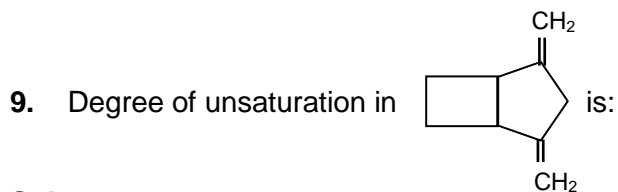
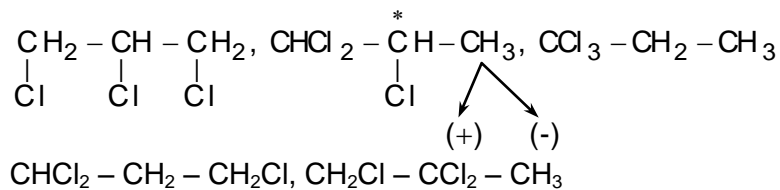
$\text{C}_4\text{H}_{10} \Rightarrow$ two isomers $\begin{cases} \nearrow \text{n butane} \\ \searrow \text{iso butane} \end{cases}$

7. An alkane has 'Ethyl' side chain minimum number of carbon should be present in alkane (Do not consider cyclo-alkane)



How many isomeric products are possible?

Sol.6



Sol.4

10. The number of chiral centers present in 3, 4-dibromo-2-pentanol is:

Sol.3

