CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

ISOMERISM AND REACTION MECHANISM

Level I

1. The stability of a carbonium ion depends upon : the bond angle of the attached group, the substrate with which it reacts, the inductive effect and hyper-conjugative effect of the attached group, None of the above

A. the bond angle of the attached group

B. the substrate with which it reacts

C. the inductive effect and hyper-conjugative effect of the attached group

D. None of the above

Answer: C

Watch Video Solution

2. Rearrangement reactions are mainly show by:

A. Carbanion

B. Free radical

C. Carbene

D. Carbocation

Answer: D

Watch Video Solution

3. Which of the following does not show electromeric effect?

A. Alkenes

B. Ethers

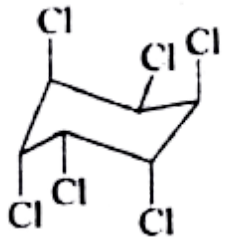
C. Aldehyde

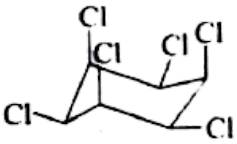
D. Ketones

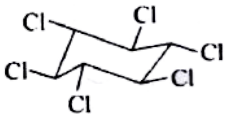
Answer: B

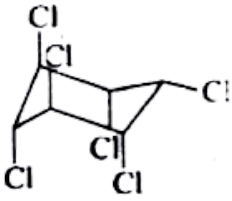
Watch Video Solution

4. Dehydrohalogenation by strong base is slowest in:

A. 

B. 

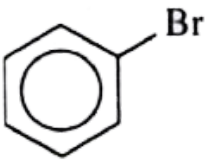
C. 

D. 

Answer: C

Watch Video Solution

5. Which of the following compounds is the most likely to undergo a biomolecular nucleophilic substituion reaction with aqueous NaOH?

A. 

B. 

C. 

D. 

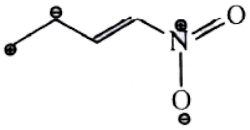
Answer: D

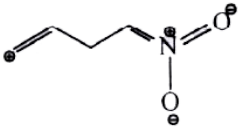
Watch Video Solution

6. Among the following the least stable resonance structure is :

A.

B.

C. 

D. 

Answer: A

Watch Video Solution

7. Electrophilic addition reactions proceed in two steps. The first step involves the addition of an electrophile. Name the type of intermediate formed in the first step of the following addition reaction.

$H_3C - HC = CH_2 + H^+ \rightarrow ?$

A. 2° carbanion

B. 1° carbocation

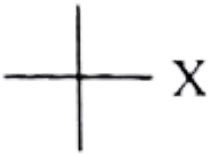
C. 2° carbocation

D. 1° carbanion

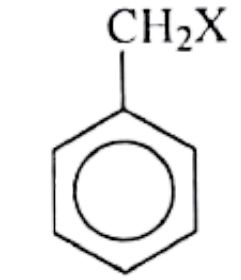
Answer: C

Watch Video Solution

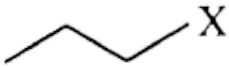
8. Which of the following cannot show S_N1 reaction?



A.

B. 

C. 

D. 

Answer: C

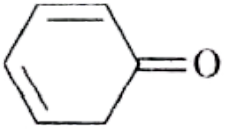
Watch Video Solution

9. Maximum enolisation takes place in

A. CH_3COCH_3

B. CH_3COCH_2CHO

C. $CH_3COCH_2COCH_3$

D. 

Answer: D

Watch Video Solution

10. Keto-enol tautomerism is observed in

A. $C_6H_5 - \overset{\overset{O}{||}}{C} - H$

B. $C_6H_5 - \overset{\overset{O}{||}}{C} - CH_3$

C. $C_6H_5 - \overset{\overset{O}{||}}{C} - C_6H_5$

D. $C_6H_5 - \overset{\overset{O}{||}}{C} - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - C_6H_5$

Answer: B

Watch Video Solution

11. $(CH_3)_3CCH_2COOH$ is more acidic than $(CH_3)_3SiCH_2COOH$ because

A. Size of Si is more than that of carbon

B. Electronegativity of carbon is less than that of silicon

C. Silicon is more electropositive than carbon due to which $(CH_3)_3SiCH_2COO^-$ becomes less stable

D. None of the above

Answer: C

Watch Video Solution

12. For the following acids

$$\underset{(\mathrm{I})}{(CH_3)_3CCH_2CO_2H} \qquad \underset{(\mathrm{II})}{(CH_3)_3\overset{\oplus}{N}CH_2CO_2H} \qquad \underset{(III)}{CH_3COOH}$$

pK_a value will be in order

A. $I > II > III$

B. $I < II < III$

C. $I > III > II$

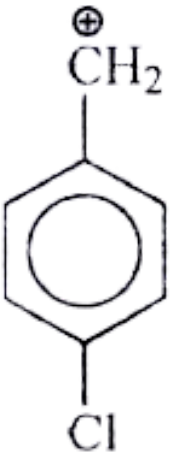
D. $II > III > I$

Answer: C

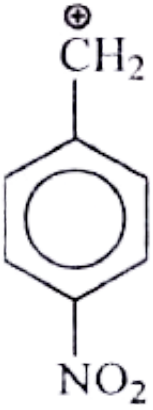
Watch Video Solution

13. Most stable carbocation is:

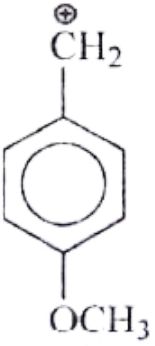
A.



B.



C.



D.

Answer: C

Watch Video Solution

14. Arrange the following in correct order of acidic strength:

I)$CH_3 - NO_2$ II) $NO_2 - CH_2 - NO_2$ III) $CH_3 - CH_2 - NO_2$

IV) $NO_2 - \underset{\underset{NO_2}{|}}{CH} - NO_2$

A. $IV > II > I > III$

B. $IV > II > III > I$

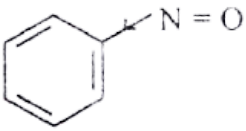
C. $III > I > II > IV$

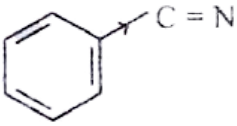
D. $III > I > IV > II$

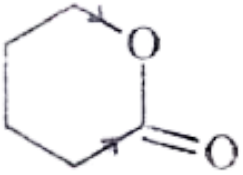
Answer: A

Watch Video Solution

15. In which of the following species, incorrect of inductive effect is shown?

A. 

B. 

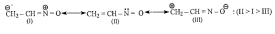
C. 

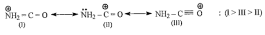
D. $CH_3 - CH_2 \longleftarrow MgBr$

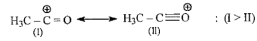
Answer: A

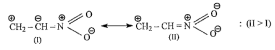
Watch Video Solution

16. Which of the following is not correctly ordered for resonance stability?

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

17. An organic molecule has 5 C = C bonds (heat of hydrogenation for C = C bond is 28.8 kJ mol^{-1}) and experimental value for heat of hydrogenation is 99 kJ mol^{-1}. The resonance energy in kJ mol^{-1} is

A. 45

B. 90

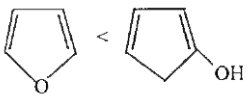
C. 70

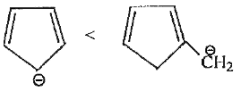
D. 140

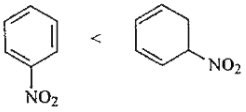
Answer: A

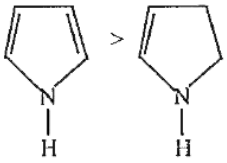
Watch Video Solution

18. Which order is true for resonance energy?

A. 

B. 

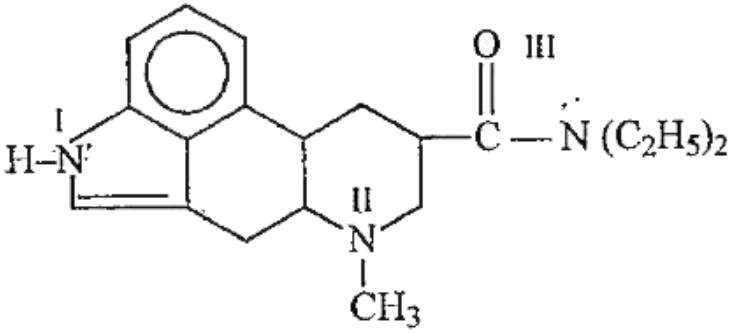
C. 

D. 

Answer: D

Watch Video Solution

19. Which nitrogen in LSD (Lysergic acid diethylamide) is more basic?



A. I

B. II

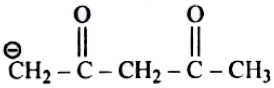
C. III

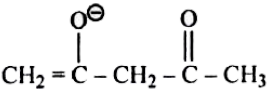
D. All are equally basic

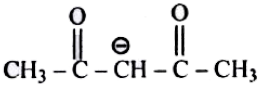
Answer: B

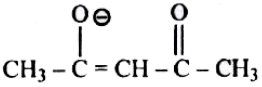
Watch Video Solution

20. The stability order of the following species is:

I. 

II. 

III. 

IV. 

A. $I > II > III > IV$

B. $III > I > II > IV$

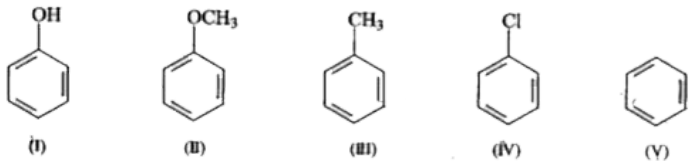
C. $IV > II > III > I$

D. $IV > III > II > I$

Answer: C

Watch Video Solution

21. Arrange the following compounds in the order of decreasing reactivity towards electrophilic substitution



A. $V > IV > III > II > I$

B. $I > II > III > V > IV$

C. $I > II > IV > III > V$

D. $I > III > IV > II > V$

Answer: B

Watch Video Solution

22. Which of the following molecules has all the effects inductive mesomeric and Baker Nathan effect?

A. C_2H_5Cl

B. $CH_3 - CH = CH_2$

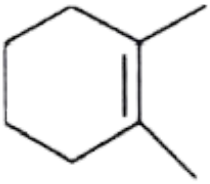
C. $CH_2 = CH - CH = CH_2$

D. $CH_3 - CH = CH - \underset{\underset{O}{||}}{C} - CH$

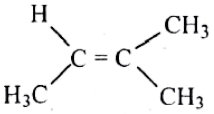
Answer: D

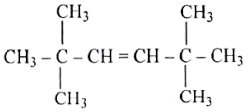
Watch Video Solution

23. Which of the following alkenes will show maximum number of hyperconjugation forms?

A. 

B. $CH_3 - CH = CH - CH_3$

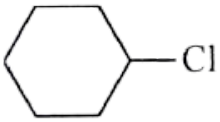
C. 

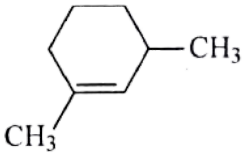
D. 

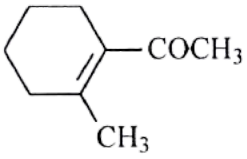
Answer: A

Watch Video Solution

24. In which of the following molecules all the effects namely inductive, mesomeric and hyperconjugation operate?

A. 

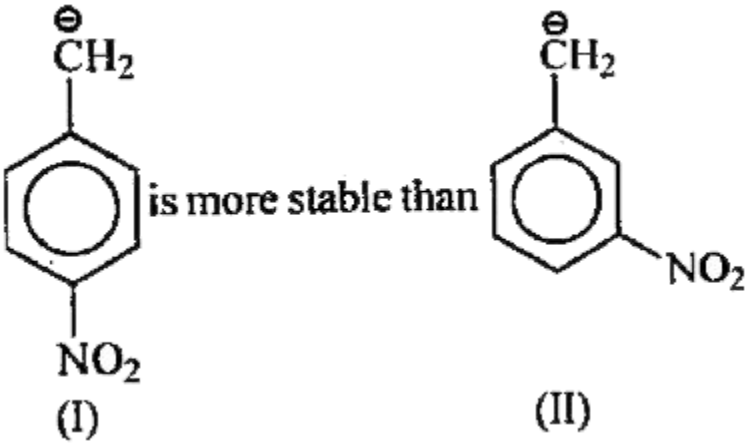
B. 

C. 

D. 

Answer: C

Watch Video Solution

25. 

because

A. 180° location of NO_2 and $\overset{\Theta}{C}H_2$ in (I)

B. $-NO_2$ operate both - I and -M in(I)

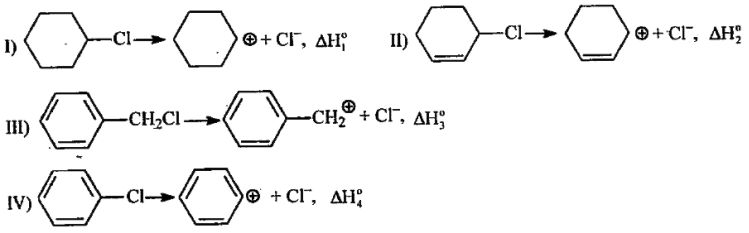
C. $-I$ in (II) is weaker than (I)

D. Due to steric repulsion

Answer: B

Watch Video Solution

26. The decreasing order of enthalpies of reaction for producing carbocation is:



A. $\Delta H_1^\circ > \Delta H_2^\circ > \Delta H_3^\circ > \Delta H_4^\circ$

B. $\Delta H_4^\circ > \Delta H_1^\circ > \Delta H_2^\circ > \Delta H_3^\circ$

C. $\Delta H_3^\circ > \Delta H_2^\circ > \Delta H_1^\circ > \Delta H_4^\circ$

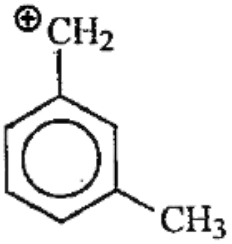
D. $\Delta H_2^\circ > \Delta H_1^\circ > \Delta H_4^\circ > \Delta H_3^\circ$

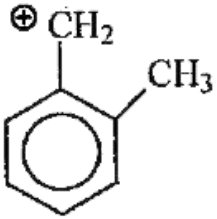
Answer: B

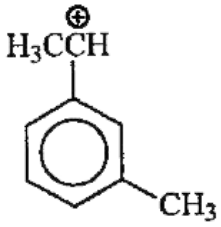
Watch Video Solution

27. Which of the following is most stable carbocation?

A.

B. 

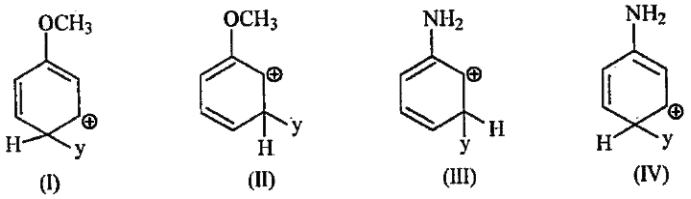
C. 

D. 

Answer: D

Watch Video Solution

28. Give the stability order of the following compounds.



A. $I > II > III > IV$

B. $IV > I > II > III$

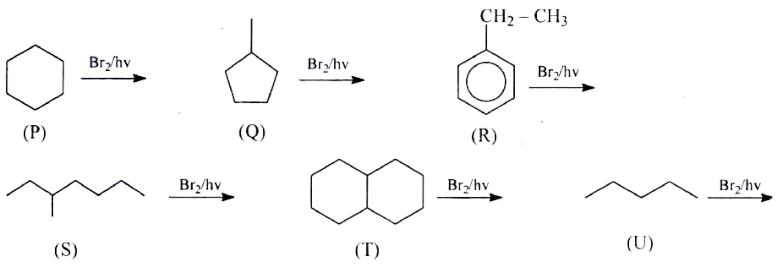
C. $IV > I > III > II$

D. $IV > II > I > III$

Answer: C

Watch Video Solution

29. Among the following free radical bromination reactions, select those in which 2 halide is the major product



A. P, Q, R , S

B. P, R , U

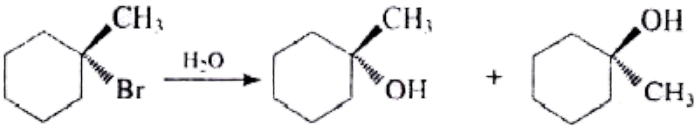
C. P, R , S , T

D. P, Q, R , S, T

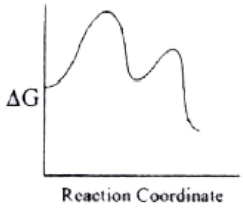
Answer: B

Watch Video Solution

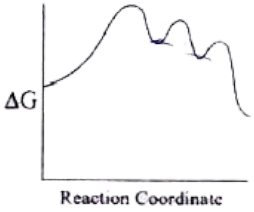
30. Which is the correct reaction coordinate diagram for the following solvolysis reaction?



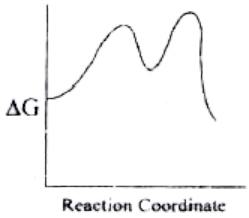
A.



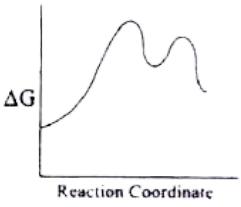
B.



C.



D.



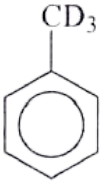
Answer: B

Watch Video Solution

Watch Video Solution

31. Arrange the following in decreasing order of reactivity towards EAS (electrophilic aromatic substitution).

(a)



(b)

(c)

A. a gt b gt c

B. cgt b gt a

C. a gt c gt b

D. c gt a gt b

Answer: A

Watch Video Solution

32. $CH_3 - \overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}} - X \xrightarrow{\text{alc. KOH}} CH_3 - \overset{CH_2}{\underset{CH_3}{\overset{||}{\underset{|}{C}}}} + HX$. The reaction is

A. S_N1 reaction

B. S_N2 reaction

C. E_1 reaction

D. E_2 reation

Answer: C

Watch Video Solution

33. The conversion of 2,3-dibromobutane to 2-butene with Zn is:

A. Redox reaction

B. α-Elimination

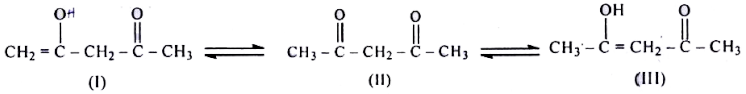
C. β -Elimination

D. Both α- elimination and redox reaction

Answer: C

Watch Video Solution

34. The order of stability of the following tautomeric compounds is:



A. $II > III > I$

B. $I > II > III$

C. $III > II > I$

D. $II > I > III$

Answer: C

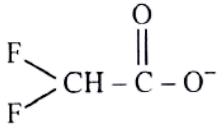
Watch Video Solution

35. Ionic species are stabilised by the dispersal of charge. Which of the following carboxylate ion is the most stable?

A. $CH_3 - \overset{\overset{O}{||}}{C} - O^-$

B. $Cl - CH_2 - \overset{\overset{O}{||}}{C} - O^-$

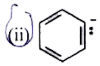
C. $F - CH_2 - \overset{\overset{O}{||}}{C} - O^-$

D. 

Answer: D

Watch Video Solution

36. The stability of carbanions in the following:

(i) $RC \equiv C^{\ominus}$ (ii)  (iii) $R_2C = \overset{\ominus}{C}H$ (iv) $R_3C - \overset{\ominus}{C}H_2$ in the order of :

A. $iv > ii > iii > i$

B. $i > iii > ii > iv$

C. $i > ii > iii > iv$

D. $ii > iii > iv > i$

Answer: C

Watch Video Solution

37. Which of the following carbocation is more stable?

A. $CH_3 - \overset{\oplus}{C}H_2$

B. $CH_3 - \overset{\oplus}{C}H - CH_3$

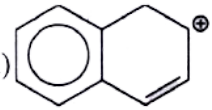
C. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\oplus}{C}} - CH_2 - CH_3$

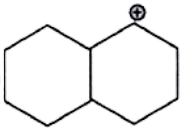
D. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\underset{CH_3}{|}}{\overset{\oplus}{C}}} - CH_3$

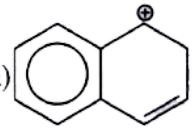
Answer: D

Watch Video Solution

38. Compare relative stability of following carbocation:

(i) 

ii) 

iii) 

A. $i > ii > iii$

B. $iii > i > ii$

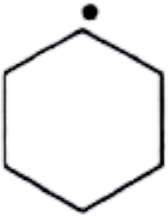
C. $i > iii > ii$

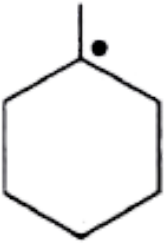
D. $iii > ii > i$

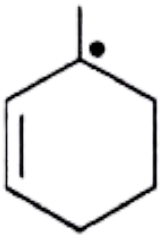
Answer: C

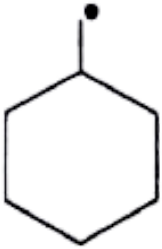
Watch Video Solution

39. Most stable radical among the following is:

A. 

B. 

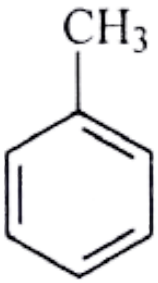
C. 

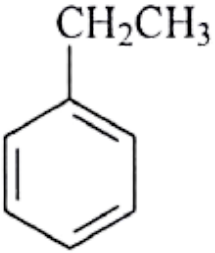
D. 

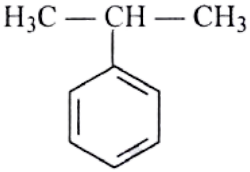
Answer: C

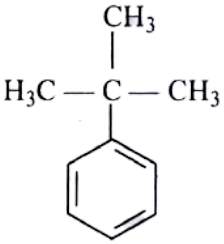
Watch Video Solution

40. Which of the following alkyl benzene cannot be oxidised to benzoic acid?

A. 

B. 

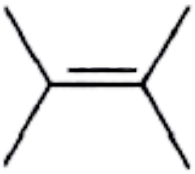
C. 

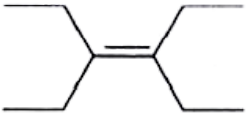
D. 

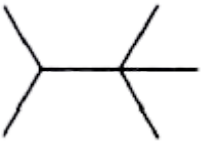
Answer: D

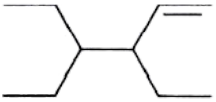
Watch Video Solution

41. Which of the following has maximum number of α-hydrogen?

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

42. The order of decreasing reactivity towards an electrophilic reagent, for the following:

I. Benzene II. Toluene III. Chlorobenzene IV. Phenol

A. $I > II > III > IV$

B. $II > IV > I > III$

C. $IV > III > II > I$

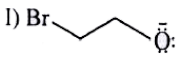
D. $IV > II > I > III$

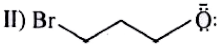
Answer: D

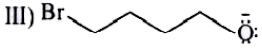
Watch Video Solution

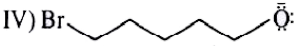
Level Ii

1. In the following compounds, nucleophile and the leaving groups are in the same molecule:

I) 

II) 

III) 

IV) 

These dual nature species can undergo intramolecular and intermolecular nucleophilic substitution. Intramolecular substitution reaction is possible in:

A. I, II

B. II, III

C. III, IV

D. IV

Answer: C

Watch Video Solution

2. The decreasing order of reactivity towards electrophilic substitution of the following is:

I) Nitrobenzene II) Chlorobenzene III) Toluene IV) Benzene

A. $I > II > III > IV$

B. $IV > III > II > I$

C. $III > IV > II > I$

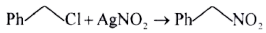
D. $I > II > IV > III$

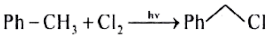
Answer: C

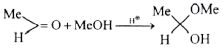
Watch Video Solution

3. Which of the following is a free radical substitution reaction?

A. Benzene $+ Me - Cl \xrightarrow[AlCl_3]{\text{anhyd.}} Ph - CH_3$

B. 

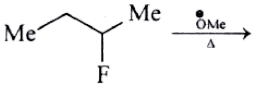
C. 

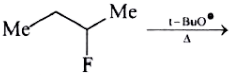
D. 

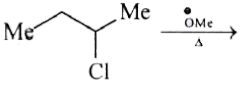
Answer: C

Watch Video Solution

4. Which of the following reactions will not give Hofmann alkene?

A. 

B. 

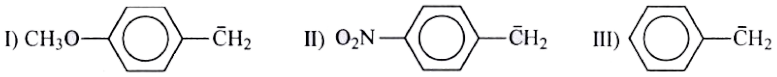
C. 

D. All

Answer: C

Watch Video Solution

5. Consider the following carbanions



Correct order of stability is

A. $I > II > III$

B. $III > II > I$

C. $II > III > I$

D. $I > III > II$

Answer: C

Watch Video Solution

6. Which of the following explain why propene undergo electrophilic addition with HBr, but not with HCN?

A. Br^- is better nucleophile than CN^-

B. HBr being better source of proton as it is stronger acid than HCN

C. HCN attacks preferentially via lone pair of nitrogen

D. The C-Br bond being stronger is formed easily as compared to C-CN bond

Answer: B

Watch Video Solution

7. Examine the following statements regarding S_N2 reaction

1. The rate of reaction is independent of concentration of nucleophile

2. The nucleophile attacks the carbon atom on the side of molecule opposite to the group being displaced

3. The reaction proceeds with simultaneous bond formation and rupture

Which of the above written statements are correct?

A. 1,2

B. 1,3

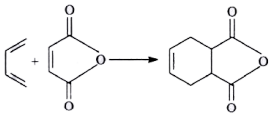
C. 1,2,3

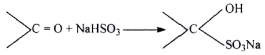
D. 2,3

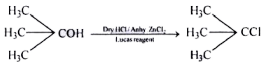
Answer: D

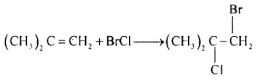
Watch Video Solution

8. The substitution reaction among the following is

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

9. Which among the following statements are true with respect to electronic displacement in a covalent bond?

I. Inductive effect operates through π-bond. II. Resonance effect

operates through σ-bond

III. Inductive effect operates through σ-bond IV. Resonance effect operates through π-bond

V. Resonance and inductive effects operate through σ-bond

A. III and IV

B. I and II

C. II and IV

D. I and III

Answer: A

Watch Video Solution

10. The arrangement of $(CH_3)_3C-$, $(CH_3)_2CH-$, CH_3CH_2- when attached to

benzene or unsaturated group in increasing order of inductive effect is:

A. $(CH_3)_3C \prec (CH_3)_2CH- < CH_3CH_2-$

B. $CH_3CH_2- < (CH_3)_2CH- < (CH_3)_3C-$

C. $(CH_3)_2CH- < (CH_3)_3C- < CH_3CH_2-$

D. $(CH_3)_3C- < CH_3CH_2- < (CH_3)_2CH-$

Answer: A

Watch Video Solution

11. The stability of $Me_2C = CH_2$ is more than that of $MeCH_2CH = CH_2$ due to:

A. inductive effect of the Me group

B. resonance effect of the Me group

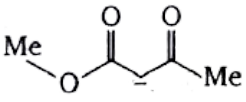
C. hyperconjugative effect of the Me group

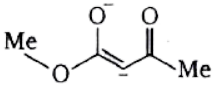
D. resonance as well as inductive effect of the group

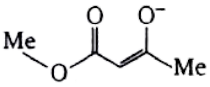
Answer: C

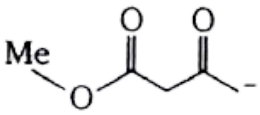
Watch Video Solution

12. Among the following structure the one which is not a resonating structure of other is:

A. 

B. 

C. 

D. 

Answer: D

Watch Video Solution

13. The stability of carbanions is in the order:

I. $RC \equiv \bar{C}$ II.  III. $R_2C = \bar{C}H$ IV. $R_3C - \bar{C}H_2$

A. $I > II > III > IV$

B. $II > III > IV > I$

C. $IV > II > III > I$

D. $I > III > II > IV$

Answer: A

Watch Video Solution

14. The effective electrophile in aromatic sulphonation is:

A. HSO_4^-

B. SO_2

C. $^+SO_2$

D. SO_3

Answer: D

Watch Video Solution

15. Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is

A. CH_3COCl

B. CH_3COOCH_3

C. CH_3CONH_3

D. $CH_3COOCOCH_3$

Answer: A

Watch Video Solution

16. Which one of the nitrogen atoms in $\underset{\text{I}}{H_2N} - \underset{\text{II}}{NH} - \overset{O}{\overset{||}{C}} - \underset{\text{III}}{NH_2}$ is the most nucleophilic?

A. III

B. I

C. II

D. All three nitrogen atoms

Answer: B

Watch Video Solution

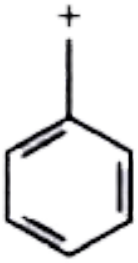
17. Which one of the following is an intermediate in the reaction of benzene with CH_3Cl in the presence of anhydrous $AlCl_3$?

A. Cl^+

B. Cl^-

C. CH_3^+

D.



Answer: C

Watch Video Solution

18. The hydrolysis of 2-bromo-3-methylbutane by S_N1 mechanism gives mainly:

A. 3-methyl-2-butanol

B. 2-methyl-2-butanol

C. 2, 2-dimethyl-1-propanol

D. 2-methyl-1-butanol

Answer: B

Watch Video Solution

19. In an S_N2 substitution reaction of the type $R-Br+Cl^- \xrightarrow{\text{DMF}} R-Cl+Br^-$. Which one of the following has the highest relative rate?

A. $CH_3-CH_2-CH_2Br$

B. $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2Br$

C. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2Br$

D. CH_3CH_2Br

Answer: D

Watch Video Solution

20. The product of which of the following reactions has the highest ease to undergo electrophilic substitution?

$C_6H_5COCl \xrightarrow{Pd/BaSO_4}$, $C_6H_6 \xrightarrow{Cl_2/FeCl_3}$, $C_6H_6 \xrightarrow{CH_3Cl/\text{Anhy.}AlCl_3}$,

$C_2H_5OH \xrightarrow{\text{conc.}H_2SO_4}$

A. $C_6H_5COCl \xrightarrow{Pd/BaSO_3}$

B. $C_6H_6 \xrightarrow{Cl_2/FeCl_3}$

C. $C_6H_6 \xrightarrow{CH_3Cl/\text{Anhy}AlCl_3}$

D. $C_2H_5OH \xrightarrow{\text{Conc.}H_2SO_4}$

Answer: C

Watch Video Solution

21. Which will undergo fastest S_N2 substitution reaction when treated with NaOH?

A. $H_5C_2 - \overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}} - Br$

B. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - Br$

C. $H - \underset{\underset{C_2H_5}{|}}{\overset{\overset{CH_3}{|}}{C}} - Br$

D. $H - \underset{\underset{Br}{|}}{\overset{\overset{H}{|}}{C}} - CH_2 - CH_2 - CH_3$

Answer: D

Watch Video Solution

22. Under identical conditions, S_N1 reaction will occur most efficient with:

A. tert-butyl chloride

B. 1-chlorobutane

C. 2-methyl-1-chloropropane

D. 2-chlorobutane

Answer: A

Watch Video Solution

23. Consider the reaction, $RCHO + NH_2NH_2 \rightarrow RCH = N - NH_2$. What type of reactions is it?

A. Electrophilic addition elimination reaction

B. Free radical addition elimination reaction

C. Electrophilic substitution elimination reaction

D. Nucleophilic addition elimination reaction

Answer: D

Watch Video Solution

Watch Video Solution

24. An incorrect statement with respect to S_N1 and S_N2 mechanism for alkyl halide is:

A. A strong nucleophile in an aprotic solvent increases the rate or favours S_N2 reaction

B. Competing reaction for an S_N2 reaction is rearrangement

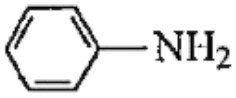
C. S_N1 reaction can be catalysed by some Lewis acids

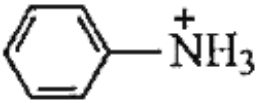
D. A weak nucleophile and a protic solvent increases the rate or favours S_N1 reaction

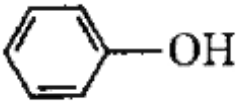
Answer: B

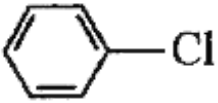
Watch Video Solution

25. In which of the following molecules, the resonance effect is not present?

A. 

B. 

C. 

D. 

Answer: B

Watch Video Solution

26. For 1-methoxy-1, 3-butadiene, which of the following resonating structures is the least stable?

A. $H_2C = CH - \overset{\oplus}{C}H - \overset{\ominus}{C}H - O - CH_3$

B. $H_2C = CH - \overset{\ominus}{C}H - CH = \overset{\oplus}{-}CH_3$

C. $H_2\overset{\ominus}{C} - \overset{\oplus}{C}H - CH = CH - O - CH_3$

D. $H_2\overset{\ominus}{C} - CH = CH - CH = \overset{\oplus}{O} - CH_3$

Answer: A

Watch Video Solution

27. Which of the following statements regarding resonance is not correct?

A. The different resonating structures of a molecule have fixed arrangement of atoms

B. The different resonating structures differ in the arrangement of electrons

C. All resonating structures are equally probable

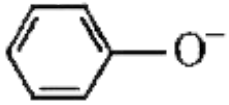
D. The characteristics of a molecule exhibiting resonance cannot be explained on the basis of one resonating structure.

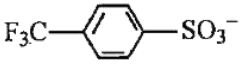
Answer: C

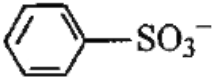
Watch Video Solution

28. Amongst the given species, the best leaving group in a nucleophilic substitution reaction is:

A. OH^-

B. 

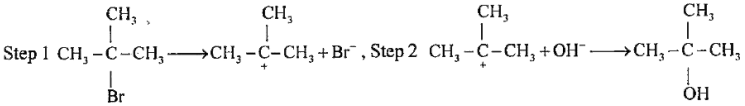
C. 

D. 

Answer: C

Watch Video Solution

29. The mechanism of the reaction between tert-butyl alcohol and hydroxide ion involves the following two steps.



Which of the following statements hold good for this mechanism?

A. step 1 is fast and step 2 is slow

B. step 1 is slow and step 2 is fast

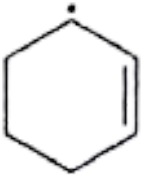
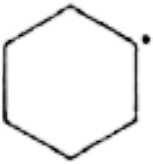
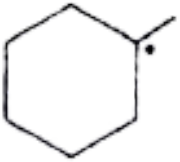
C. both steps 1 and 2 are slow:

D. both steps 1 and 2 are fast

Answer: B

Watch Video Solution

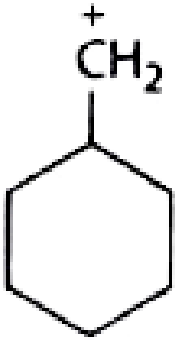
30. In which of the following pairs A is more stable than B?

	A	B
A)		
B)		
C)		
D)	$Ph_3C^{\cdot}$	$(CH_3)_3C^{\cdot}$

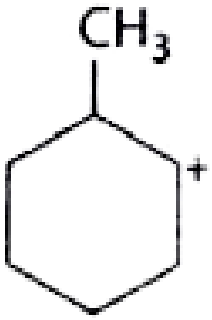
Watch Video Solution

31. Which of the following carbocations will not rearrange?

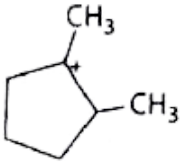
A.



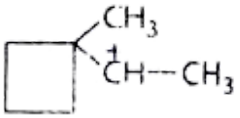
B.



C.



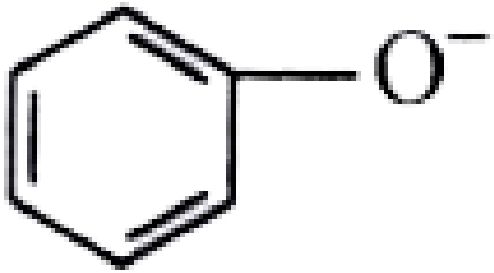
D.



Answer: C

Watch Video Solution

32. Which one of the following substitutents at para-position is most effective in stabilizing the phenoxide



ion ?

A. $-CH_3$

B. $-OCH_3$

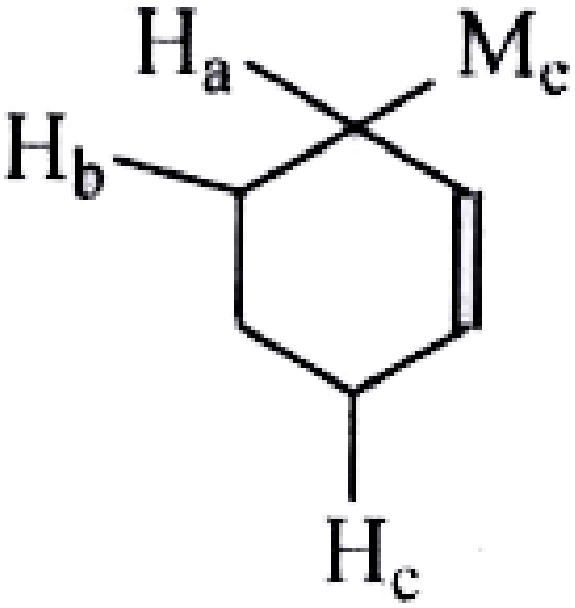
C. $-COCH_3$

D. $-CH_2OH$

Answer: C

Watch Video Solution

33. The order of decreasing ease of abstraction of hydrogen atoms in the following molecule is



A. $H_a > H_b > H_c$

B. $H_a > H_c > H_b$

C. $H_b > H_a > H_c$

D. $H_c > H_b > H_a$

Answer: B

Watch Video Solution

34. Which of the following reactions involves a nucleophile?

(I) $CH_3COOH + OH^- \rightarrow CH_3COO^- + H_2O$ (II)

$CH_3COCH_3 + CN^- \rightarrow (CH_3)_2C(CN) + (OH)$

(III) $C_6H_5 + \overset{+}{C}H_3CO \rightarrow C_6H_5COCH_3$

A. I and II

B. I and III

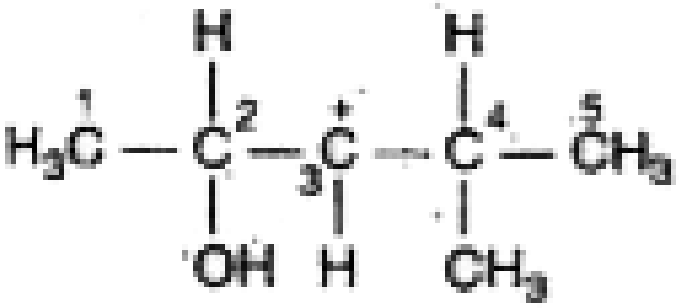
C. III only

D. II and III

Answer: A

Watch Video Solution

35. In the following carbocation, H/CH_3 that is most likely to migrate, to the positively charged carbon is -



A. CH_3 at C_4

B. H at C_4

C. CH_3 at C_2

D. H at C_2

Answer: D

Watch Video Solution

36. The hyperconjugative stabilities of tert-butyl cation and 2-butene, respectively, are due to

A. $\sigma \rightarrow \pi$ (empty and $\sigma \rightarrow \pi^*$ electron delocalizations

B. $\sigma \rightarrow \sigma^*$ and $\sigma to \pi$ electron delocalizations

C. $\sigma \rightarrow \pi$ (filled) and $simga \rightarrow \pi$ electron delocalizations

D. π(filled) $\rightarrow \sigma^*$ and $\sigma \rightarrow \pi^*$ electron delocalizations

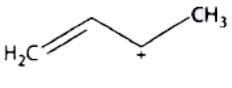
Answer: A

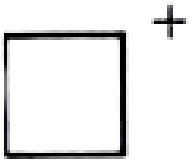
Watch Video Solution

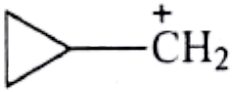
37. If the carbocation

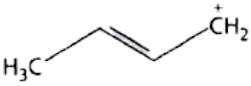
rearranges

to gain stability, it will rearrange to

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

38. p-chlorophenol is a stronger acid than phenol because

A. Cl is less electronegative than oxygen atom

B. of the -I effect of a halogen, which is greater than its +R effect

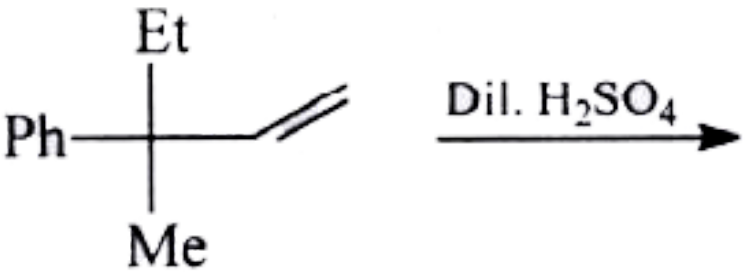
C. of +R effect of Cl, which is stronger than its -I effect

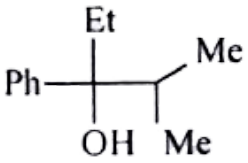
D. of +R effect of Cl.

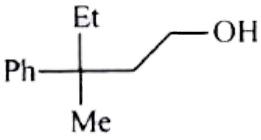
Answer: B

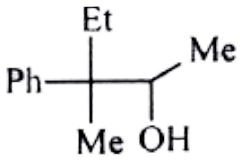
Watch Video Solution

39. The major product in the reaction is:



A. 

B. 

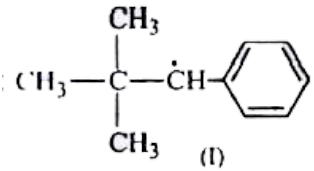
C. 

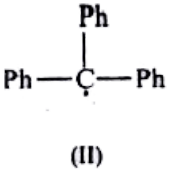
D. Both (B) and (C)

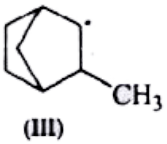
Answer: A

Watch Video Solution

40. Consider the following compounds:


(I)


(II)


(III)

Hyperconjugation occurs in

A. III only

B. I and II

C. I only

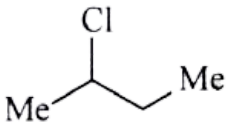
D. II only

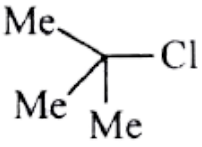
Answer: A

Watch Video Solution

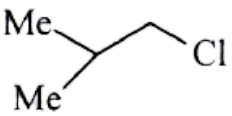
Level Iii

1. Equal amount of an $RCl(C_4H_9Cl)$ is reacted at the same temperature with equal volume of 0.2 Mand 0.4M. solution of KOH, respectively, in two separate experiments. The time taken for the reaction of 50% of (C_4H_9Cl) was found to be same, the alkyl halide is:

A. 

B. 

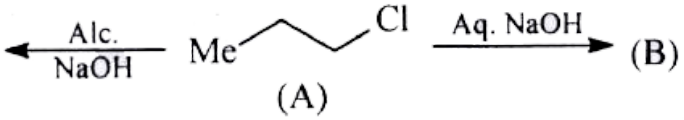
C. 

D. 

Answer: B

Watch Video Solution

2. Which of the following statements is correct about the following reactions?



A. (B) is obtained by elimination reaction

B. (C) is obtained by substitution reaction

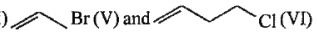
C. The molecular formula of (B) is C_3H_6 and that of (C) is C_3H_8O

D. (B) is an isomer of ethyl methyl ether, while (C) is the dehydrated compound of (B)

Answer: D

Watch Video Solution

3. Which compound in each of the following pairs will react faster in S_N2 reaction with $\overset{\Theta}{O}H$.

i) MeBr (I) and MeI (II) ii) Me_3C-Cl (III) and MeCl (IV) iii)  Br (V) and Cl (VI)

	(i)	(ii)	(iii)
A)	(I)	(III)	(V)
B)	(I)	(IV)	(V)
C)	(II)	(III)	(VI)
D)	(II)	(IV)	(VI)

Watch Video Solution

4. Consider thiol anion $\left(RS^{\Theta}\right)$ and alkoxy anion $\left(RO^{\Theta}\right)$. Which of the following statement is correct?

A. RS^{Θ} is less basic and less nucleophilic than RO^{Θ}

B. RS^{Θ} is less basic but more nucleophilic than RO^{Θ}

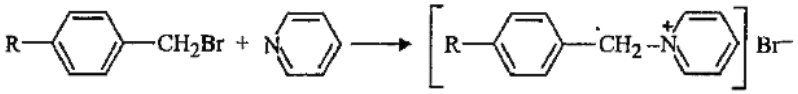
C. RS^{Θ} is more basic and more nucleophilic than RO^{Θ}

D. RS^{Θ} is more basic but less nucleophilic than RO^{Θ}

Answer: B

Watch Video Solution

5. The rate of the reaction,



is influenced by the hyperconjugation effect of group R. If R sequentially is

I. CH_3- II. CH_3-CH_2- III. $H_3C-\underset{CH_3}{\underset{|}{CH}}-$ (IV)

$H_3C-\overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}}-$

the increasing order of speed of the above reaction is

A. IV, III, II, I

B. I, II, III, IV

C. I, IV, III, II

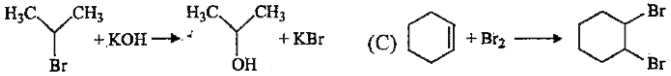
D. III, II, I, IV

Answer: B

Watch Video Solution

6. For the following reactions:

$(A)CH_3CH_2CH_2Br + KOH \rightarrow CH_3CH = CH_2 + KBr + H_2O$



Which of the following statement is correct?

A. (A) is elimination, (B) and (C) are substitution reactions

B. A is substitution, (B) and (C) are addition reactions

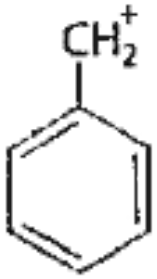
C. (A) and (B) are elimination reactions and (C) is an addition reaction

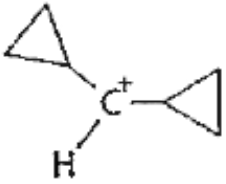
D. (A) is elimination, (B) is substitution and (C) is addition reaction

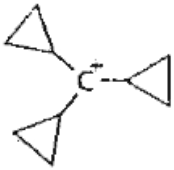
Answer: D

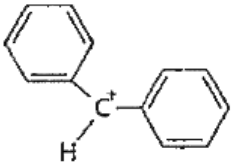
Watch Video Solution

7. Which of the following is the least stable carbocation?

A. 

B. 

C. 

D. 

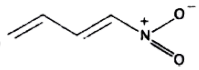
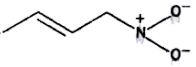
Answer: B

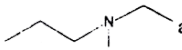
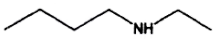
Watch Video Solution

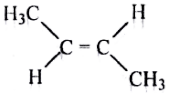
8. Select the correct statement(s) given below:

(I) Both - Cl group as well as - $OCOCH_3$ group deactivate benzene ring towards electrophilic aromatic substitution

reactions.

(II)  is more stable resonance form than 

(III)  and  are functional isomers.

(IV) The combustion enthalpy of is less than 

A. I and II only

B. II and III only

C. II, III and IV only

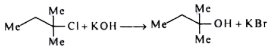
D. All four are correct

Answer: C

Watch Video Solution

Level Iii Multiple Choice Answer Type

1. Which of the following are S_N^2 reactions?

A. 

B. $Me_3C-Br+KOH\longrightarrow Me_3C-OH+KBr$

C. $Et-I+EtONa\rightarrow Et-O-Et+NaI$

D. $Et-Cl+NaOH\rightarrow EtOH+NaCl$

Answer: C::D

Watch Video Solution

2. Vinyl bromide undergoes:

A. Addition reaction

B. Substitution reaction

C. Elimination reaction

D. Rearrangement reaction

Answer: A::C

Watch Video Solution

3. Which of the following statements are correct?

A. EtO^{Θ} is a stronger nucleophile than $\overset{\Theta}{O}H$

B. MeO^{Θ} is a stronger nucleophile than $\overset{\Theta}{O}H$

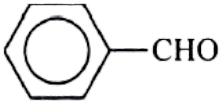
C. $RCOO^{\Theta}$ is a stronger nucleophile than ROH

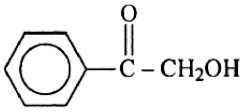
D. MeO^{Θ} is a weaker nucleophile than $\overset{\Theta}{O}H$

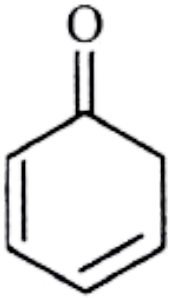
Answer: A::C::D

Watch Video Solution

4. Which of the following compounds shows higher 'enol content than 'keto'?

A. 

B. 

C. 

D. $H_5C_6 - \overset{O}{\overset{||}{C}} - CH_2 - \overset{O}{\overset{||}{C}} - CH_3$

Answer: C::D

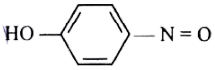
Watch Video Solution

5. Which of the following compounds shows tautomerism?

A. $NH_2 - \overset{\overset{O}{||}}{C} - NH_2$

B. $NH_2 - \overset{\overset{S}{||}}{C} - NH_2$

C. $CH_3 - \overset{\overset{O}{||}}{C} - CH_3$

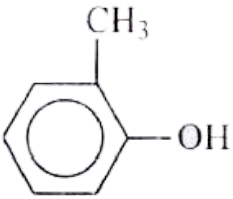
D. 

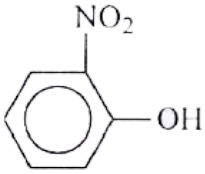
Answer: A::B::C::D

Watch Video Solution

6. Which of the following are less acidic than phenol?

A. CH_3OH

B. 

C. 

D. H_2O

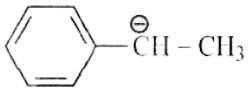
Answer: A::B::D

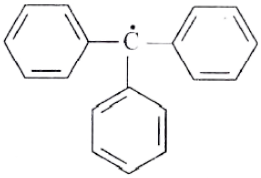
Watch Video Solution

7. Resonance is possible in

A. $CH_2 = \overset{\oplus}{N}H_2$

B. $CH_3CH = C = \overset{\Theta}{C}H$

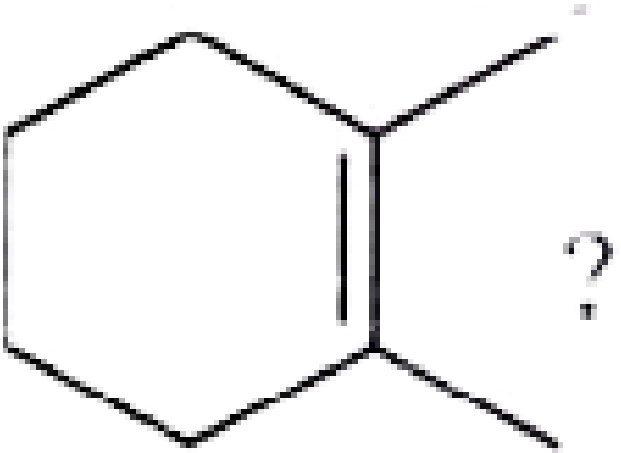
C. 

D. 

Answer: C::D

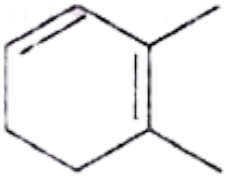
Watch Video Solution

8. Which of the following alkenes have more value of heat of hydrogenation than

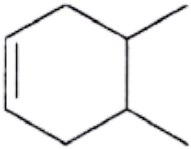


?

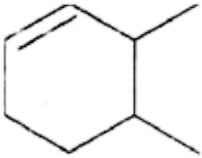
A.

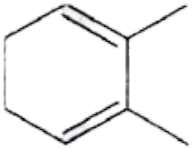


B.



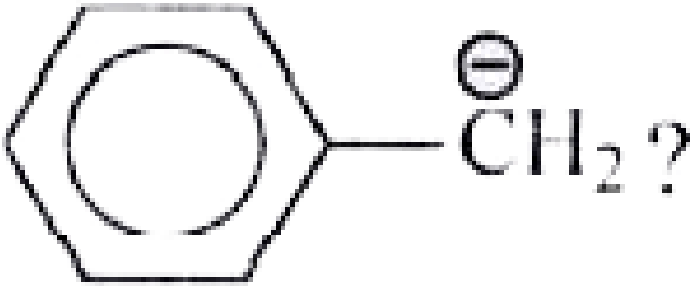
C.



D. 

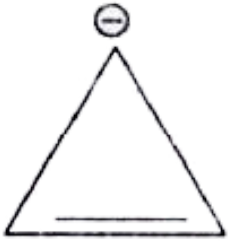
Answer: B::C

Watch Video Solution

9. Among following anions which are more stable than 

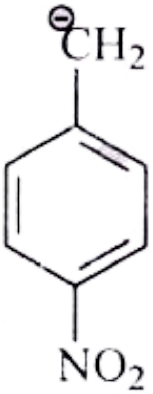
A. $CH_2 = CH - \overset{\Theta}{C}H_2$

B.



C. $CH_3 - \overset{O}{\overset{||}{C}} - \overset{\Theta}{C}H_2$

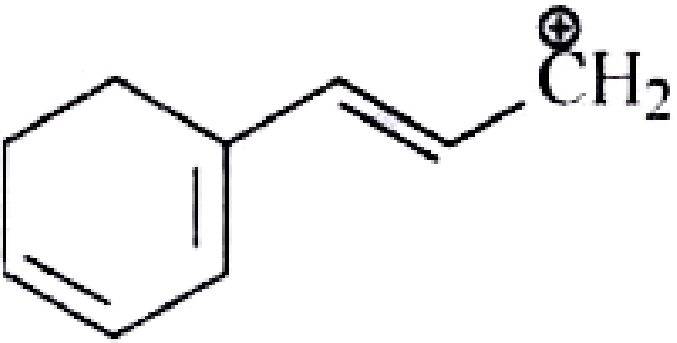
D.



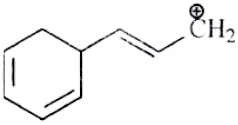
Answer: C::D

Watch Video Solution

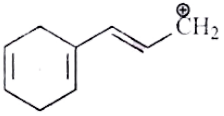
10. Identify the cations which are less stable than



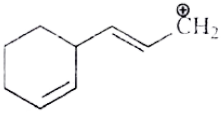
A.



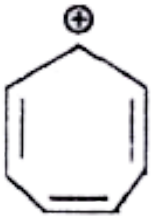
B.



C.



D.



Answer: A::B::C

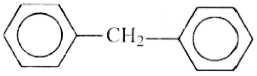
Watch Video Solution

11. Which of the following molecules of alkane will give only one monohalogenated product on reaction with halogen in presence of sunlight?

A. $H_3C - CH_3$

B. $H_3C - CH_2 - CH_3$

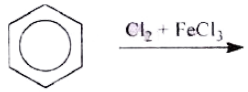
C. $(H_3C)_4C$

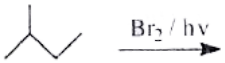
D. 

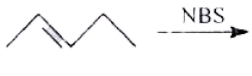
Answer: A::C::D

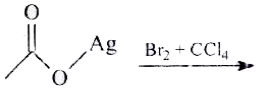
Watch Video Solution

12. Which of the following reactions involve free radical as intermediate?

A. 

B. 

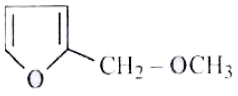
C. 

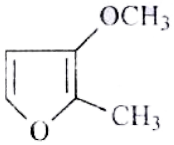
D. 

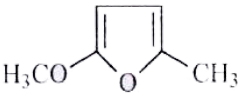
Answer: B::C::D

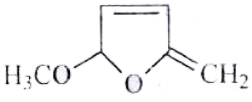
Watch Video Solution

13. Which of the following products can be obtained by S_N1 reaction?

A. 

B. 

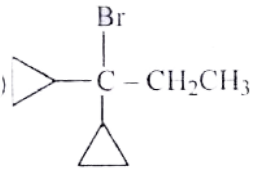
C. 

D. 

Answer: A::B::C

Watch Video Solution

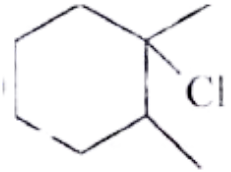
14. Which of the following compounds will give E_1 reaction :



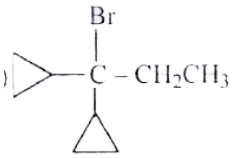
,

$$Ph - \overset{Br}{\overset{|}{C}}H - CH_3$$

,

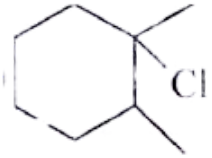


$$H_2C = CH - \overset{Cl}{\overset{|}{C}}H - CH_3,$$

A. 

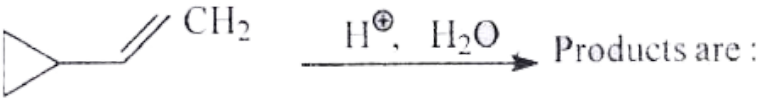
B. $Ph - \overset{Br}{\overset{|}{C}}H - CH_3$

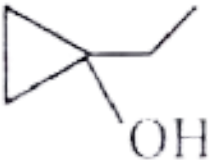
C. $H_2C = CH - \overset{Cl}{\overset{|}{C}}H - CH_3$

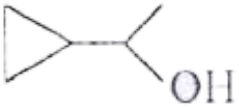
D. 

Answer: A::B::C::D

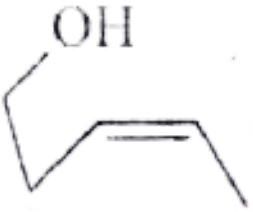
Watch Video Solution

15. 

A. 

B. 

C. 

D. 

Answer: A::B::C

Watch Video Solution

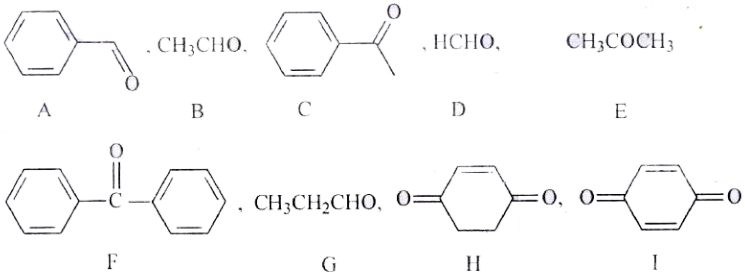
Level Iii Numerical Type

1. Among the following the total number of nucleophiles is:

$SO_3, NH_2^-, R^-, H_2O, OR^-, ROH, AlCl_3, H^-, BF_3.$

Watch Video Solution

2. Among the following, how many of them will show keto-enol tautomerism?



Watch Video Solution

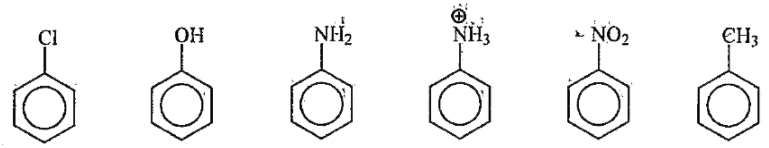
3. How many groups show - I effect?

$CH_3, \overset{\oplus}{N}H_3, -OH, O^{\Theta}, -N(CH_3)_2, -SO_3H,$

$-CHO, -Cl, -COO^{\Theta}$

Watch Video Solution

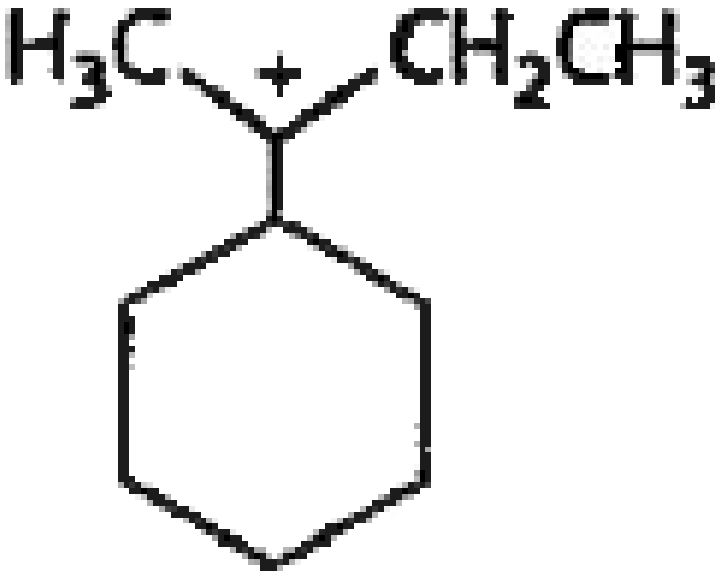
4. How many of the following compounds are more reactive than benzene towards electrophilic substitution?



Watch Video Solution

5. The total number of contributing structures showing hyperconjugation (involving C-H bonds) for the following

carbocation is



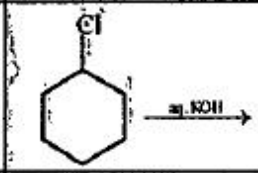
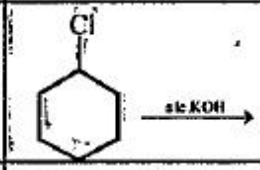
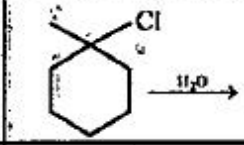
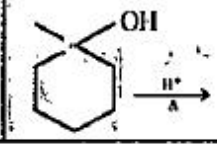
Watch Video Solution

6. The total number of carbocations for the formula $C_4H_9^+$?

Watch Video Solution

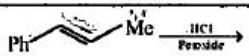
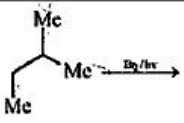
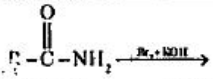
Level Iii Matching Column Type

1. Match the following Column I and Column II :

	Column I		Column II
A)		p)	S_N1
B)		q)	S_N2
C)		r)	E_1
D)		s)	E_2

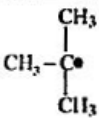
Watch Video Solution

2.

Column I Reaction			Column II Intermediate
A)		p)	Nitrene
B)		q)	Carbocation
C)	$F_3C-CHCl_2 \xrightarrow{RO^{\bullet}}$	r)	Free radical
D)		s)	Carbanion

Watch Video Solution

3.

Column I			Column II
A)	$CH_3-\ddot{O}-\overset{\oplus}{C}H-CH_3$	p)	Stable due to resonance
B)	$F_3-C^{\oplus}$	q)	Destabilised due to inductive effect
C)		r)	Stabilised by hyperconjugation
D)	$CH_3-\overset{\oplus}{C}H-CH_3$	s)	A secondary carbocation

Watch Video Solution

4.

Column I		Column II	
A)	$CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$	p)	Electrophilic addition
B)	$C_6H_6 + HNO_3 \xrightarrow{H_2SO_4} C_6H_5NO_2 + H_2O$	q)	Nucleophilic substitution
C)	$CH_3CH_2 = CH_2 + HBr \rightarrow CH_3CHBrCH_3$	r)	Free radical substitution
D)	$(CH_3)_2CO + HCN \longrightarrow (CH_3)_2C(OH)(CN)$	s)	Electrophilic substitution
E)	$CH_3CH = CH_2 \xrightarrow{HBr/Peroxide} CH_3CH_2CH_2Br$	t)	Nucleophilic addition
F)	$R-X + OH^- \rightarrow ROH + X^-$	u)	Free radical addition

Watch Video Solution

5.

Column I		Column II	
A)	$CH_3C \equiv N$	p)	Resonance
B)	$CH_2 = C = CH_2$	q)	Planar
C)	C_6H_6	r)	Inductive effect
D)	$(CH_3)_3\dot{C}$	s)	Non-planar

Watch Video Solution

6.

Column I		Column II	
A)	$(CH_3)_3\ddot{C}Cl \xrightarrow{-Cl^-} (CH_3)_3\overset{+}{C}$	p)	Electrophile
B)	$CH_3-CH_3 \xrightarrow{h\nu} 2\dot{C}H_3$	q)	Heterolytic fission
C)	$CH_2N_2 \xrightarrow[-N_2]{h\nu} :CH_2$	r)	Nucleophile
D)	$HC\equiv CH \xrightarrow[-NH_3]{NH_2^-} {}^-C\equiv CH$	s)	Homolytic fission

Watch Video Solution

Level Iii Statement Type

1. Statement 1 : Energy of resonance hybrid is equal to the average of energies of all canonical forms.

Statement 2 : Resonance hybrid cannot be represented by a single structure.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: D

Watch Video Solution

2. Statement 1 : CH_3CHO and $CH_2 = CHOH$ are resonance structures.

Statement 2 : Tautomers differ both in the position of atoms as well as electrons

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: D

Watch Video Solution

3. Assertion : Simple carbanions are usually pyramidal but allyl carbanion is a planar species.

Reason : All the carbon atoms in allyl carbanion are sp^2-hybridized.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: B

Watch Video Solution

4. Assertion : E_1cB reaction is favoured by stabilisation of carbanion and poor leaving group.

Reason : The reaction is kinetically of the second order and unimolecular.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: B

Watch Video Solution

5. Assertion : Inductive effect is responsible for the dipole moment in the molecules.

Reason : All inductive effects are permanent polarisations in the ground state.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: A

Watch Video Solution

6. Statement 1 : Heterolytic fission occurs readily in polar covalent bonds.

Statement 2 : Heterolytic fission involves breaking of bond in such a way that the shared pair of electron go with one atom.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: B

Watch Video Solution

Level Iii Linked Comprehension Type Paragraph I

1. The leaving group is that functional group which is ejected with electrons of the o-bond in a reaction. Better the leaving group, faster is the reaction. The relative leaving abilitiy of the leaving group X in (R-X) is increased by:

i. The polarisability of (R-X) bond ii. The degree of stabilisation

through solvation of X.

iii. The strength of (R-X) bond. iv. The stability of X^{Θ}.

The leaving group tendency is also called fugacity.

Which statement is wrong?

A. In polar aprotic solvents such as DMSO, DMF, and DMA, the fugacity order is $I^{\Theta} > Br^{\Theta} > Cl^{\Theta} > F^{\Theta}$

B. Strong bases are good leaving groups.

C. The leaving group order of the following is: $OH^{\Theta} > RO^{\Theta} > CH \equiv C^{\Theta} > {}^{\Theta}NH_2$

D. Charged species are good leaving group than neutral species.

Answer: B

Watch Video Solution

2. The leaving group is that functional group which is ejected with electrons of the o-bond in a reaction. Bette the leaving group, faster is the reaction. The relative leaving abilitiy of the leaving group X in (R-X) is increased by:

i. The polarisability of (R-X) bond ii. The degree of stabilisation through solvation of X.

iii. The strength of (R-X) bond. iv. The stability of X^{Θ}.

The leaving group tendency is also called fugacity.

Which statement is correct?

A. Only S_N1 reaction depends on the nature of leaving group.

B. Only S_N2 reaction depends on the nature of leaving group.

C. Both S_N1 and S_N2 reactions depend on the nature of leaving group.

D. All

Answer: C

Watch Video Solution

3. The leaving group is that functional group which is ejected with electrons of the o-bond in a reaction. Bette the leaving group, faster is the reaction. The relative leaving abilitiy of the leaving group X in (R-X) is increased by:

i. The polarisability of (R-X) bond ii. The degree of stabilisation through solvation of X.

iii. The strength of (R-X) bond. iv. The stability of X^{Θ}.

The leaving group tendency is also called fugacity.

Which statement is correct?

A. EtO^{Θ} is a strong base and therefore a good leaving group.

B. The $-NH_2$ gorup in $ArNH_2$ is converted into a good leaving group by reacting it with $NaNO_2 + HCl \text{ at } 0^\circ C.$

C. The (OH) group is converted into a good leaving group by reacting alcohols with TsCl (p-toluene sulphonyl chloride).

D. The amine group in RNH_2 is converted into leaving group by reacting RNH_2 with $NaNO_2 + HCl \text{ at } 0^\circ C.$

Answer: C

Watch Video Solution

Level Iii Linked Comprehension Type Paragraph Ii

1. Stability of carbocations depends upon the electron releasing inductive effect of groups adjacent to positively charged carbon atom involvement of neighbouring groups in hyperconjugation and resonance.

From the following resonance structures of $CH_3 - \ddot{\underset{\cdot\cdot}{O}} - \overset{+}{C}H_2$ predict which of the structures is more stable? : $CH - 3O - \overset{+}{C}H_2$, $CH_3 - \overset{+}{\underset{\cdot\cdot}{O}} = CH_2$, $CH_2 = \overset{-}{\underset{\cdot\cdot}{O}} - CH_3$, All are equally stable

A. $CH - 3O - \overset{+}{C}H_2$

B. $CH_3 - \overset{+}{\underset{\cdot\cdot}{O}} = CH_2$

C. $CH_2 = \overset{-}{\underset{\cdot\cdot}{O}} - CH_3$

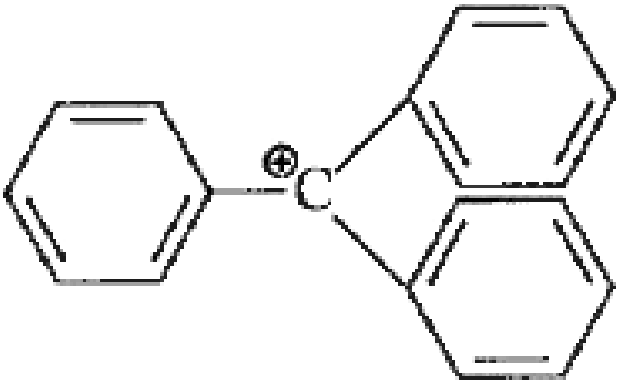
D. All are equally stable

Answer: B

Watch Video Solution

2. .

The structure of triphenylmethyl cation is given below. This is very stable and some of its salts can be stored for months. The cause of high stability of this cation, is



A. hyperconjugation

B. mesomeric effect

C. resonance

D. Both (B) and (C)

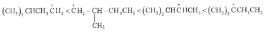
Answer: C

Watch Video Solution

3. Stability of carbocations depends upon the electron releasing inductive effect of groups adjacent to positively charged carbon atom involvement of neighbouring groups in hyperconjugation and resonance.

From the following resonance structures of $CH_3 - \ddot{O} - \overset{+}{C}H_2$ predict which of the structures is more stable? : $CH - 3O - \overset{+}{C}H_2$, $CH_3 - \overset{+}{\ddot{O}} = CH_2$, $CH_2 = \overset{-}{\ddot{O}} - CH_3$, All are equally stable

A.

B. 

C.

D. $(CH_3)_2CHCH_2CH_2<(CH_3)_2CHCH_2CH_3<CH_3CH_2CH(CH_3)CH_2CH_3<(CH_3)_3CHCHCH_3$

Answer: B

Watch Video Solution

Level Iii Linked Comprehension Type Paragraph Iii

1. Which of the following is most basic?

A. $CH_3 - NH_2$

B. $CH_3 - NH - CH_3$

C. $CH_3 - \underset{\underset{CH_3}{|}}{N} - CH_3$

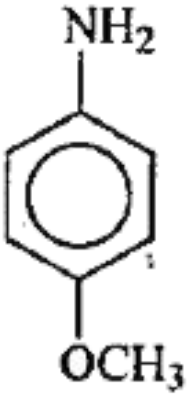
D. NH_3

Answer: B

Watch Video Solution

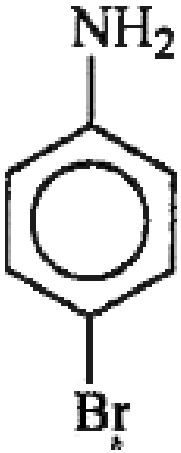
Watch Video Solution

2. Which of the following has highest value of K_b ?

A. 

B. 

C.



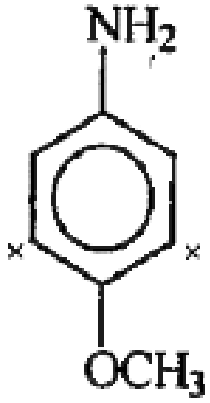
D.

Answer: A

Watch Video Solution

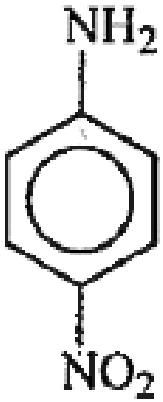
3. Amines are basic in nature due to presence of lone pair of electrons on nitrogen atom. Electron releasing groups increase the basic character ofamines and electron withdrawing groups decrease the basic character of amines.

Which of the following is the most basic ?



A.

B.



C.

D. Can't be predicted

Answer: B

Watch Video Solution