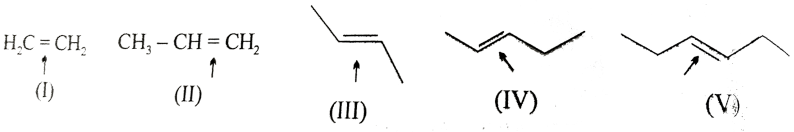
CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 12 FOR CHEMISTRY

GENERAL ORGANIC CHEMISTRY

Mcq S

1. Find out the correct statement(s) about given compound



A. Order of heat of hydrogenation & Heat of combusion is same

B. Order of heat of Hydrogenation & Heat of combustion is different

C. Order of rotation barrier energy for marked bond is I gt IIgtVgtIVgtIII

D. Order of boiling point is VgtIVgtIIIgtIIgtI

Answer: B::C::D

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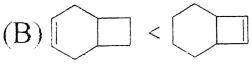
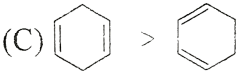
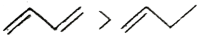
2. Incorrect order of Heat of hydrogenation per π-bond is

A. 

B. 

C. 

D. (D) 

Answer: D

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3. Which statement is correct for electromeric effect

A. it is a temporary effect

B. it is the property of π bond

C. it take place in presence of reagent, i.e., electrophile or nucleophile

D. All are correct

Answer: D

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4. Hyperconjugation occur due to overlaping of

A. π M.O with 's'

B. p' orbital with σ

C. σ M.O. with π M.O.

D. None

Answer: C

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5. Which of the following properties cannot be explained on the basis hyperconjugation.

A. Dipole moment of $CH_3 - NO_2$

B. o-p directing character of $-CH_3$ group

C. Greater stability of $CH_3 - \overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2^{\oplus}$

D. Meta directing character of CCl_3 group.

Answer: A::C

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6. Correct order of stability-

A. $CH_2 = CH_2 > CH_3 - CH = CH_2 > (CH_3)_2C = CH_2$

B. $CH_2 = CH_2 < CH_3 - CH = CH_2 < (CH_3)_2C = CH_2$

C. $CH_2 = CH_2 < (CH_3)_2C = CH_2 < CH_3 - CH = CH_2$

D. $CH_3 - CH = CH_2 < CH_2 = CH_2 < (CH_3)_2C = CH_2$

Answer: B

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7. Which of the following is most stable carbocation.

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

B. $CH_2 - \overset{+}{C}H - CH_3$

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

D. $(CH_3 - CH_2)_3\overset{+}{C}$

Answer: C

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8. Deactivating effect of $-CCl_3$ can be explained on the basis of

A. $-I$ effect

B. $+R$ effect

C. negative hyper conjugative effect

D. none

Answer: A::C

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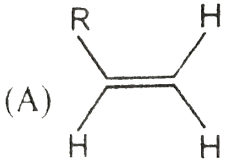
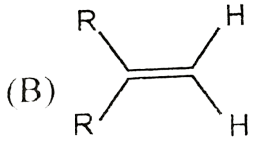
9. Which of the following alkenes will react fastest with H_2 under catalytic hydrogenation conditions

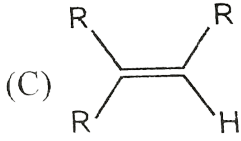
A.

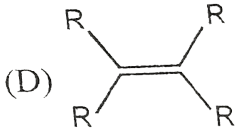


B.



C.



D. 

Answer: A

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10. Which of the following has maximum hydrogenation energy.

A. $CH_3 - CH_2 - CH = CH_2$

B. $CH_3 - CH = CH - CH_3(cis)$

C. $CH_3 - CH = CH - CH_3$(trans)

D. all have the same

Answer: A

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11. Select the nucleophile

A. BF_3

B. Cl^+

C. $AlCl_3$

D. C_2H_4

Answer: D

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12. An electrophile among the following is-

A. NH_3

B. CH_3NH_2

C. H_2O

D. $AlCl_3$

Answer: D

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13. A nucleophile is:

A. Electron-rich species

B. electron-deficient species

C. a Lewis acid

D. Positively charged species

Answer:

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14. Which of the following species is an electrophile?

A. NH_3

B. OH^-

C. CH_4

D. SO_3

Answer: D

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15. Which is not considered as electrophile

A. $-\overset{+}{N}H_4$

B. $-H^+$

C. $-Cl^+$

D. $-\overset{+}{N}O_2$

Answer: A

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16. Homolytic fission of organic compound yields

A. Nucleophile

B. Carbanion

C. Free radical

D. Carbocation

Answer: C

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17. The number of electrons present in the valence shell of carbon of $CH_3\overset{+}{C}H_2$ ion bearing $+ve$ charge:

A. 8

B. 7

C. 6

D. 4

Answer: C

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18. Inductive effect refers to-

A. σ electron displacement along a carbon chain

B. Complete transfer of one of the shared pair of electrons to one of the atoms joined by a double bond

C. complete transfer of electron with the help of conjugation

D. none of above

Answer: A

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19. most acidic hydrogen is present in

A. Ethyne

B. Ethene

C. Benzene

D. Ethane

Answer: A

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20. The least acidic among the following acids is-

A. Trrichloroacetic acid

B. Dichloroacetic acid

C. Monochloroacetic acid

D. Acetic acid

Answer: D

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21. Among the following which one is most basic-

A. NH_3

B. CH_3NH_2

C. $CH_3CH_2NH_2$

D. $\underset{\underset{Cl}{|}}{CH_2} - NH_2$

Answer: C

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22. Which one is the characteristic feature of a free radical:

A. presence of positive charge presence of unpaired electron

B. presence of even number of electrons

C. associated with high stability

D. presence of odd no. of electrons

Answer: d

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23. Benzoylperoxide, when heated to about 80° C gives a-

A. Free radical

B. Carbanion

C. Carbocation

D. none of these

Answer: A

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24. Which one is a 1° carbocation of the following

A. $CH_3\overset{+}{C}H_2$

B. $CH_3\overset{+}{C}H - C_2H_5$

C. $(CH_3)_2\overset{+}{C}H$

D. $(CH_3)_3\overset{+}{C}$

Answer: A

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25. $\overset{\Theta}{C}H_3$ is less stable than

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

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

C. $\overset{\Theta}{C}H_2 - NO_2$

D. $CH_3 - \overset{\Theta}{C}H - C_2H_5$

Answer: C

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26. Which of the following alkyl groups has the maximum $+I$ effect?

A. $-CH_3$

B. $CH_3 - CH_2 -$

C. $(CH_3)_2CH -$

D. $(CH_3)_3C -$

Answer: D

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27. Decreasing order of -I effect of the triad $\left[-NO_2, \overset{\oplus}{N}H_3, -CN\right]$ is

A. $-\overset{\oplus}{N}H_3 > -NO_2t > -CN$

B. $-\overset{\oplus}{N}H_3 > -CN > -NO_2$

C. $-CN > -NO_2 > \overset{\oplus}{N}H_3$

D. $-NO_2 > -CN > \overset{\oplus}{N}H_3$

Answer: A

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28. Maximum -I effect is exerted by the group-

A. $-C_6H_5$

B. $-OCH_3$

C. $-Cl$

D. $-NO_2$

Answer: D

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29. Choose the strong base from each of the following pair

(1). $.^- OC_2H_5, .^- OH$

(2). $HC- \equiv C^-, CH_3^-$

(3). Br^-, I^-

(4). CH_3^-, NH_2^-

A. $\underset{.^- OC_2H_5}{(1)} \quad \underset{CH_3^-}{(2)} \quad \underset{Br^-}{(3)} \quad \underset{CH_3^-}{(4)}$

B. $\underset{OH}{(1)} \quad \underset{CH_3^-}{(2)} \quad \underset{I^-}{(3)} \quad \underset{NH_2^-}{(4)}$

C. $\underset{OH^-}{(1)} \quad \underset{HC\equiv C^-}{(2)} \quad \underset{Br^-}{(3)} \quad \underset{CH_3^-}{(4)}$

D. $\underset{OH^-}{(1)} \quad \underset{CH_3^-}{(2)} \quad \underset{I^-}{(3)} \quad \underset{NH_2^-}{(4)}$

Answer: A

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30. Basic nature of H_3O^+, H_2O and OH^- is in order

A. $H_3O^+ < H_2O < OH^-$

B. $H_2O < OH^- < H_3O^-$

C. $OH^- < H_2O < H_3O^+$

D. $OH^- = H_3O^+ = H_2O$

Answer: A

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31. Which is most stable carbocation

A. $CH_3CH_2^+$

B. CH_3^+

C. $CH_3 - \overset{+}{C}H - CH_3$

D. $CH_3CH_2 - \overset{+}{C}H_2$

Answer: C

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32. Among the following compound, the weakest acid is-

A. $HC \equiv CH$

B. C_6H_6

C. C_2H_6

D. CH_3OH

Answer: C

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33. Most stable carbanion is :-

A. $HC \equiv C^-$

B. $C_6H_5^-$

C. $(CH_3)_3C - CH_2^-$

D. $(CH_3)_2C = CH^-$

Answer: A

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34. Which of the following compounds is most acidic ?

A. CH_3COOH

B. CH_3CH_2OH

C. $CH_3ClCOOH$

D. CCl_3COOH

Answer: D

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35. Which is the decreasing order of stability

(a). $CH_3 - \overset{+}{C}H - CH_3$

(b). $CH_3 - \overset{+}{C}H - O - CH_3$

(c). $CH_3 \_ \overset{+}{C}H - CO - CH_3$

A. agtcgtb

B. agtbgtc

C. cgtbgta

D. bgtagtc

Answer: D

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36. Which molecule does not show resonance

A. CO

B. CO_2

C. CO_3^{-2}

D. NO_3^-

Answer: A,B

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37. Polarization of electrons in acrolein may be written as:

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

B. $\overset{\delta+}{C}H_2 = CH - \overset{\delta-}{C}H = 0$

C. $\overset{\delta-}{C}H_2 = \overset{\delta+}{C}H - CH = 0$

D. $\overset{\delta-}{C}H_2 = CH - CH = \overset{\delta+}{O}$

Answer: A

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38. In pyridine,

Number of conjugated electrons are

A. 6

B. 8

C. zero

D. 5

Answer: A

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39. In which compound delocalization is not possible-

A. 2-butene

B. 1,3-butadiene

C. 1,3,5-hexatriene

D. Benzene

Answer: A

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40. Consider the following compound:

$\underset{1}{C}H_2 = \underset{2}{C}H - \underset{3}{C}H = \underset{4}{C}H_2$

carbon-carbon bond length between C_2 and C_3 will be-

A. 1.54Å

B. 1.3Å

C. 1.21Å

D. less than 1.54 and greater than 1.33Å

Answer: D

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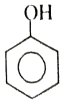
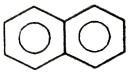
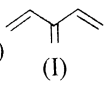
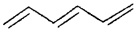
41. Which compound has higher resonance energy in the following pairs.

(A)  

(I) (II)

(B)  

(I) (II)

(C). $\underset{(I)}{CH_2 = CH - F}$ $\underset{(II)}{CH_2 = CH - Br}$

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42. Which is less stable canonical structure in the following pairs.

$\underset{(I)}{\overset{\oplus}{C}H_2 - O - CH_3}$ $\underset{(II)}{CH_2 = \overset{\oplus}{O} - CH_3}$

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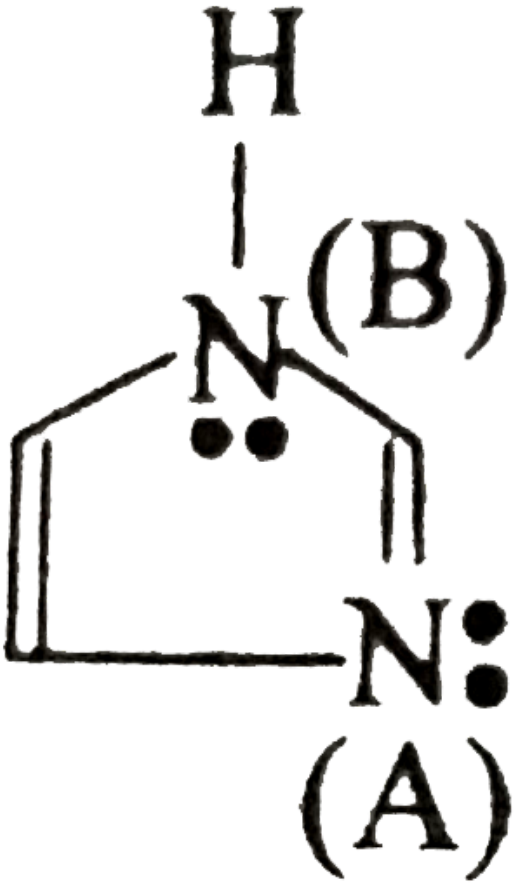
43. Which marked atom's lone pair participate in resonance phenomenon



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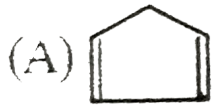
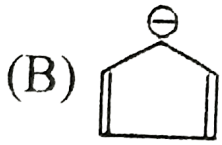
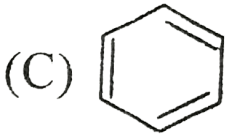
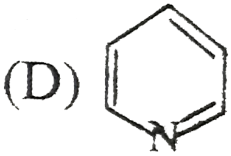
44. Which molecules is not showing resonance.

A. 

B. 

C. 

D. 

Answer: A

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45. Which molecules I showing π-electrons alternate to π-electron conjugation

A. (A) 

B. $CH_2 = CH - \overset{\oplus}{C}H_2$

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

D. $CH_2 = CH - \dot{C}H_2$

Answer: A

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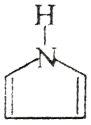
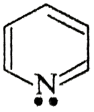
46. Correct order for resonance energy in the following molecules.


(I)


(II)


(III)

A. III>I>II

B. III=I=II

C. IIIltIltII

D. III=IgtII

Answer: A

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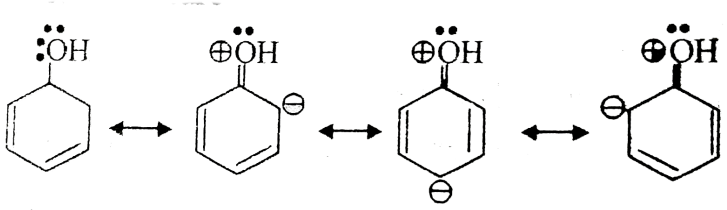
47.



In the following canonical structures which is most stable structure.

A. I

B. II

C. III

D. IV

Answer: A

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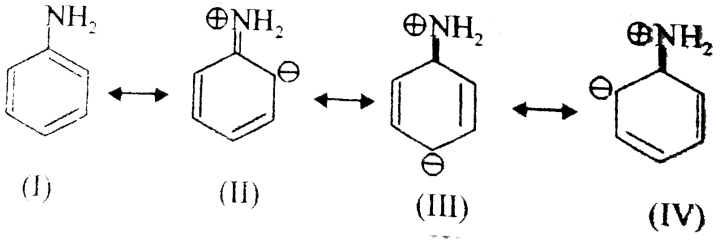
48.



(I) (II) (III) (IV)

In the following canonical structures which is least stable structure

A. I

B. II

C. III

D. IV

Answer: C

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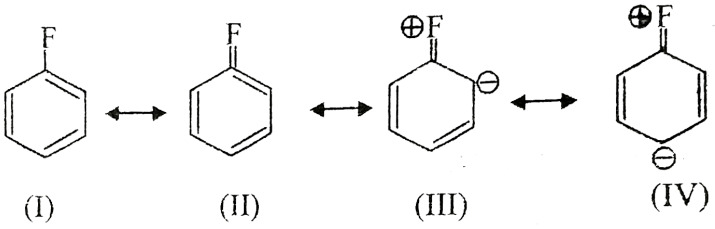
49.



Which is incorrect canonical structure

A. I

B. II

C. III

D. IV

Answer: B

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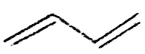
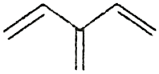
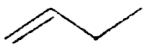
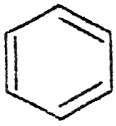
50. In which molecules non-conjugation is present

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: C

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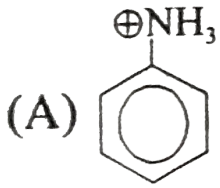
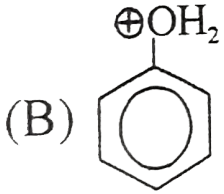
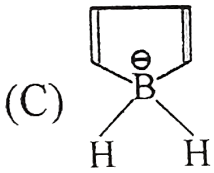
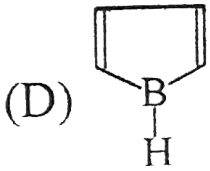
51. In which molecules resonance phenomenon operates-

A. 

B. 

C. 

D. 

Answer: D

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52. Which of the following carboxylic acids is most acidic in character-

A. o-methyl banzoic acid

B. m-methyl benzoic acid

C. p-methyl benzoic acid

D. Benzoic acid

Answer: A

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53. Which one of the following is most acidic

A. p-nitrophenol

B. phenol

C. m-nitrophenol

D. o-nitrophenol

Answer: A

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54. Consider the following carbocation-

(a). $CH_3 - \overset{\oplus}{C}H_2$

(b). $CH_2 = \overset{\oplus}{C}H$

(c). $CH_2 = CH - \overset{\oplus}{C}H_2$

(d). $C_6H_5 - \overset{\oplus}{C}H_2$

A. $d > c > a > b$

B. $d > c > b > a$

C. $c > d > b > a$

D. $c > d > a > b$

Answer: A

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55. Increasing order of acidic strength among $p-$ methoxyphenol $(i) p-$ methylphenol (II) and $p-$ nitrophenol (III) is

A. p-nitrophenol, p-methoxyphenol, p-methylphenol

B. p-methylphenol, p-methoxyphenol, p-nitrophenol

C. p-nitrophenol, p-methylphenol, p-methoxyphenol

D. p-methoxyphenol, p-methylphenol, p-nitrophenol.

Answer: D

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56. The groups which when present in para position tend to decrease the acidity of phenol are-

A. $-NO_2$

B. $-CN$

C. $-OCH_3$

D. $-F$

Answer: C

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57. Which free radical is the most stable-

A. $C_6H_5-\dot{C}H_2$

B. $CH_2=CH-\dot{C}H_2$

C. $CH_3 - \dot{C}H - CH_3$

D. $CH_3 - \underset{\underset{CH_3}{|}}{\dot{C}} - CH_3$

Answer: A

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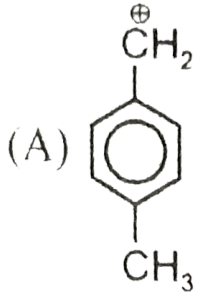
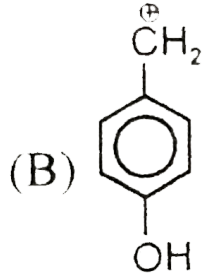
58. Which carbocation is the most stable-

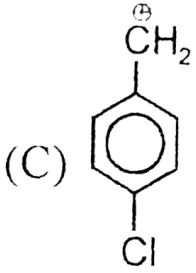
A.



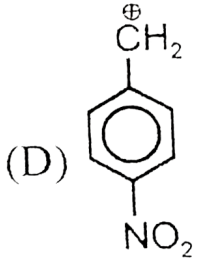
B.



C.



D.



Answer: B

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Exercise 1

1. Which is the correct order of stability of carbanion

(I). $F - CH_2 - CH_2 - \overset{\ominus}{C}H_2$

(II). $O_2N - CH_2 - CH_2 - CH_2^{\ominus}$

(III). $Cl - CH_2 - CH_2 - CH_2^{\ominus}$

(IV). $Me_3\overset{\oplus}{N} - CH_2 - CH_2 - CH_2^{\ominus}$

A. IgtIIIgtIIgtIV

B. IVgtIgtIIIgtII

C. IVgtIIgtIgtIII

D. IVgtIIIgtIgtII

Answer: C

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2. Select the least acidic compound.

A. $NO_2 - CH_2 - \overset{O}{\overset{||}{C}} - O - H$

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

C. $Ph - CH_2 - \overset{\overset{O}{||}}{C} - O - H$

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

Answer: D

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3. Select the most acidic compound

A. $H - F$

B. $H - Cl$

C. $H - Br$

D. $H - I$

Answer: D

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4. Arrange acididy of given compounds in decreasing order

(I). $CH_3 - N - CH_2 - OH$

(II). $CH_3 - NH - CH_2 - CH_2 - CH_2 - OH$

(III). $(CH_3)_3\overset{\oplus}{N} - CH_2 - CH_2 - OH$

A. IIIgtIgtII

B. IIIgtIIgtI

C. IgtIIgtIII

D. IIgtIgtIII

Answer: A

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5. Hyperconjugation is best decribe as:

A. Delocalisation of π electrons into a near by empty orbital.

B. Delocalisation of σ electrons into a near by empty orbial.

C. The effect of alkyl groups donating a small amount of electron density inductively into a carbocation

D. The migration of a carbon or hydrogen from one carbocation to another.

Answer: B

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6. Select the correct statement

(i). Delocalisation of σ-electron is hyperconjugation.

(ii). Delocalisation of π-electron is resonance.

(iii). Partial displacement of σ-electron is inductive effect.

A. (i) & (iii)

B. (ii) & (iii)

C. (i) & (ii)

D. (i),(ii),(iii)

Answer: D

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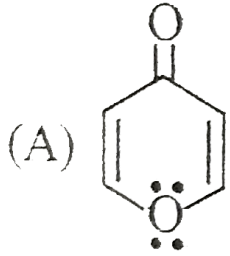
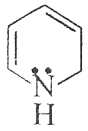
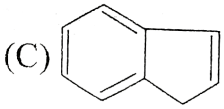
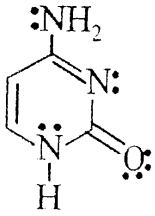
7. Which of the following compound is non aromatic:

A.



B. (B) 

C. (C) 

D. (D) 

Answer: B

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8. $CH_2 = \underset{(I)}{CH} - CH = CH - CH_3$ is more stable than $CH_3 - \underset{(II)}{CH} = C = CH - CH_3$ because

A. there is resonance is but not in II

B. there is tautomerism in I but not in II

C. there is hyper conjugation in I but not in II

D. II has more canonical structural than I.

Answer: A

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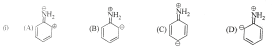
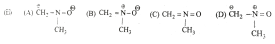
9. Which of the following is not a valid resonating of the other three?

A. 

B. 

C. 

D. 

Answer: A::B::C

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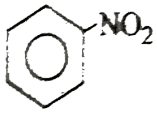
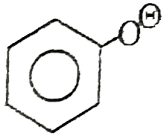
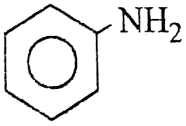
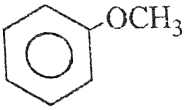
10. In which of the following molecules π-electron density in ring is maximum.

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: B

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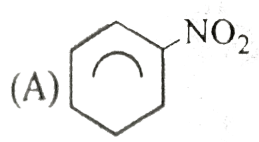
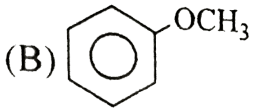
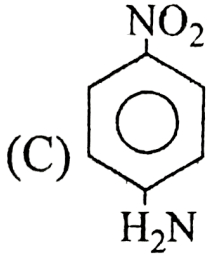
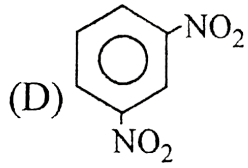
11. In which of the following molecules π-electron density in ring is minimum:

A. 

B. 

C. 

D. 

Answer: D

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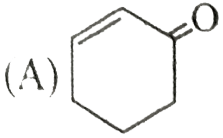
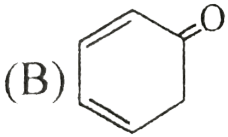
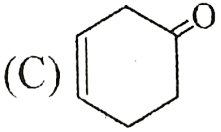
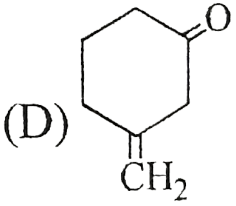
12. Which of the following has longest C-O bond

A. 

B. 

C. 

D. 

Answer: B

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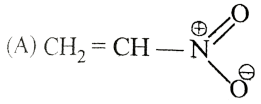
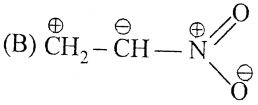
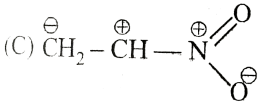
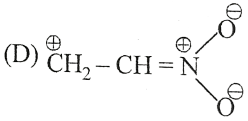
13. Select the least stble resonating structure in each of the following sets.

A. 

B. 

C. 

D. 

Answer: A::C

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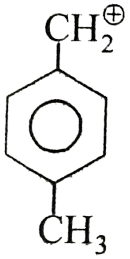
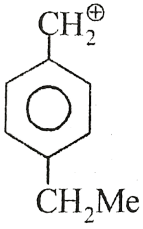
14. Select the most stable intermediate

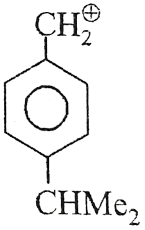
A.

(A) 

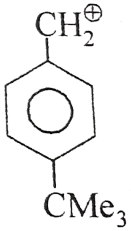
B.

(B) 

C.

(C) 

D.

(D) 

Answer: A

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15. Write correct order regarding stability of intermediates

(I). $CH_2 = CH - \overset{\oplus}{C}H_2$

(II). $CH_2 = \overset{\oplus}{C}H$

(III). $CH \equiv \overset{\oplus}{C}$

A. I=II=III

B. IltIIltIII

C. III=IIgtI

D. IgtIIgtIII

Answer: D

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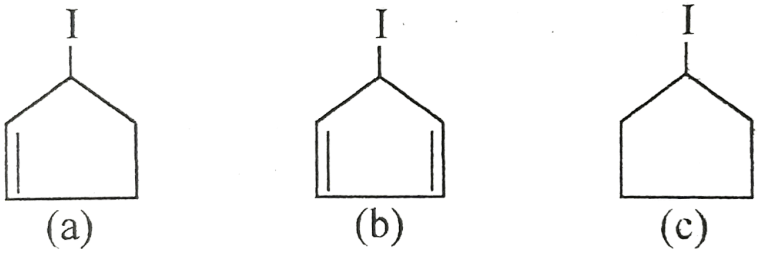

(a) (b) (c)

16.

Rate of abstraction of iodine by $Ag^{\oplus}$ is

A. agtbgtc

B. bgtagtc

C. cgtagtb

D. agtcgtb

Answer: D

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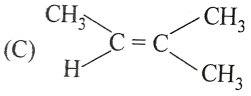
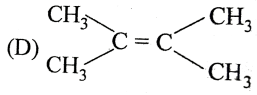
17. Which of the following alkene is most stable alkene.

A. $CH_3 - CH_2 - CH = CH_2$

B. $CH_3 - CH = CH - CH_3$

C. 

D. 

Answer: D

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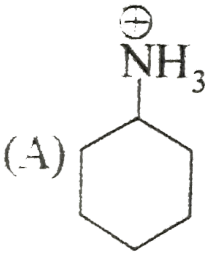
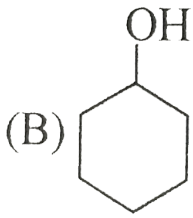
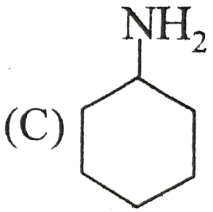
18. Which of the following is lowest pKa value?

A. 

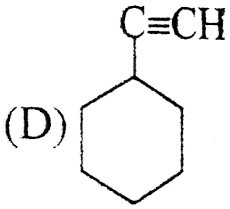
B.



C.



D.



Answer: A

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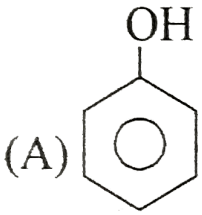
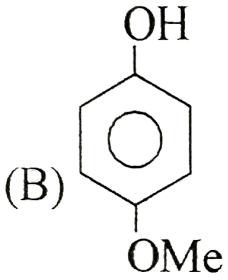
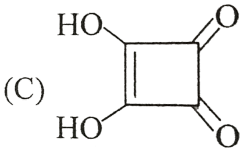
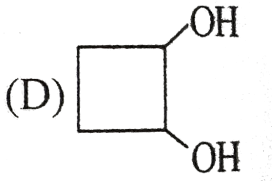
19. Which of the following will give effervesce of CO_2 with $NaHCO_3$

A. 

B. 

C. 

D. 

Answer: C

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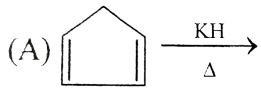
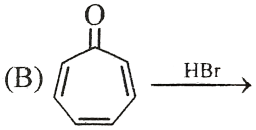
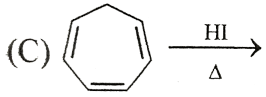
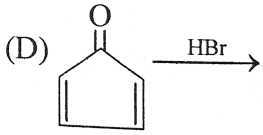
20. Select the one which does not results in the formation of aromatic species.

A. 

B. 

C. 

D. 

Answer: D

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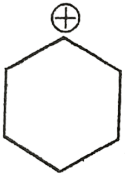
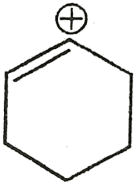
(I)



(II)



(III)

21.

Correct order of stability of these carbocatios is:

A. IgtIIgtIII

B. IgtIIIgtII

C. IIgtIgtIII

D. IIgtIIIgtI

Answer: D

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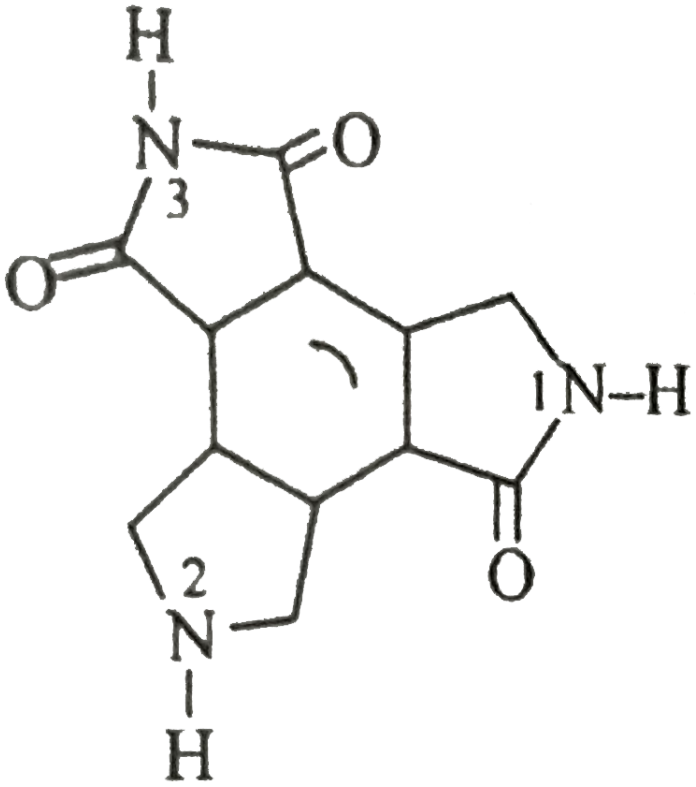
22. Correct order of stability-



A. 1gt2gt3

B. 2gt1gt3

C. 2gt3gt1

D. 3gt2gt1

Answer: B

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23. Which of the following is a+I group

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

B. $-\overset{\overset{O}{||}}{C}-Me$

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

D. $-\overset{\overset{O}{||}}{C}-O^{\ominus}$

Answer: D

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24. Correct order of heat of combustion for following compounds is:

(P) $CH_3 - CH = CH - CH_2 - CH_2 - CH_2 - CH_3$

(Q) $CH_2 = CH - CH_2 - CH_2 - CH_2 - CH_3$

(R) $CH_3 - CH_2 - CH = CH - CH_2 - CH_2 - CH_3$

A. QgtRgtP

B. RgtPgtQ

C. PgtRgtQ

D. QgtPgtR

Answer: B

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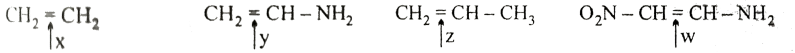
25. 

Compare rotational energy barrier for indicated bond.

A. xgtzgtygtw

B. wgtzgtygtx

C. xgtygtwgtz

D. zgtwgtygtx

Answer: A

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26. The carbocation $(CH_3)_3C^+$ is stabilized primarily by

A. hyperconjugation

B. tautomerism

C. resonance

D. conjugation

Answer: A

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27. Which of the following compound is most basic

A. $CH_3 - \overset{\overset{O}{||}}{C} - \ddot{N}H_2$

B. $H_2\ddot{N} - \overset{\overset{\ddot{N}H}{||}}{C} - \ddot{N}H_2$

C. $CH_3 - \overset{\overset{\ddot{N}H}{||}}{C} - \ddot{N}H_2$

D. $Ph - \overset{\overset{O}{||}}{C} - \ddot{N}H_2$

Answer: B

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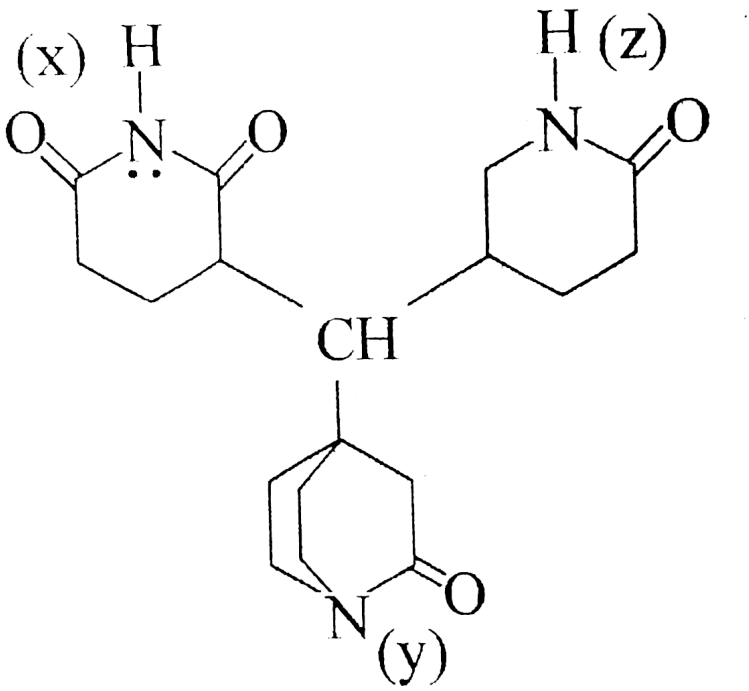

28.

Correct order for basic strength.

A. xgtzgty

B. ygtzgtx

C. ygtxgtz

D. zgtygtx

Answer: B

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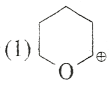
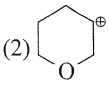
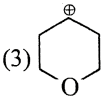
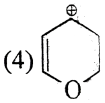
29. Arrange following increasing order of stability

(1) 

(2) 

(3) 

(4) 

A. 1gt4gt3gt2

B. 4gt1gt3gt2

C. 4gt1gt2gt3

D. 2gt1gt4gt3

Answer: B

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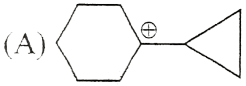
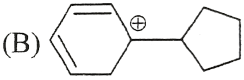
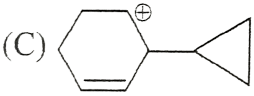
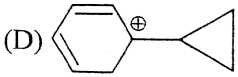
30. Which of the following is relatively most stable carbocation?

A. 

B. 

C. 

D. 

Answer: D

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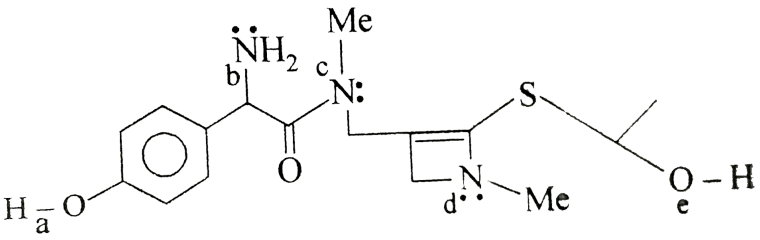
Exercise 2

1. 

Observed the following compound and answer the following questions.

Q. Arrange the H-atom in decreasing order of their acidic strength.

A. agtbgte

B. agtegtb

C. bgtagtc

D. egtagtb

Answer: B

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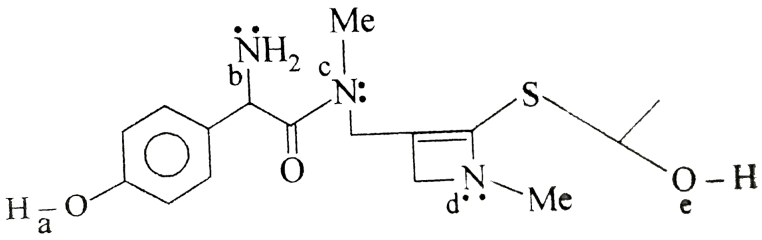
2.



Observed the following compound and answer the following questions.

Q. Arrange the H-atom in decreasing order of their acidic strength.

A. bgtdgtc

B. cgtbgtd

C. dgtcgtb

D. cgtdgtb

Answer: A

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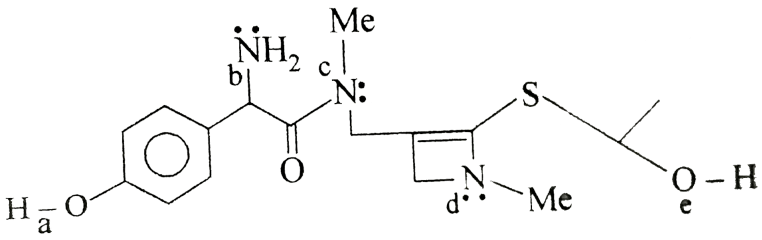
3.



Observed the following compound and answer the following questions.

Q. Arrange the H-atom in decreasing order of their acidic strength.

A. 5

B. 6

C. 7

D. 8

Answer: C

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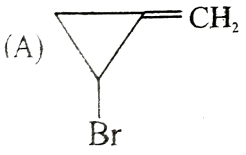
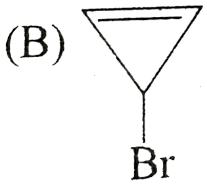
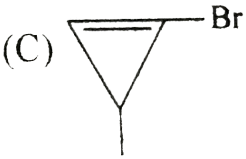
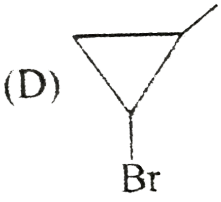
4. Compound A gives white precipitate with $AgNO_3$ and a highly stable cation. Whereas compound B which is antiaromatic reacts with Na metal to give an aromatic compound.

Q. Which of the following is A?

A. 

B. 

C. 

D. 

Answer: B

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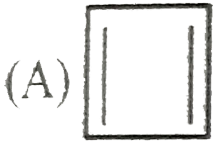
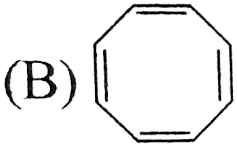
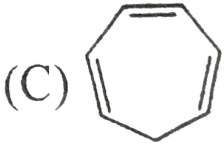
5. Compound A gives white precipitate with $AgNO_3$ and a highly stable cation. Whereas compound B which is antiaromatic reacts with Na metal to give an aromatic compound.

Q. Which of the following is A?

A. 

B. 

C. 

(D) 

D.

Answer: A

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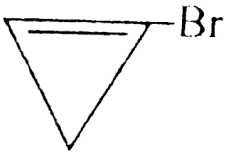
6. Compound A gives white precipitate with $AgNO_3$ and a highly stable cation. Whereas compound B which is antiaromatic reacts with Na metal to give an aromatic compound.

Q. Which of the following is A?

A. A is more soluble than bromocyclopropane

B. A is having even number of DBE

C. A is having lower dipole moment than bromocylopropane



D. A is more ionic than

Answer: C

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7. Statement-I: $CH_3 - \overset{O}{\overset{||}{C}} - CH_2 - \overset{O}{\overset{||}{C}} - CH_3$ is more acidic than $CH_3 - CO_2H$

Statement-II: Above active methylene hydrogen is less acidic than carboxylic acid.

A. If both statement-I & statement-II are true & the statement-II is a correct explanantion of the statement-I

B. If both statement-I & statement-II are true but statement-II is not a correct explanation of the statement-I

C. If statement-I is true but the sttement-II is false.

D. If statement-I is false but the statement -II is true.

Answer: D

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8. Statement-I: All C-C bod lengths are equal in $CH_2 = CH - CH = CH_2$

Statement-II: There is resonance between two π bonds.

A. If both statement-I & statement-II are true & the statement-II is a correct explanantion of the statement-I

B. If both statement-I & statement-II are true but statement-II is not a correct explanation of the statement-I

C. If statement-I is true but the sttement-II is false.

D. If statement-I is false but the statement -II is true.

Answer: D

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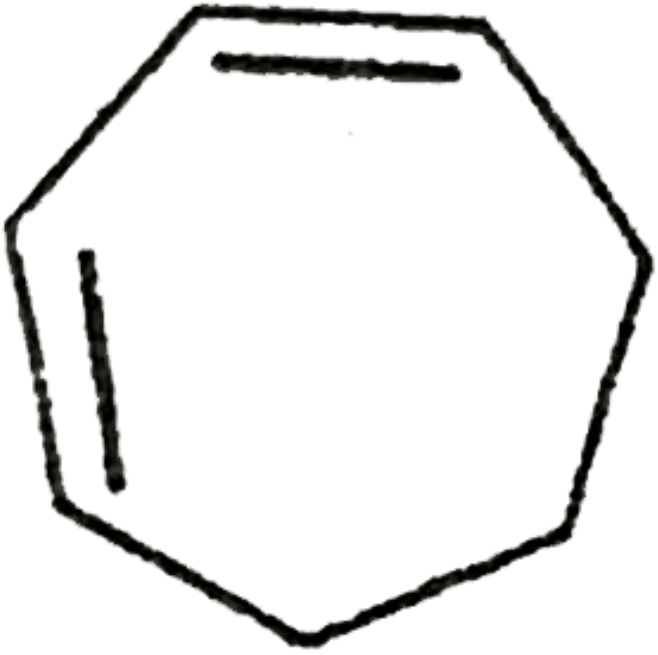
9. Statement-I:



is an anti-

aromatic compound.

Statement-II: Cyclic, planar, completely conjugated species having 4n π electrons are anti-aromatic.

A. If both statement-I & statement-II are true & the statement-II is a correct explanantion of the statement-I

B. If both statement-I & statement-II are true but statement-II is not a correct explanation of the statement-I

C. If statement-I is true but the sttement-II is false.

D. If statement-I is false but the statement -II is true.

Answer: D

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10. Give the correct order of initials T or F for following statements Use T if statements is true and F if it is false.

Statement-I: p-chloro phenol is more acidic than p-flouro phenol.

Statement-II: $T_{1/2}$ time period of $(C_6H_5)_3\overset{\oplus}{C}$ is less than $T_{1/2}$ of $C_6H_5\overset{\oplus}{C}H_2$

Statement-III: Solubility of Br^- salt of alkali metals in water increases down the group

A. TFF

B. FFF

C. FTT

D. TFT

Answer: A

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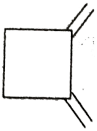
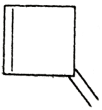
11. (I)  (II)  (III) 

Choose the correct statement:

A. Stability (II)gt(III)gt(I)

B. HOC of (II)gt(III)gt(I)

C. Stability of (III)gt(II)gt(I)

D. HOH of (I)gt(II)gt(III)

Answer: A

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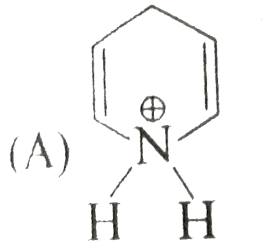
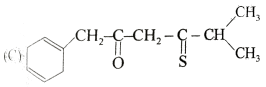
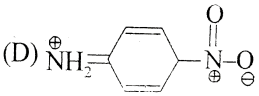
12. Among the following which one is having conjugated system:

A. 

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

C. 

D. 

Answer: B::D

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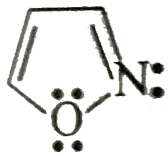
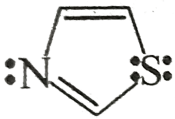
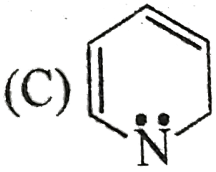
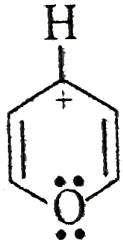
13. Which of the following compound is /are aromatic:

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: A::B::D

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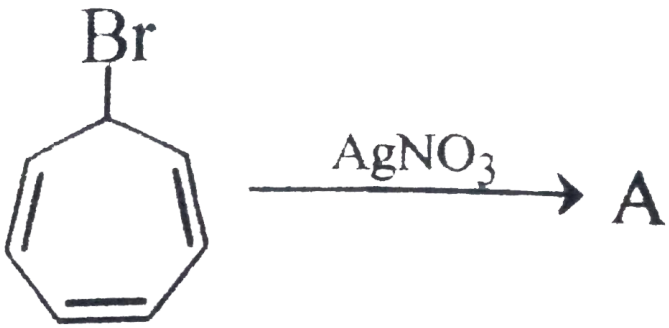

14.

Select the correct statement about product A.

A. product is aromatic

B. product has high dipole moment

C. product has less resonance energy

D. Product is soluble in polar solvent.

Answer: A::B::D

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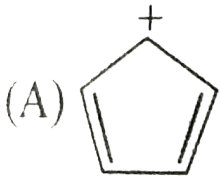
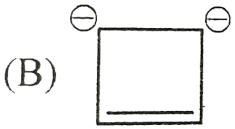
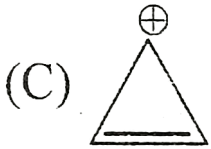
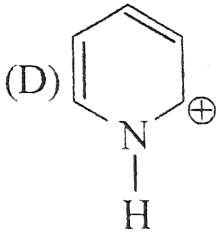
15. In each set of species select the aromatic species.

A. 

B. 

C. 

D. 

Answer: B::C::D

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16. Identify electron-donating groups in resonance among the following.

A. $-CONH_2$

B. $-NO_2$

C. $-OCOCH_3$

D. $-NHCOCH_3$

Answer: C::D

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17. Which one of the following pairs of structures represents the phenomenon of resonance?

A. $H_2C = CH - \overset{\overset{O}{||}}{C} - H, \overset{+}{C}H_2 - CH = \overset{\overset{O^-}{|}}{C} - H$

B. $CH_2 = CH - \overset{+}{C}HCl, \overset{+}{C}H_2 - CH = CH - Cl$

C. $(CH_3)_2CH - \overset{O}{\overset{||}{C}} - O^-, (CH_3)_2CH - \overset{O^-}{\overset{|}{C}} = O$

D. $CH_3 - CH_2 - \overset{O}{\overset{||}{C}} - CH_3, CH_3 - CH = \overset{O^-}{\overset{|}{C}} - CH_3$

Answer: A::B::C

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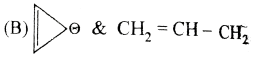
18. In which of the followig pairs II^{nd} compound has less resonance energy:

A. $CO_3^{2-} \& HCOO^-$

B. 

C. $\ddot{N} = CH - \underset{\cdot\cdot}{\overset{\ominus}{N}}H \& CH_2 = CH - \underset{\cdot\cdot}{\overset{\ominus}{N}}H$

D. none of these

Answer: A::C

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19. In which of the following pairs II^{nd} compound has higher resonance energy:

A. $CH_2 = CH - OH \& CH_2 = CH - CH = CH - OH$

B. 

C. 

D. none of these

Answer: A::B

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20. Resonance energy will be more if

A. canonical structures are equivalent than if canonical structures are non-equivalent.

B. Molecule is aromatic than if molecule is not aromatic.

C. more number of π-bonds are involved in resonance than less number of π-bonds are involved.

D. Resonance with $2p - 2p$ overlapping than resonance with 3p-2p overlapping.

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

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21. Select the correct statement (s):

A. $CH_3O\overset{\oplus}{C}H_2$ is more stable than $CH_3\overset{\oplus}{C}H_2$

B. $Me_2\overset{\oplus}{C}H$ is more stable than $CH_3CH_2\overset{\oplus}{C}H_2$

C. $CH_2 = CH - \overset{\oplus}{C}H_2$ is more stable than $CH_3CH_2\overset{\oplus}{C}H_2$

D. $CH_2 = \overset{\oplus}{C}H$ is more stable than $CH_3\overset{\oplus}{C}H_2$

Answer: A::B::C

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22. A canonical structure will be more stable if

A. it has more number of π bonds than if it has less number of π bonds

B. the octets of all atoms are complete than if octets of all atoms are not complete

C. it involves cyclic delocalization of $(4n+2)\pi$ electrons than if it involves acyclic delocalization of (4n) π electrons

D. $-ve$ charge is on more electronegative atom than if -ve charge is on less electronegative atom.

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

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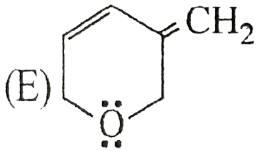
23. In which of the following lone-pair indicated is not involved in resonance:

A. $CH_2 = CH - CH = \ddot{O}:$

B. $CH_2 = CH - \ddot{O}: - CH = CH_2$

C. $CH_2 = CH - C \equiv N:$

D. 

Answer: A::C::D

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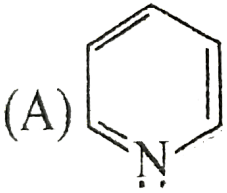
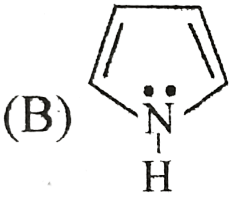
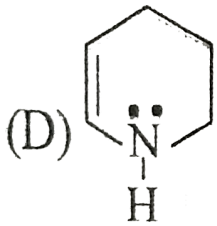
24. In which of the following lone-pair indicated is involved in resonance:

A. 

B. 

C. (D) 

D. (E) $CH_2 = CH - CH_2^{\Theta}$

Answer: B::C::D

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25. Which of the following statement is/are correct?

A. Contributing structures contributes to the resonance hybrid in proportion of their energies.

B.

C. Equivalent contributing structure make the resonance very important.

D. contributing structures represent hypothetical molecules having no real existance.

Answer: B::C::D

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26. Which of the following statement(s) is/are true.

A. p-chloro phenol is more acidic than p-flouro phenol

B. $-\overset{\oplus}{N}Me_3$ is stronger $-I$ group than $-\overset{\oplus}{N}H_3$

C. Acidity order : o-nitrobenzoic acid gt p-nitrobenzoic acid gt m-nitrobenzoic acid

D. Acidity order $H_3C-COOH < H_3Si-\overset{O}{\overset{||}{C}}-OH$

Answer: A::B::C

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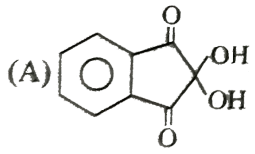
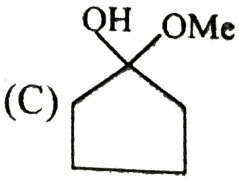
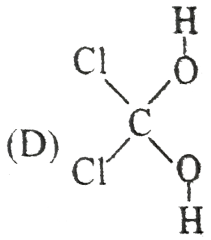
27. Select stable molecule(s)

A. 

B. $CCl_3CH(OH)_2$

C. 

D. 

Answer: A::B

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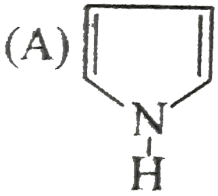
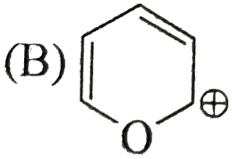
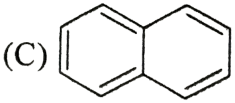
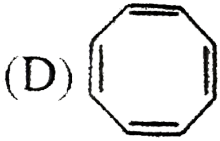
28. Which of the following is/are aromatic species.

A. 

B. 

C. 

D. 

Answer: A::B::C

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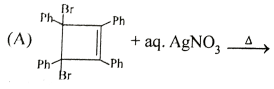
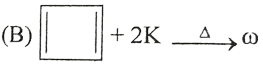
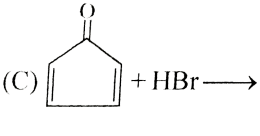
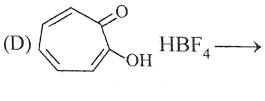
29. Which of the following reaction will form stable ion.

A. 

B. 

C. 

D. 

Answer: A::B::D

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30. Which of the following statements are incorrect

A. EtOH is more acidic than water.

B. Both $C-O$ bonds in $Me-\underset{\underset{O}{||}}{C}-OH$ are of equal length due to resonance.

C. $Ph-NH_2$ is more basic then $Me-NH_2$

D. $-\ddot{\underset{\ddot{}}{O}}-\overset{:O:}{\overset{||}{C}}-R$ is a positive mesomeric effect $(+M)$ showing group.

Answer: A::B::C

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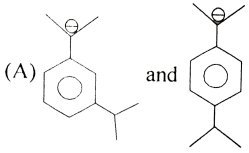
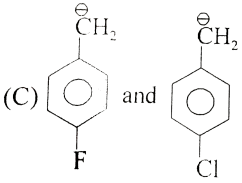
31. In which of the following pairs II is more stable than I

A. 

B. $CH_3-\overset{\oplus}{C}=O$ and $CH_3-C\equiv\overset{\oplus}{O}$

C. 

D. $CH_3 - \overset{\oplus}{C}H_2$ & $CD_3 - \overset{\oplus}{C}H_2$

Answer: B::C

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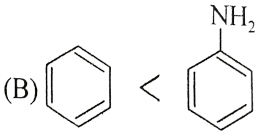
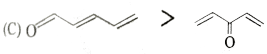
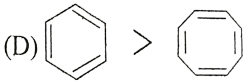
32. Which of the following is/are correct order of resonance energy in given molecules

A. $CH_2 = CH - NH_2 > CH_2 = CH - OH$

B. 

C. 

D. 

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

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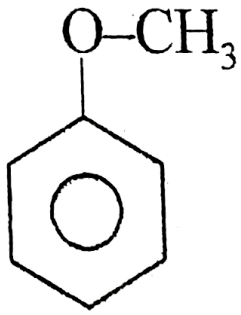
33. Select true statement(s):

A. Resonance affect bond order

B. E-2-chlorobut-2-ene & cis-2-chlorobut-2-ene are identical compounds

C. $H-\underset{\underset{O}{||}}{C}-OH$ is more acidic than $.^{-}O-\underset{\underset{O}{||}}{C}-\underset{\underset{O}{||}}{C}-OH$

D.



Boiling point of is greater than boiling point of

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

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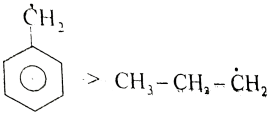
34. Select the correct options

A. Stability of free radical  $> CH_3-\dot{C}H_2-\dot{C}H_2$

B. Stability of carbanion

$$HC \equiv \overset{\ominus}{C} > CH_2 = \overset{\ominus}{C}H > CH_3 - \overset{\ominus}{C}H_2$$

C. Stability order of carbocation 

D. Stability of resonanting structures

$$\overset{\ominus}{C}H_2 - \overset{O}{\overset{||}{C}} - H < CH_2 = \overset{O^{\ominus}}{\overset{|}{C}} - H$$

Answer: A::B::D

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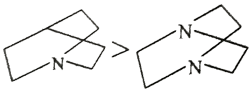
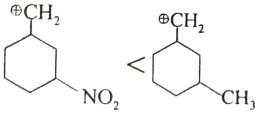
35. Which of the following orders are correct?

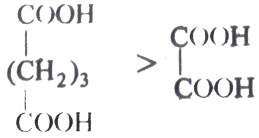
A. Basic strength 

B. Acidic strength

$$CH_3 - \underset{Cl}{\underset{|}{CH}} - COOH > \underset{Cl}{\underset{|}{CH_2}} - CH_2 - COOH$$

C. Stability of carbocation 

D. Diprotic acid, first dissociation constant (Ka_1)



Answer: A::B::C

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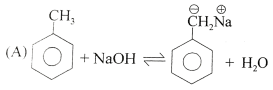
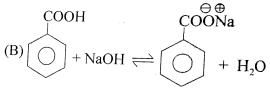
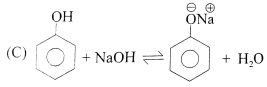
36. Which of the following reaction equilibrium is favoured in forward direction?

A. 

B. 

C. 

D. $EtOH + NaOH \Leftrightarrow E \rightarrow verset\left(\text{ɵ} \right)(O)N\overset{\oplus}{a} + H_2O$

Answer: B::C

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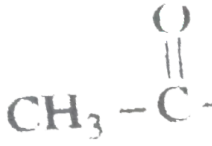
37. Match the column

(A) 

(B) 

(C) 

(D) 

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38. Match the names of carboxylic acids in column I with pk_a value in column II.

Column I	Column II
(A). Benzoic acid	(P). 4.17
(B). Ethanoic acid	(Q). 4.14
(C). o-methyl benzoic acid	(R). 4.74
(D). p-florobenzoic acid	(S). 3.91

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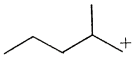
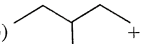
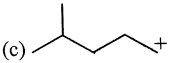
Exercise 3

1. Write stability order of following intermediates:

(i) (a) $CH_3-\overset{\oplus}{C}H_2$ (b) $CH_3-\overset{\oplus}{C}H-CH_3$ (c) $CH_3-\overset{CH_3}{\underset{CH_3}{C}}\oplus$

(A) c > b > a (B) c < b < a (C) c = b = a (D) c < b > a

(ii) (a)  (b)  (c) 

(A) b > c > a (B) c < b < a (C) c = b = a (D) c < b > a

(iii) (a) $CF_3-\overset{+}{C}H_2$ (b) $CCl_3-\overset{+}{C}H_2$ (c) $CBr_3-\overset{+}{C}H_2$

(A) a < b > c (B) a < b < c (C) a > b > c (D) a < b = c

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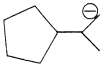
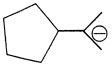
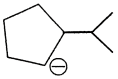
2. Write stability order of following intermediates:

(i) (a) 

(A) a > c > b

(b) 

(B) a < c < b

(c) 

(C) a > c = b

(D) a > c < b

(ii) (a) $HC \equiv \overset{\ominus}{C}$

(A) a > b > c

(b) $CH_2 = \overset{\ominus}{C}H$

(B) a < b < c

(c) $CH_3 - \overset{\ominus}{C}H_2$

(C) a > b = c

(D) a > b < c

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3. Write Stability order of following intermediates:

(i) (a) $CH_3 - \dot{C}H_2$

(A) c < b < a

(b) $CH_3 - \dot{C}H - CH_3$

(B) c > b > a

(c) $CH_3 - \overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{\dot{C}}}}}$

(C) c > b = a

(D) c < b > a

(ii) (a) $HC \equiv \dot{C}$

(A) c < b < a

(b) $CH_2 = \dot{C}H$

(B) c > b < a

(c) $CH_3 - \dot{C}H_2$

(C) c > b = a

(D) c > b > a

(iii) (a) 

(A) a > c > b

(b) 

(B) c < b < a

(c) 

(C) c > b < a

(D) c = b > a

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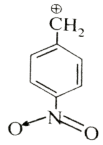
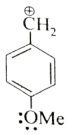
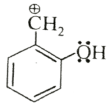
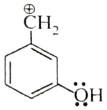
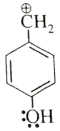
4. Rank the following sets of intermediates in increasing order of their stability.

(i) (a)  (b)  (c) 

(A) b > c > a (B) b < c < a (C) b = c > a (D) b > c = a

(ii) (a)  (b)  (c) 

(A) c > a > b (B) c < a < b (C) c > a < b (D) c = a > b

(iii) (a) $CF_3-CH_2-\overset{\oplus}{C}H_2$ (b) $CF_3-\overset{\oplus}{C}H_2$ (c) $\overset{\oplus}{C}F_3$

(A) c > a > b (B) c < a < b (C) c > a = b (D) c < a > b

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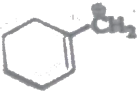
5. In each of the following pairs of ions which ion is more stable:

(a) (I) $C_6H_5-\overset{\oplus}{C}H_2$ and (II) $CH_2=CH-\overset{\oplus}{C}H_2$

(b) (I) $CH_3-\overset{\oplus}{C}H_2$ and (II) $CH_2=\overset{\oplus}{C}H$

(c) (I)  and (II) 

(d) (I) $CH_3-CH-CH_3$ and (II) CH_3-N-CH_3

$CH_3-\overset{\oplus}{C}-CH_3$ $CH_3-\overset{\oplus}{C}-CH_3$

(e) $\left[\ddot{\overset{\ominus}{C}}H_2-CH=NH \longleftrightarrow CH_2=CH-\overset{\ominus}{N}H\right]$

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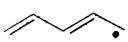
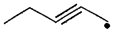
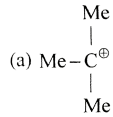
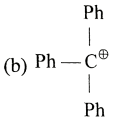
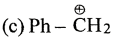
6. Rank the following sets of intermediates in increasing order of their stability .

(a)  (b)  (c) 

(A) a > b > c (B) a = b = c (C) a < b < c (D) a > b < c

(a)  (b) 

(A) a > b (B) a < b (C) a = b (D) a << b

(iii) (a)  (b)  (c)  (d) 

(A) d > b > c > a (B) d < b > c > a (C) d > b < c > a (D) d > b < c < a

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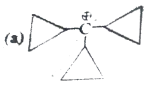
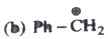
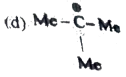
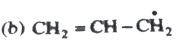
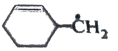
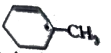
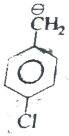
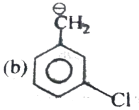
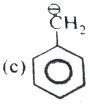
7. Rank the following sets of intermediates in increasing order of their stability.

(a)  (b)  (c)  (d) 

(A) a ≈ c > b > d (B) a ≈ c > b = d (C) a ≈ c < b < d (D) a < c > b > d

(ii) (a)  (b)  (c)  (d) 

(A) d > b > c > a (B) d > b > c < a (C) d > b > c = a (D) d < b > c > a

(iii) (a)  (b)  (c) 

(A) b = a > c (B) b > a > c (C) b = a = c (D) b > a < c

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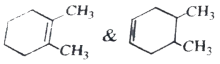
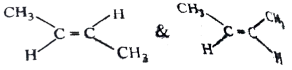
8. Compare heat of hydrogenation (Decreasing order)

(i)  (ii) 

(iii) $CH_2 = CH - CH(CH_3)_2$ & $CH_3 - CH = C(CH_3)_2$

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9. Write increasing order of heat of hydrogenation:

(i) (a)  (b) 

(ii) (a)  (b)  (c)  (d) 

(A) a > b > d > c (B) a < b < d < c (C) c < b < d < a (D) a < d < b < c

(iii) (a) (b)  (c)  (d)  (e) 

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10. In which of the following pairs, indicated bond is of greater strength:

(a)  and $CH_2 \equiv CH_2$

(b) $CH_3 - C \equiv CH$ and $HC \equiv CH$

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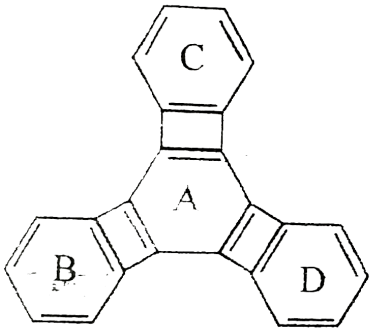
11. Consider the given reaction:



$+ 3H_2 \xrightarrow{Pd/C}$

In the above reaction which one of the given ring will undergo reduction?

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12. Write correct order of acidic strength of following compounds:

(i). (a). $CH_3 - CH_2 - O - H$ (b) $CH_3 - \underset{\underset{CH_3}{|}}{C}H - O - H$ (c)

$$CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - O - H$$

(A). $a > b > c$ (B). $a < b < c$ (C). $a > c > b$ (D). $b > a > c$

(ii). (a). $F - CH_2 - CH_2 - O - H$, (b)

$NO_2 - CH_2 - CH_2 - O - H$

(c). $Br - CH_2 - CH_2 - O - H$, (d).

$\overset{\oplus}{N}H_3 - CH_2 - CH_2 - O - H$

(A). $d > b > a > c$

(B). $d < b < a < c$

(C). $c > b > a > d$

(D). $d > a > b > c$

(iii). (a). CH_3COOH

(b). CH_3CH_2OH

(c). C_6H_5OH

(d). $C_6H_5SO_3H$

(A). $d > a > c > b$

(B). $d < a < c < b$

(C). $d > a > b > c$

(D). $a > d > c > b$

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13. Write increasing order of basic strength of following:

(i). (a) $F^{\ominus}$, (b). $Cl^{\ominus}$, (c). $Br^{\ominus}$, (d). $I^{\ominus}$

(A). $a > b > c > d$

(B). $d < a < c < b$

(C). $d > a > b > c$

(D). $a > d > c > b$

(ii). (a). $CH_3^{\ominus}$, (b). $Cl^{\ominus}$, (c) $OH^{\ominus}$, (d). $F^{\ominus}$

(A). $a > b > c > d$

(B). $d < a < c < b$

(C). $d > a > b > c$

(D). $a > d > c > b$

(iii). (a). $R - NH_2$, (b). $Ph - NH_2$, (c). $R - \underset{\underset{O}{||}}{C} - NH_2$

(A). $a > b > c$

(B). $a < c < b$

(C). $a < b < c$

(D). $a > c > b$

(iv). (a). NH_3, (b). $MeNH_2$, (c). Me_2NH , (d). Me_2N

(A). $a < b < c < d$

(B). $d < a < c < b$

(C). $d > a > b > c$

(D). $a > d > c > b$

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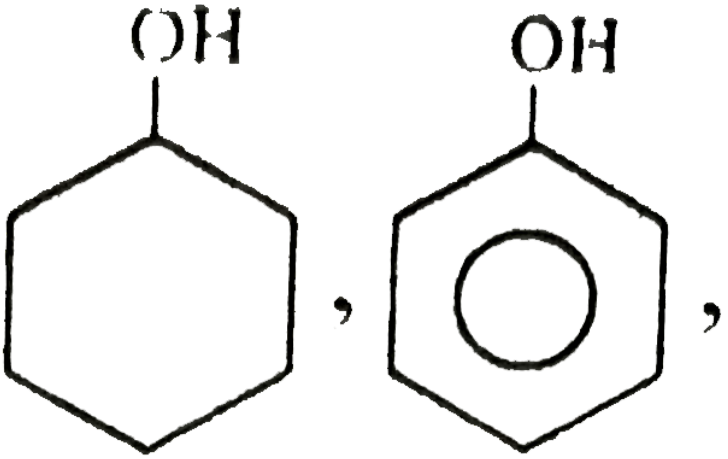
14. Record the following sets of compounds according to increasing $pK_a(= -\log Ka)$



(a).

cyclohexane carboxylic acid

(A). $3 < 2 < 1$

(B). $3 > 2 > 1$

(C). $1 < 2 < 3$

(D). $3 < 1 < 2$

(b). 1-butyne, 1-butene, butane

(A). $3 < 2 < 1$

(B). $3 < 2 < 1$

(C). $1 < 3 < 2$

(D). $3 < 2 > 1$

(c). Propanoic acid, 3-bromopropanoic acid, 2-nitropropanoic acid

(A). 3lt2lt1

(B). 3gt2gt1

(C). 1lt2lt3

(D). 3lt1lt2

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15. Explain which is a stronger acid

$CH_3CH_3 \& BrCH_2NO_2$

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16. Which of the following pairs has higher resonance energy:

(a). $CH_3COOH \& CH_3COONa$

(b). $CH_2 = CH - \overset{\Theta}{O} \& CH_2 = CH - OH$

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17. Choose the more stable alkene in each of the following pair. Explain your reasoning.

(a). 1-Methylcyclohexene or 3-methylcyclohexene

(b). Isopropenylcyclopentane or allylcyclopentane.

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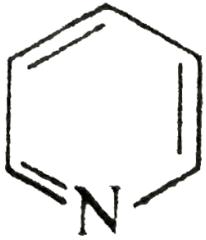
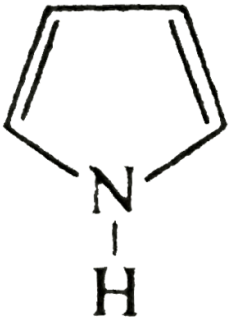
18. Which of the followig pairs has higher resonance energy:

(a)  & 

(a).

(b).

$CH_2 = CH - O - CH = CH_2 \& CH_2 = CH - NH - CH = CH_2$

(c). $CH_2 = CH - \overset{\Theta}{N}H \& NH = CH - \overset{\Theta}{N}H$

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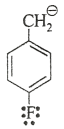
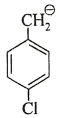
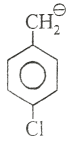
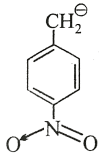
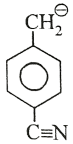
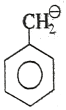
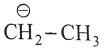
19. Rank the following sets of intermediates in increasing order of their stability.

(i) (a)  (b) 

(ii) (a)  (b)  (c)  (d) 

(iii) (a)  (b) 

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