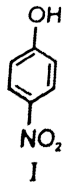
CHEMISTRY

RESONANCE ENGLISH

GENERAL ORGANIC CHEMISTRY II

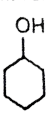
Solved example

1. Arrange the following in the decreasing order of their acidity.



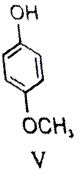
I

II



III

IV



V

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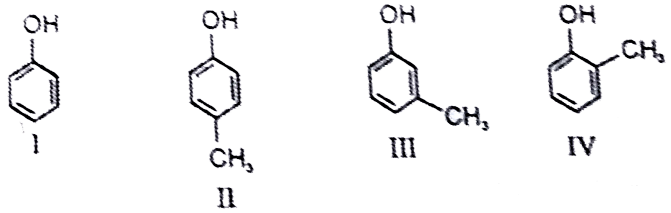
2. Arrange the following in the increasing order of their acidity.



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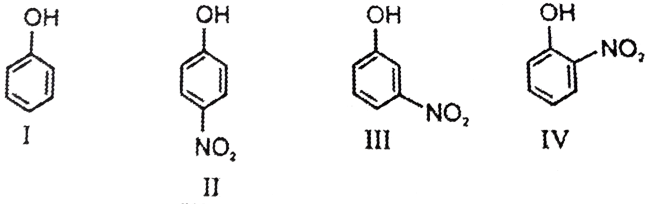
3. Compare the acidic character of the following:

(c)



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Exercise-1

1. Arrange the following in decreasing order of stability

(a)	$\overset{\ominus}{C}H_2-NO_2$, 1	$\overset{\ominus}{C}H_2-CHO$ 2	$CH\equiv\overset{\ominus}{C}$ 3
(b)	$CH_3-CH_2-CH_2-\overset{\ominus}{C}H_2$ 1	$CH_3-\overset{\ominus}{C}H-CH_2CH_3$ 2	$(CH_3)_2\overset{\ominus}{C}-CH_2CH_3$ 3

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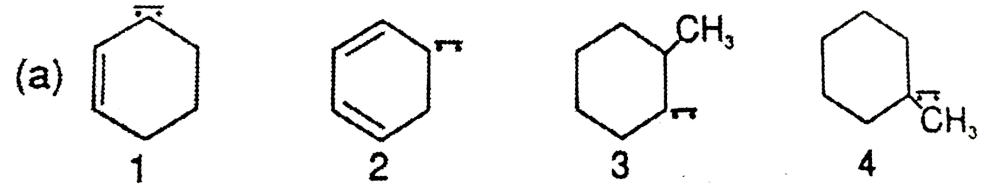
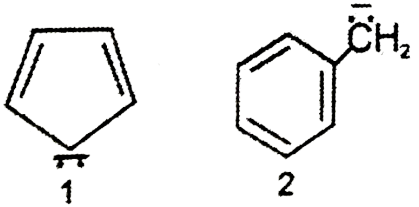
2. Arrange the following in decreasing order of stability

(a) 1 2 3 4



(b) 1 2 3



(c) $\bar{C}Cl_3$ 1 $\bar{C}F_3$ 2

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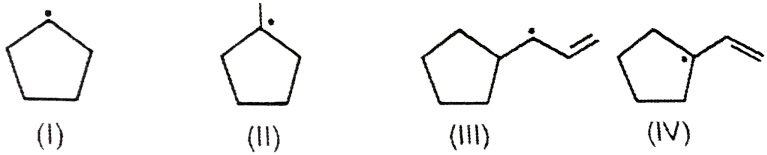
3. Range the following free radicals in increasing order of their stability and give appropriate reasons.



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

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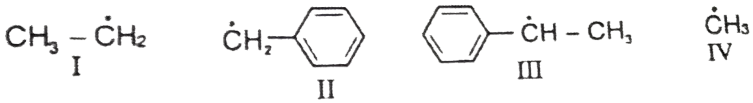
4. Arrange the following free radicals in decreasing order of stability:



I II III IV

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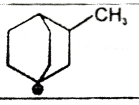
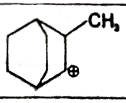
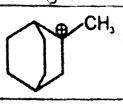
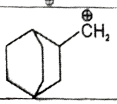
5. Arrange the following carbocations in decreasing order of their stability:

	(I)	(II)	(III)	(IV)
(P)	$CH_3-CH_2-\overset{\oplus}{C}H_2$	$CH_3-CH(F)-\overset{\oplus}{C}H_2$	$CH_3-CH(Br)-\overset{\oplus}{C}H_2$	$CH_3-CH(Cl)-\overset{\oplus}{C}H_2$
(Q)	$CH_3-\overset{\oplus}{C}H-C_2H_5$	$(CH_3)_2\overset{\oplus}{C}-CH_3$	$Ph-\overset{\ominus}{C}(CH_3)-C_2H_5$	$Ph-\overset{\oplus}{C}(Ph)-C_2H_5$
(R)				

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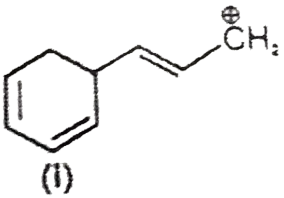
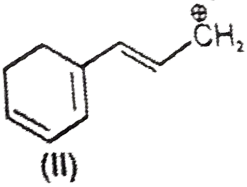
6. Which of the following carbocation is more stable and why?



(I)



(II)

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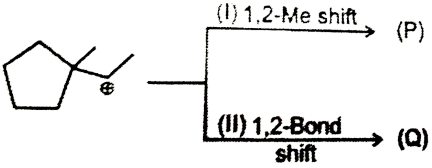
7.



Draw the structures of P and Q.

Draw the structure of P and Q.

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8. Compare the basic strength of the following compounds:

$\underset{(I)}{C_2H_5O^-}$ $\underset{(II)}{C_2H_5^-}$ $\underset{(III)}{C_2H_5NH^-}$ $\underset{(IV)}{NH_2^-}$ $\underset{(V)}{F^-}$

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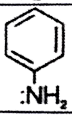
9. Compare the basic strength of the following compound:

(a)	$PhNH_2$	Ph_2NH	Ph_3N
(b)			
(c)	$CH_3-\underset{\displaystyle Ph}{\underset{\vert}{CH}}-NH_2$	$CH_3-CH_2-\underset{\displaystyle Ph}{\underset{\vert}{NH}}$	$Ph-CH_2-CH_2-NH_2$

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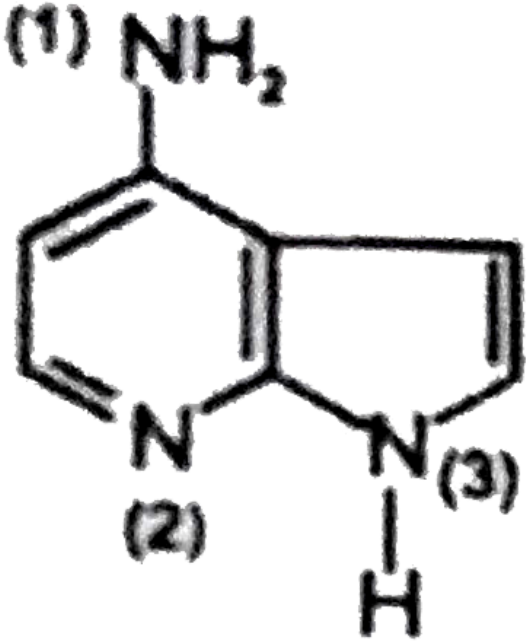
10. Which of the following group is most basic in the given compounds"



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11. Which of the following is a stronger base? Give reason to justify your answer.

$CH_2 = CH - NH_2$ $\quad$ $CH_2 = N - CH_3$

I $\quad$ II

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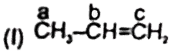
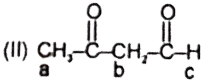
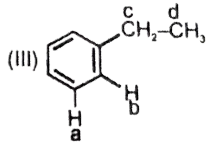
12. Which 'H' atom is most acidic in the following compounds.

(I) 

(II) 

(III) 

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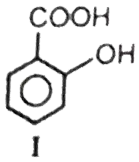
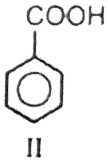
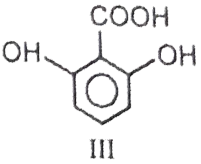
13. Arrange the following in decreasing order of acidity



I



II



III

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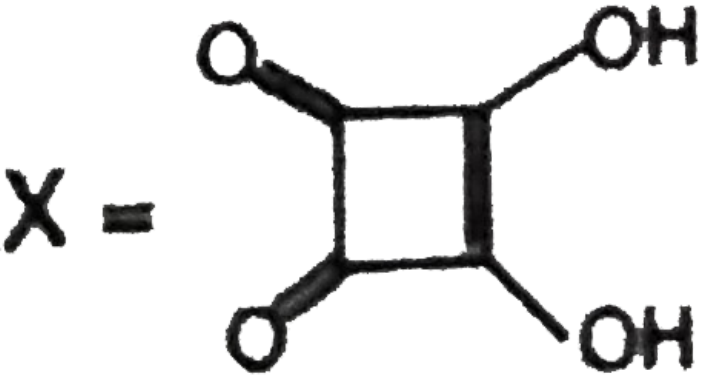
14. The given compound is a strong acid. Justify this statement. X=



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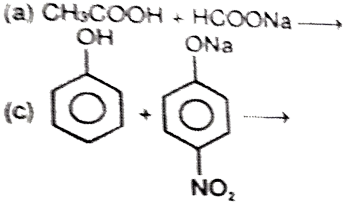
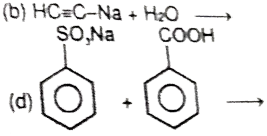
15. Which of the following reactions is/are feasible?





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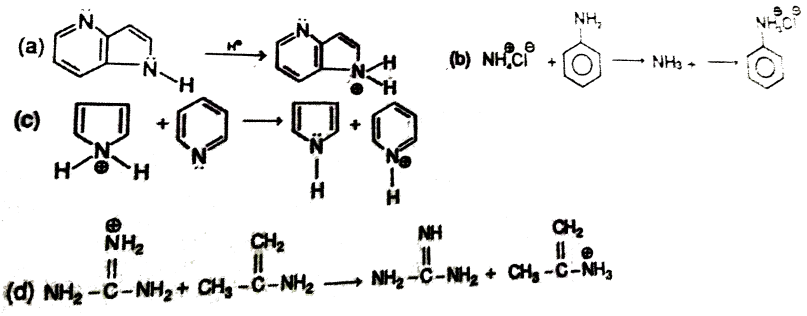
16. Which of the following reaction is feasible?



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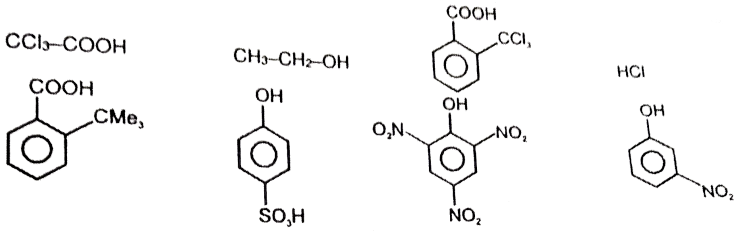
17. Which of the following acids (given below) react with $NaHCO_3$ and liberate $CO_2(g)$?



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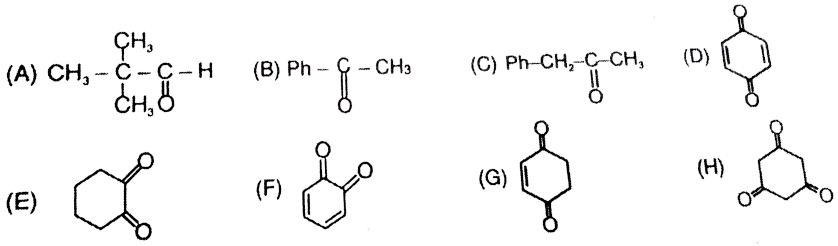
18. Which of the following compounds will exhibit tautomerism?



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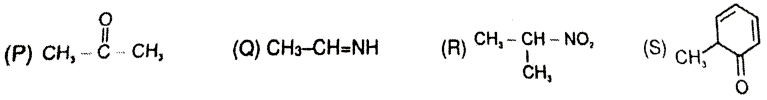
19. Write the tautomers of the following compounds.



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20. Monocarbonyl compounds have very small percentage enol form at equilibrium . Explains.

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Part-II Only One Option Correct Type

1. Which of the following is least stable carbanion ?

A. $HC = -\overline{C}$

B. $(C_6H_5)_3\overline{C}$

C. $(CH_3)_3\overline{C}$

D. $\overline{C}H_3$

Answer: C

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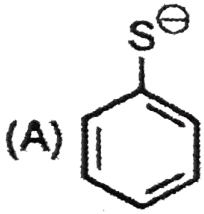
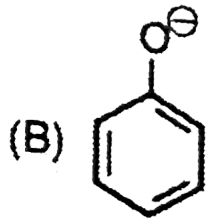
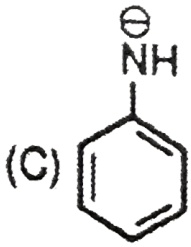
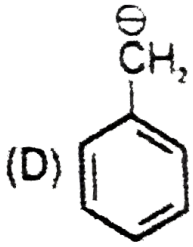
2. The most stable anion is:

A.



B. 

C. 

D. 

Answer: A

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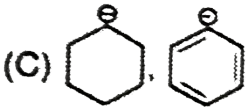
3. In which of the following pairs of carbarion the first one is more stable than correct.

A. $\overset{\odot}{C}F_3, \overset{\odot}{C}Cl_3$

B. $HC \equiv \overset{\odot}{C}, H_2C = \overset{\odot}{C}H$

C. 

D. $(CH_3), \overset{\odot}{C}, H_3C - \overset{\odot}{C}H_2$

Answer: B

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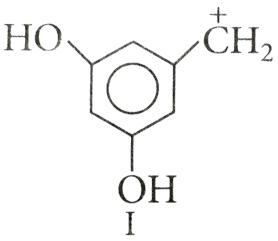
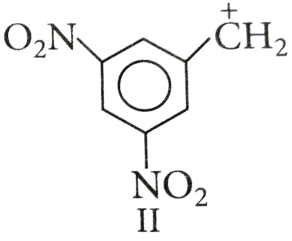
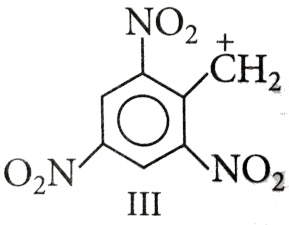
4. Arrange the followinng carbocations in decreasing order of stability



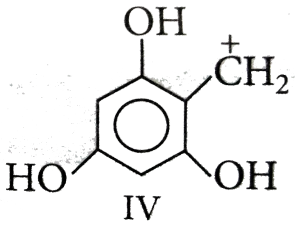
I



II



III



IV

A. $III > I > IV > II$

B. $III > II > I > IV$

C. $I > III > II > IV$

D. $III > I > II > IV$

Answer: D

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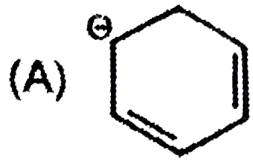
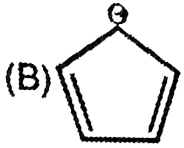
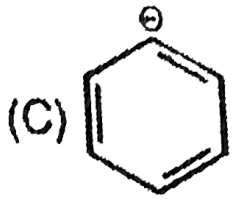
5. The most stable ion is .

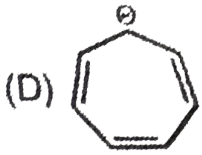
A. 

B. 

C.



D.



Answer: B

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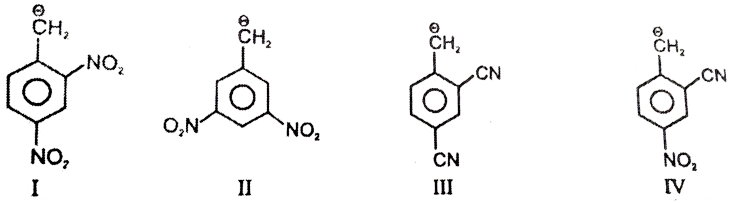
6. Arrange the following carbanions in increasing order of stability:



A. $III > VI > I > II$

B. $I > III > IV > II$

C. $I > II > III > IV$

D. $I > IV > III > II$

Answer: D

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7. Among the following, the paramagnetic species is:

A. Free radical

B. Carbocation

C. Carbanion

D. All the three

Answer: A

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8. The stability of given free radicals in decreasing order is

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

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

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

(iv) $\dot{C}H_3$

A. $iii > iv > I > ii$

B. $I > ii > iii > iv$

C. $iii > ii > iv > i$

D. $iii > ii > I > iv$

Answer: D

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9. Which of the following is the correct order of stability of free radicals ?

A. benzyl $>$ allyl $> 2^o > 1^o$

B. allyl $>$ benzyl $> 2^{\overset{o}{-}} > 1^{\overset{o}{-}}$

C. allyl $> 2^{\overset{o}{-}} > 1^{\overset{o}{-}}$ benzyl

D. benzyl $> 2^{\overset{o}{-}} > 1^{\overset{o}{-}}$ allyl

Answer: A

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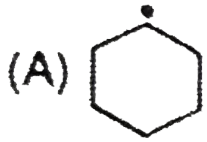
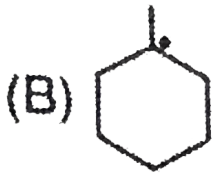
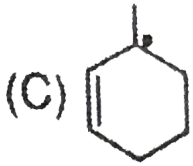
10. Most stable radical among the following is :

A. (A) 

B. (B) 

C. (C) 

(D) 

D.

Answer: C

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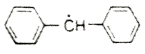
11. Arrange the following radicals in decreasing order of their stability.

(I) $\dot{C}H_3$ (II) $CH_3-\dot{C}H_2$ (III)  (IV) 

A. $IV > I > III > II$

B. $IV > III > II > I$

C. $I > II > III > IV$

D. $IV > III > I > II$

Answer: B

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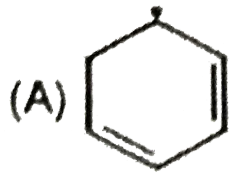
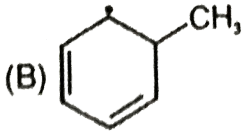
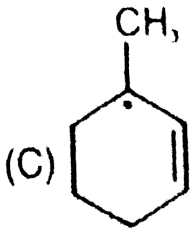
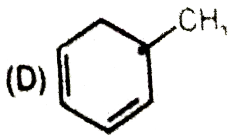
12. Least stable radical among the following is :

A. 

B. 

C. 

D. 

Answer: C

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13. The most stable carbocation is

A. $Ch_3\overset{\oplus}{C}H_2$

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

C. $\overset{\oplus}{C}H_2 - CHO$

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

Answer: C

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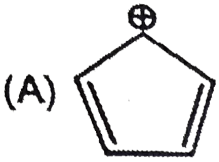
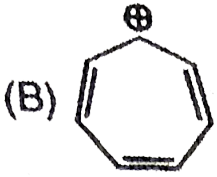
14. The most stable carbocation is:

A.



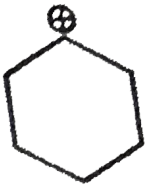
B.



(C)

C.

(D)



D.

Answer: B

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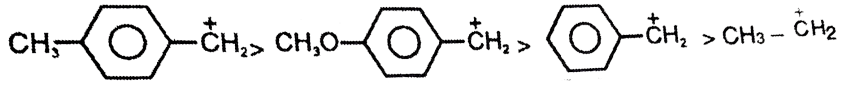
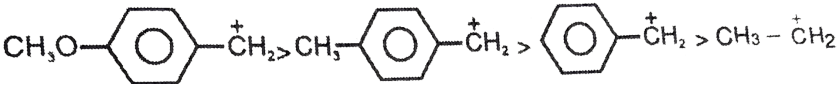
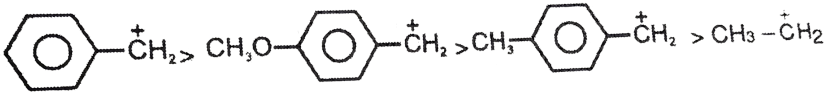
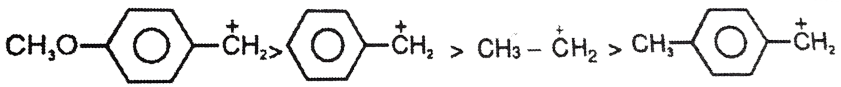
15. Which of the following shows the correct order of decreasing stability?

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: B

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16. Which of the following is the arranged more stable carbocation of the given species ?

$$CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-\overset{\oplus}{C}H-CH_3 \rightarrow$$

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

B. $CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-\overset{\oplus}{C}H_2$

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

D. $CH_3-\overset{\overset{CH_3}{|}}{C}-\underset{\underset{CH_3}{|}}{CH}-\overset{\oplus}{C}H_2$

Answer: C

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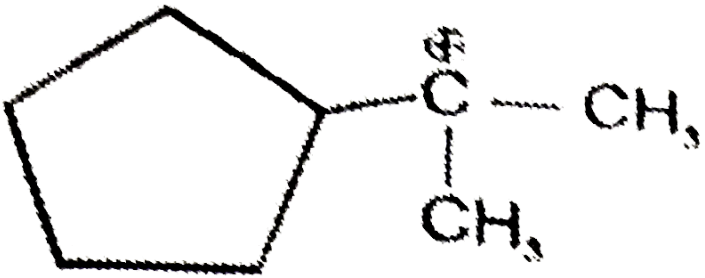
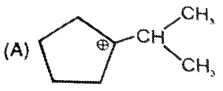
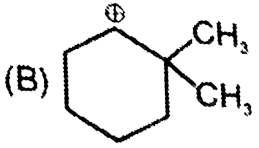
17. Most stable rearranged form of given carbocations is:



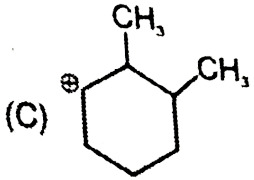
A.

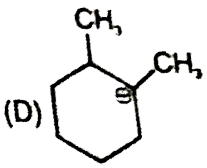


B.



C.



D. 

Answer: D

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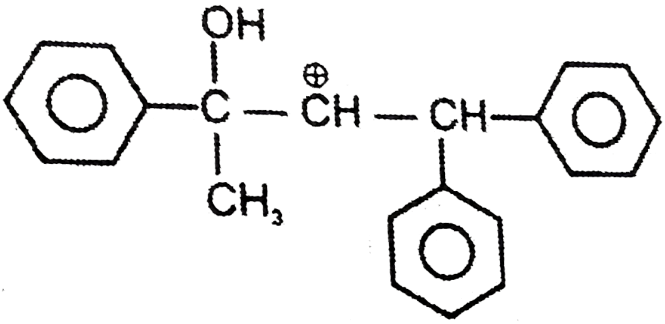
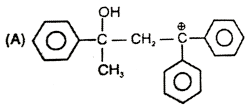
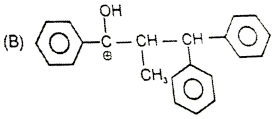
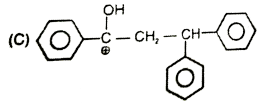
18. Which of the following in the rearranged in the rearranged more stable carbocation of the given species?



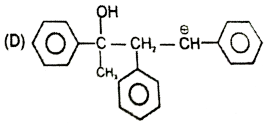
A. 

B. 

C.



D.



Answer: B

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19. The correct basic strength order of following anions is:

A. $CH_3 - \overset{\ominus}{C}H_2 > \overset{\ominus}{N}H_2 > CH_2 = \overset{\ominus}{C}H > CH \equiv \overset{\ominus}{C} > \overset{\ominus}{H}O > \overset{\ominus}{F}$

B. $\overset{\ominus}{N}H_2 < CH_3 - \overset{\ominus}{C}H_2 > CH_2 = \overset{\ominus}{C}H > CH \equiv \overset{\ominus}{C} > \overset{\ominus}{F} > \overset{\ominus}{H}O$

C. $CH_3 - \overset{\ominus}{C}H_2 > CH_2 = \overset{\ominus}{C}H > \overset{\ominus}{N}H_2 > CH \equiv \overset{\ominus}{C} > \overset{\ominus}{H}O > \overset{\ominus}{F}$

D. $\overset{\ominus}{F} > \overset{\ominus}{H}O > Ch \equiv \overset{\ominus}{C} > CH_2 = \overset{\ominus}{C}H > \overset{\ominus}{N}H_2 > CH_3 - \overset{\ominus}{C}H_2$

Answer: C

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20. Which of the following shows the correct order of decreasing basicity in gas phase?

A. $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > NH_3$

B. $(CH_3)_2NH > (CH_3)_3N > CH_3NH_2 > NH_3$

C. $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > NH_3$

D. $(CH_3)_2NH > CH_3NH_2 > NH_3 > (CH_3)_3N$

Answer: A

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21. Find the order of basic strength .(If R=Me) ?

$(I)R_4N^+OH^-$ $(II)R_3N$ $(III)R_2NH$ $(IV)RNH_2$

A. $I > III > IV > II$

B. $IV > III > I > II$

C. $II > IV > III > I$

D. $II > IV > I > III$

Answer: A

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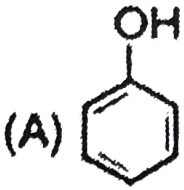
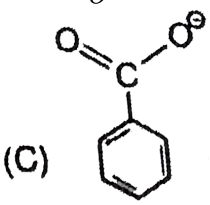
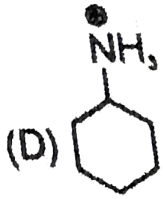
22. Which of the following cannot be a base?

A. 

B. $CH_3 - \underset{\underset{O}{||}}{C} - NH_2$

C. 

D. 

Answer: D

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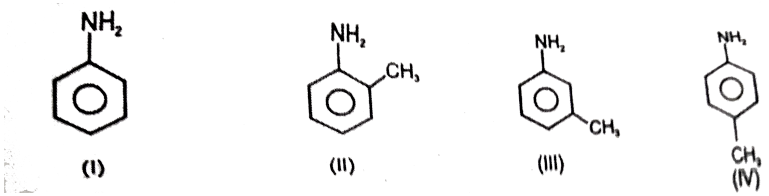
23. Select the basic strength order of following molecules ?



A. $II > III > IV > I$

B. $II > IV > III > I$

C. $IV > II > III > I$

D. $IV > III > I > II$

Answer: D

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24. Among the following compounds the strongest acid is:

A. $HC \equiv CH$

B. C_6H_6

C. C_2H_6

D. CH_3OH

Answer: D

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25. Which of the following is not correct decreasing k_a order .

A. $CH_4 > NH_3 > H_2O > HF$

B. $CH_3 - OH > CH_3 - NH_2 > CH_3 - F > CH_3 - CH_3$

C. $Hl > HBr > HCl > HF$

D. $PhOH > H_2O > C_2H_5OH > CH_3 - C \equiv CH$

Answer: A

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26. Which of the following acids has the smallest value of dissociation constant?

A. $CH_3 - \underset{\underset{NO_2}{|}}{C}\ H - COOH$

B. $O_2N - CH_2 - CH_2\_COOH$

C. $Cl - CH_2 - CH_2 - COOH$

D. $NC - CH_2 - CH_2 - COOH$

Answer: C

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27. Find the strongest acid among the following compounds is:

A. $HOOC-(CH_2)_2-COOH$

B. $H_3N^{\oplus}-(CH_2)_2-COOH$

C. $F-(CH_2)_2-COOH$

D. $CH_3-(CH_2)_2-COOH$

Answer: B

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28. Which of the following options shows the correct order of decreasing acidity:

A. $PhCO_2H > PhSO_3H > PhCH_2H > PhOH$

B. $PhSO_3H > PhOH > PhCH_2H > PhCO_2H$

C. $PhCO_2H > PhOH > PhCH_2H > PhSO_3H$

D. $PhSO_3H > PhCO_2H > PhOH > PhCH_2H$

Answer: D

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29. Arrange increasing order of acidic strength of following dibasic acids:

(I) oxalic acid. (II) succinic acid (III) malonic acid (IV) adipic acid

A. $III < II < I < IV$

B. $II < III > I > IV$

C. $I > III > II > IV$

D. $II > I > III < IV$

Answer: C

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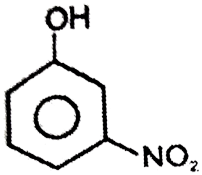
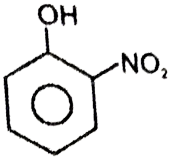
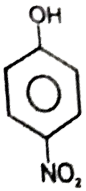


I



II



III

30.

Arrange above phenol in increasing order of pK_a value:

A. $I < II < III$

B. $III < I < II$

C. $III < II < I$

D. $I < III < II$

Answer: C

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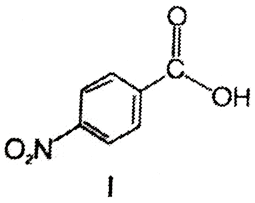
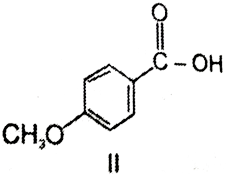
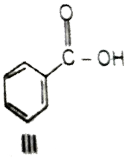
31. Order of K_a of following acids is:



I



II



III

A. $I > II > III$

B. $II > I > III$

C. $I > III > II$

D. $III > I > II$

Answer: C

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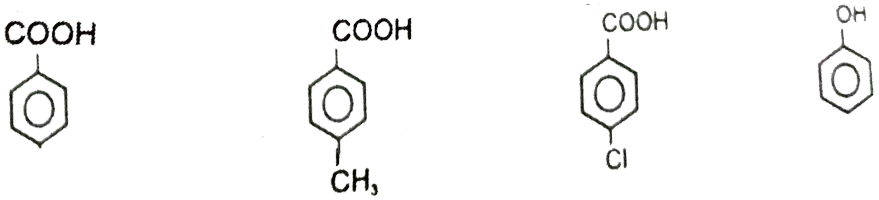
32. Arrange the following compounds in increasing order of their acidic strength.



A. $I < II < III < IV$

B. $IV < I < III < II$

C. $IV < II < I < III$

D. $II < I < III < IV$

Answer: A

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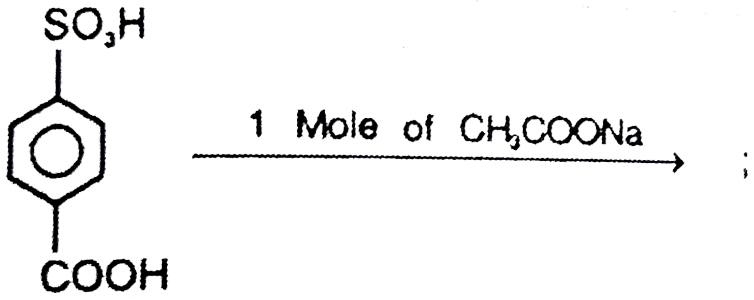
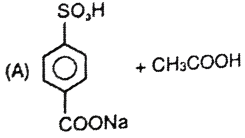
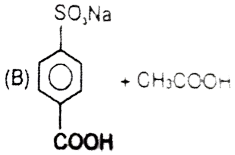
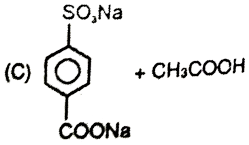
33. 

, The products will be:

A. 

B. 

C. 

D. Reaction is not feasible

Answer: B

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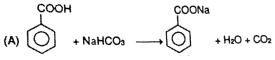
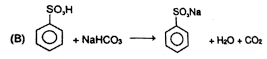
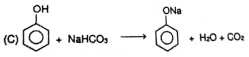
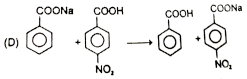
34. Which reaction is not feasible ?

A. 

B. 

C. 

D. 

Answer: C

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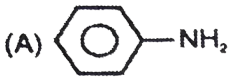
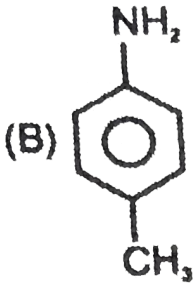
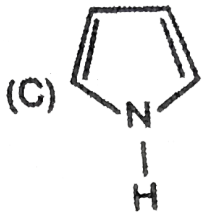
35. Which of the following will accept H^+ from NH_4 ion.

A. 

B. 

C. 

D. $CH_3 - CH_2 - NH_2$

Answer: D

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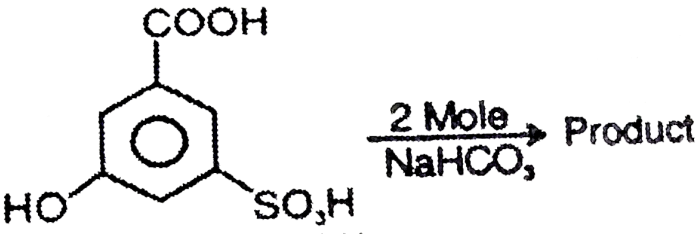
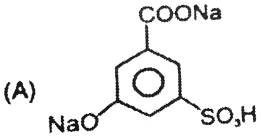
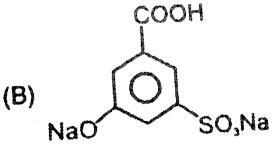
36. Complete the following reaction



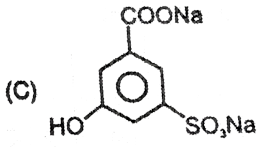
A.

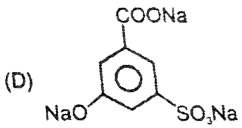


B.



C.



D. 

Answer: C

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37. Keto enol tautomerism is not observed in:

A. $C_6H_6 - \overset{O}{\overset{||}{C}} - H$

B. $C_6H_6 - \overset{O}{\overset{||}{C}} - CH_3$

C. $C_6H_6 - \overset{O}{\overset{||}{C}} - CH(CH_3)_2$

D. $C_6H_6 - \overset{O}{\overset{||}{C}} - CH_2 - \overset{O}{\overset{||}{C}} - CH_3$

Answer: A

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38. The enolic form of acetone contains:

A. 9σ bonds, 1π bond and 1 lone pairs

B. 8σ bond, 2π bond and 2 lone pairs

C. 10σ bond, 1π bond and 1 lone pair

D. 9σ bond, 2π bond and 1 lone pair

Answer: A

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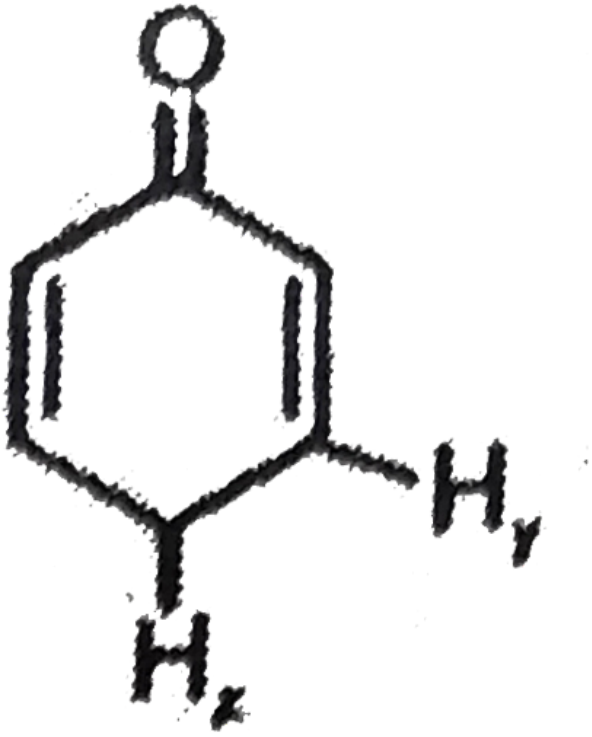

39.

The above molecule can be enolised by which hydrogen ?

A. $y - H$

B. $x - H$

C. both

D. None of these

Answer: B

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40. Which among the following compound will give maximum enol content in solution :

A. $C_6H_6-\overset{\overset{O}{||}}{C}-CH_2-\overset{\overset{O}{||}}{C}-CH_3$

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

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

D. $CH_3-\overset{\overset{O}{||}}{C}-CH_2-COOC_2H_5$

Answer: A

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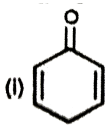
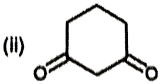
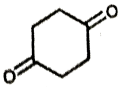
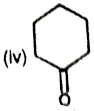
41. Arrange the following in decreasing order of percentage enol content.

(I) 

(II) 

(III) 

(IV) 

A. $I > II > III > IV$

B. $II > I > III > IV$

C. $II > III > I > IV$

D. $III > II > IV > I$

Answer: A

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Part-III: Match the Column

1. Match the column

Column I	Column II
(a) Apple	(i) Outer portion of receptacte
(b) Coconut	(ii) Fleshy thalamus
(c) Jackfruit	(iii) Thalamus and pericarp
(d) Guava	(iv) Endosperm
(e) Pineapple	(v) Bract, perianth and seeds

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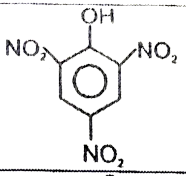
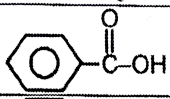
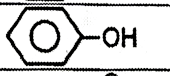
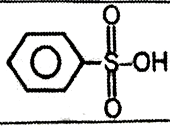
2. Match the column

	Column-I		Column-II
(A)	$NaHCO_3$ will react with	(p)	
(B)	Na will react with	(q)	
(C)	NaOH will react with	(r)	
(D)	$NaNH_2$ will react with	(s)	

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Part-I : Only One Option Correct Type

1. Arrange following compounds in decreasing order of their dipole moment.

$\underset{\text{I}}{CH_3-CH_2}-NO_2$ $\quad$ $\underset{\text{II}}{CH_3-CH_2}-NH_2$ $\quad$ $\underset{\text{III}}{CH_3-CH_2}-F$

$\underset{\text{IV}}{CH_3-CH_2}-C\equiv N$

A. $III > II > IV > I$

B. $III > II > I > IV$

C. $III > I > II > IV$

D. $II > III > I > IV$

Answer: B

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2. Correct decreasing stability order of following carbanions :

$$\underset{I}{{}^{\ominus}CH_2} - CHO \qquad CH_3 - \underset{\underset{O}{||}}{C} - \underset{II}{{}^{\ominus}CH} - \underset{\underset{O}{||}}{C} - CH_3 \qquad H - \underset{\underset{O}{||}}{\underset{III}{-}} \overset{\ominus}{CH} -$$

A. $III > IV > II > I$

B. $IV > II > III > I$

C. $IV > III > II > I$

D. $III > II > I > IV$

Answer: C

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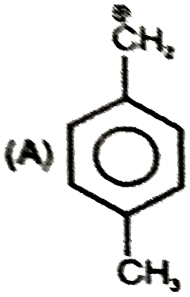
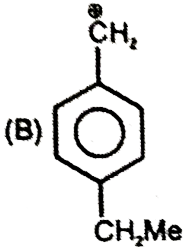
3. Select the most stable intermediates :

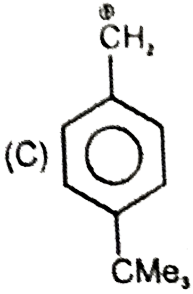
A.



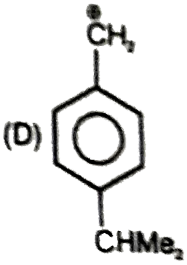
B.



C.



D.



Answer: A

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4. Which of the following is most stable carbocation?

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

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

C. $CH_3-\overset{\oplus}{C}=NH$

D. $CH_2=\overset{\oplus}{C}H$

Answer: C

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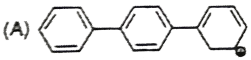
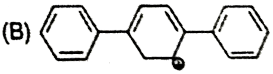
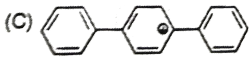
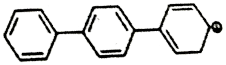
5. The most stable carbocation is:

A. 

B. 

C. 

D. (D) 

Answer: A

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6. The following carbocation rearranges to

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

A. $CH_2 = \underset{\underset{Ch_3}{|}}{C} - \underset{\underset{\oplus}{CH_2}}{\underset{|}{C}}\,H - \overset{CH_3}{\overset{|}{C}}\,H - \overset{CH_3}{\overset{|}{C}}\,H - CH_3$

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

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

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

Answer: D

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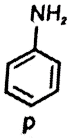
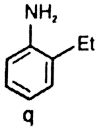
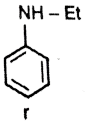
7. Correct basic strength order is :



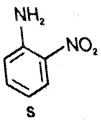
p



q



r



s

A. $r > q > p > s$

B. $r > p > q > s$

C. $q > r > p > s$

D. $r > q > s > p$

Answer: B

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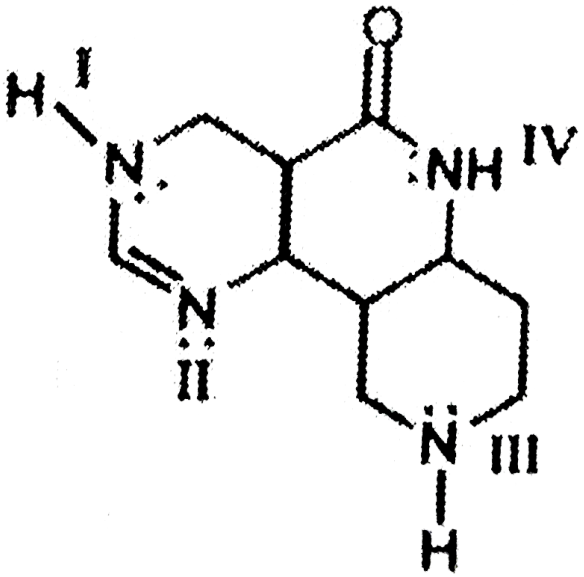
8. The order of basic strength of the given basic nitrogen atoms is :



A. $III > II > I > IV$

B. $III > I > II > IV$

C. $I > III > II > IV$

D. $II > III > I > IV$

Answer: D

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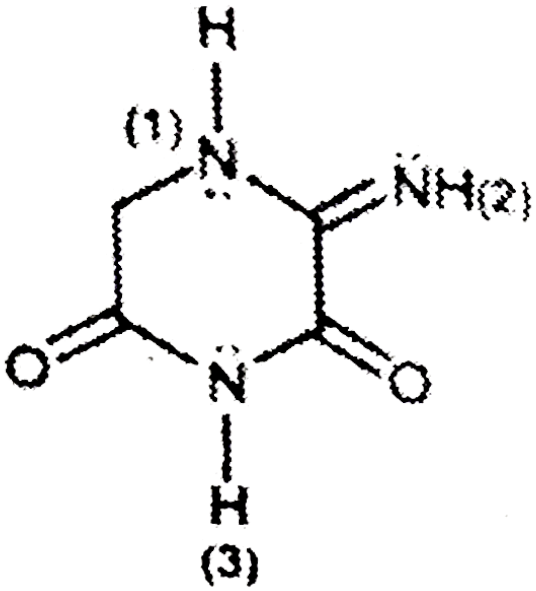
9. In the labelled N-atoms which is correct basic strength order:



A. $2 > 1 > 3$

B. $3 > 1 > 2$

C. $2 > 3 > 1$

D. All are equally basic

Answer: A

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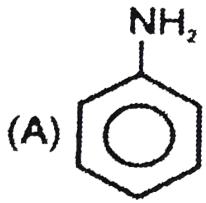
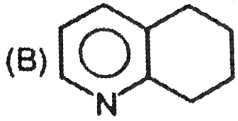
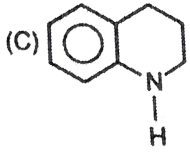
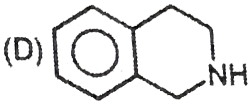
10. Choose the strongest base among the following:

A. 

B. 

C. 

D. 

Answer: D

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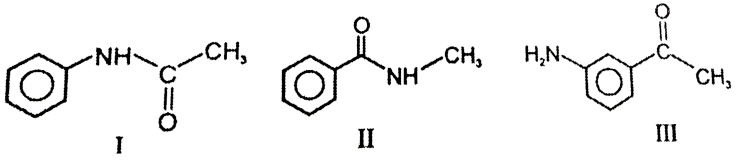
11. Select the basic strength order of following molecules ?



A. $III > II > I$

B. $II > III > I$

C. $I > III > II$

D. $III > I > II$

Answer: A

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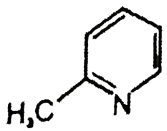
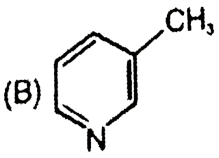
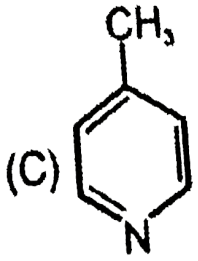
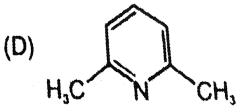
12. Which is the weakest base among the followings ?

A. (A)



B. 

C. 

D. 

Answer: D

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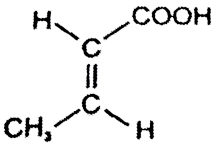
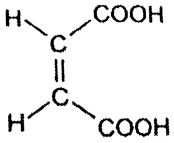
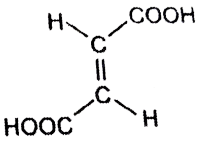
13. Write the order of K_{a_1} values of following acids :







A. $II > III > I$

B. $I > III > II$

C. $III > II > I$

D. $II > I > III$

Answer: A

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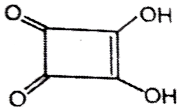
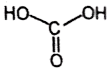
14. The acid strength order is :

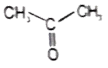


I

II



III



IV

A. $I > IV > II > III$

B. $III > I > II > IV$

C. $II > III > I > IV$

D. $I > III > II > IV$

Answer: D

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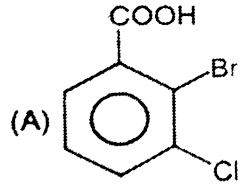
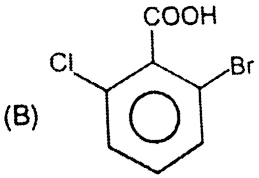
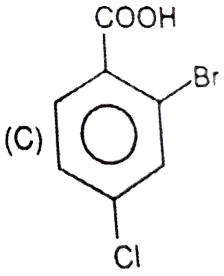
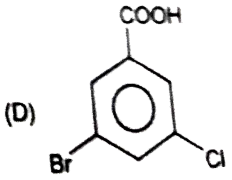
15. (X) $(C_6H_3ClBrCOOH)$ are a dihalosubstituted benzoic acids. The strongest acid among all isomers is -

A. 

B. 

C. 

D. 

Answer: B

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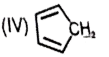
16. The order of acidity of the H-atoms underlined in the following compounds is in the order:

(I) Ph-$\underline{CH_2}$-CH_3 (II) Ph–CH=CH–$\underline{CH_3}$ (III) Ph-CH=$\underline{CH_2}$ (IV) 

A. $IV > II > I > III$

B. $II > IV > III > I$

C. $III > IV > I > II$

D. $I > III > II > IV$

Answer: A

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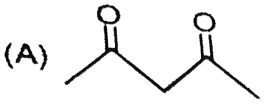
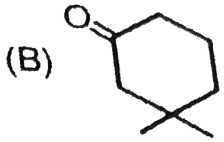
17. Most acidic hydrogen is present in

A. 

B. 

C. $(CH_3CO)_3CH$

D. $(CH_3)_3COH$

Answer: C

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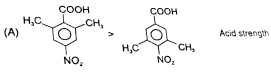
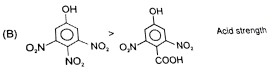
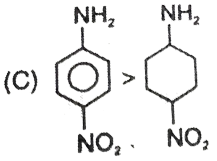
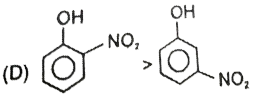
18. The correct orders are:

A. 

B. 

C. 

basicity order

D.  acidity order

Answer: A::B

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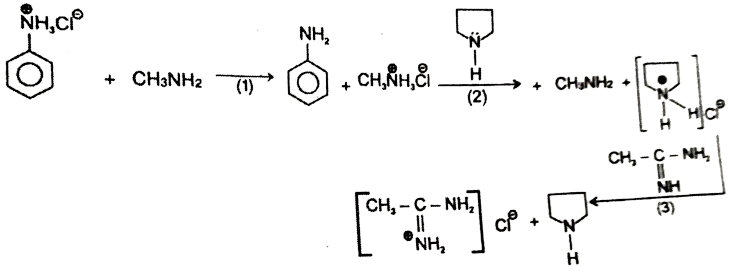
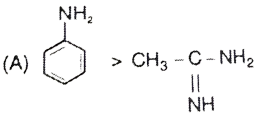
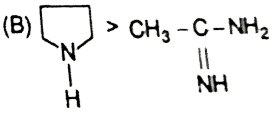
19. Observe the following sequence of reactions :

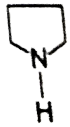


Select the correct option regarding the relative basic strength (K_b):

A. 

B. 

C. $CH_3 - \underset{\underset{NH}{||}}{C} - NH_2 > CH_3NH_2$

D. (D) CH_3NH_2 > 

Answer: C

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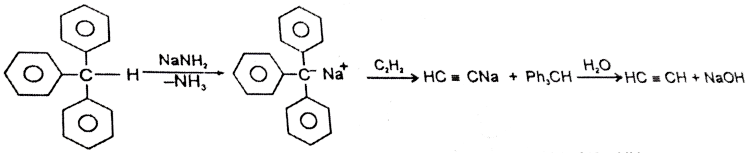
20. Order of K_a which can be predicted by following reaction is:



A. $NH_3 > Ph_3CH > C_2H_2 > H_2O$

B. $H_2O > HC \equiv CH > Ph_3CH > NH_3$

C. $HC \equiv CH > H_2O > H_2O > Ph_3CH > NH_3$

D. $Ph_3CH > HC \equiv CH > H_2O > NH_3$

Answer: B

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21. The gases produced in the following reactions are respectively

$I: CH_3NH_2 + NH_2Br \rightarrow$

$II: CH_3SO_3H + NaHCO_3 \rightarrow$

$III: CH_3 - \underset{\underset{O}{||}}{C} - NH_2 + NaH \rightarrow$

A. NH_3, NH_3, CO_2

B. NH_3, SO_2, H_2

C. NH_3, CO_2, H_2

D. NH_3, SO_2, NH_3

Answer: D

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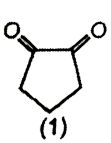
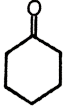
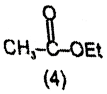
22. Decreasing order of enol content of the following compounds in liquid phase


(1)


(2)


(3)



(4)

A. $2 > 1 > 3 > 4$

B. $1 > 2 > 3 > 4$

C. $4 > 3 > 2 > 1$

D. $3 > 1 > 2 > 4$

Answer: B

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Part-II: Single And Double Value Integer Type

1. Which of the following carbocation can not undergo rearrangement ?

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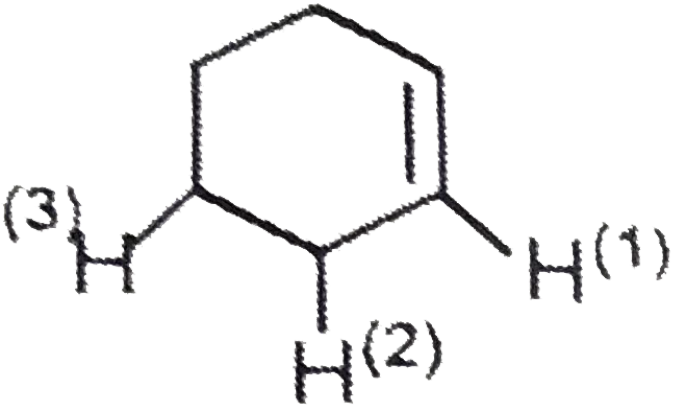
2. Consider following compound, which H-atom deprotonated first ?



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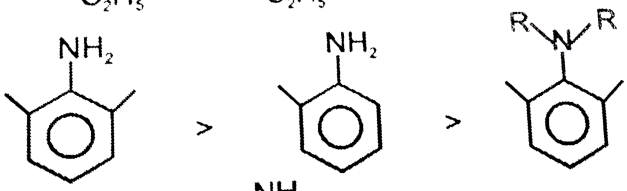
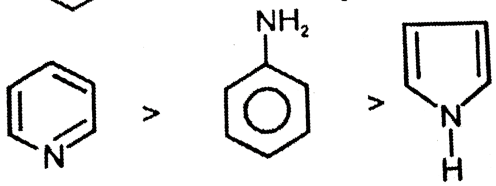
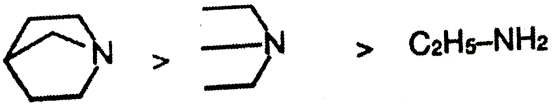
3. How many of the followign are correct orders for Basic Strength :

S_1 : $CH_3-\underset{\underset{CH_3}{|}}{NH} > CH_3-NH_2 > CH_3-\underset{\underset{CH_3}{|}}{N}-CH_3$

S_2 : $C_2H_5-\underset{\underset{C_2H_5}{|}}{NH} > C_2H_5-\underset{\underset{C_2H_5}{|}}{NH}-C_2H_5 > C_2H_5-NH_2$

S_3 : 

S_4 : 

S_5 : 

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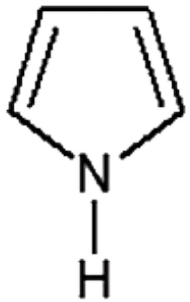
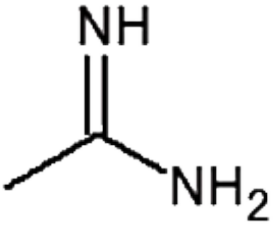
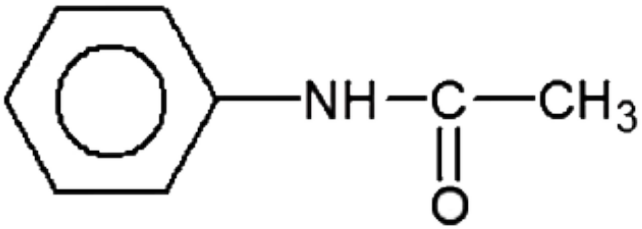
4. How many compounds are less basic than aniline.

(iii) 

(iv) NH_3

(v) 

(vi) 

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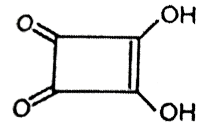
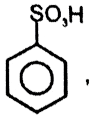
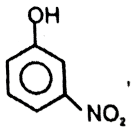
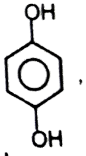
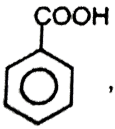
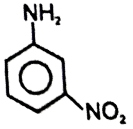
5. How many of the following compounds give CO_2 on reaction with $NaHCO_3$

HCl, , , , , HCOOH, C_2H_5–OH, CH_3COOH,

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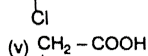
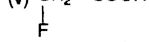
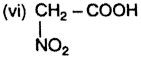
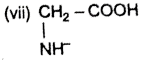
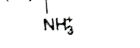
6. How many of the following are more acidic than $HCOOH$.

(i) 
(ii)
(iii)
(iv)
(v) 
(vi) 
(vii) 
(viii) 

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7. 90 g of acetic acid react with excess of $NaHCO_3$ then what volume of CO_2 will produce at S.T.P. Write your answer in terms of nearest integer.

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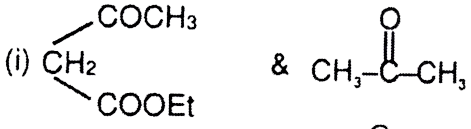
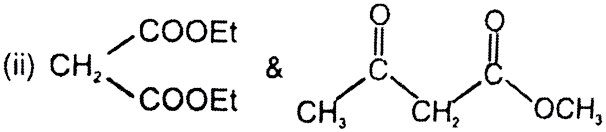
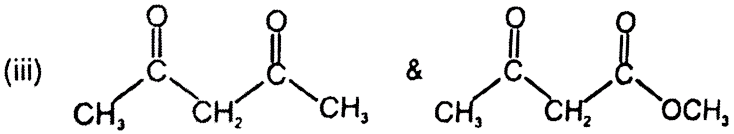
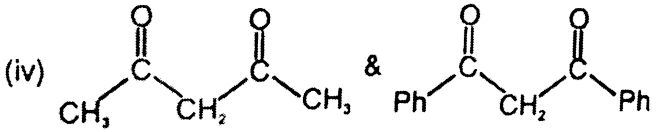
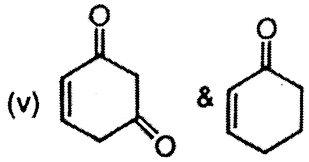
8. In how many of the following pairs will have higher enol content than second.

(i) 

(ii) 

(iii) 

(iv) 

(v) 

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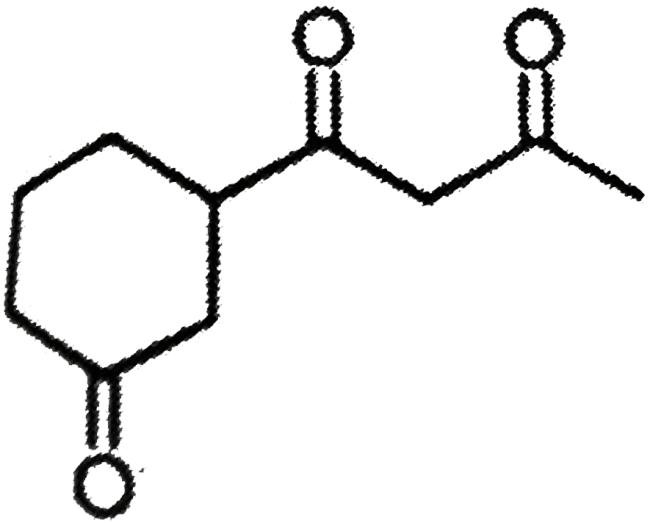
9. Consider the following compound and write number of enolizable H-atom



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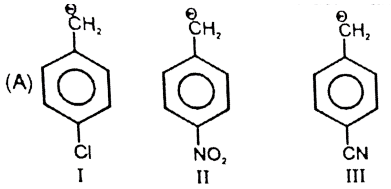
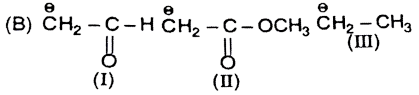
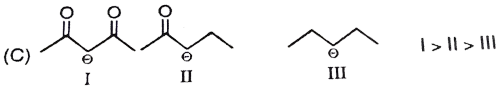
Part-III: One or More Than One Options Correct Type

1. Which of the following stability order of anions is/are correct :

A. (A)  II > III > I

B. (B)  I > II > III

C. 

D. $\overset{\ominus}{C}H_3 > \overset{\ominus}{C}D_3 \qquad I > II$

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

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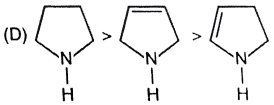
2. Which of the following is/are correct for basic strength:

A. $(CH_3)_2NH > (CH_3)_3N > CH_3NH_2 > NH_3$

B. $(C_2H_5)_3N > (C_2H_5)_2NH > C_2H_5NH_2 > NH_3$

C. $PhNH_2 > Ph_2NH > Ph_3N$

D. 

Answer: B::C::D

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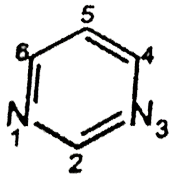
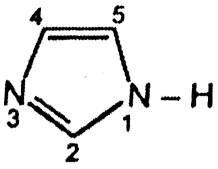
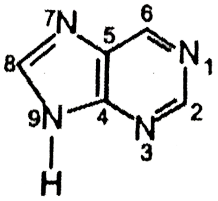


Pyrimidine



Imidazole



Purine

3.

Among the following which statement(s) is/are correct:

A. Both N of pyrimidine are same basic strength

B. In imidazole protonation take places on N-3

C. In purine only one lone pair of N is delocalised.

D. Pyrimidine, imidazole and purine all are aromatic.

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

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4. Consider the following compounds

$$O_2N - CH_2 - \underset{(I)}{\overset{O}{\overset{||}{C}}} - OH \qquad F - CH_2 - \underset{(II)}{\overset{O}{\overset{||}{C}}} - OH \qquad Ph - CH_2 - \underset{(II}{\overset{O}{\overset{||}{C}}}$$

Which statement is/are correct :

A. $I > II > III > IV$ (Acidic strength order)

B. I is most acidic because of -M effect of $-NO_2$ group

C. I is most acidic because of -I effect of $-NO_2$ group

D. IV is least acidic because of $+I$ Effect.

Answer: A::C::D

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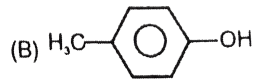
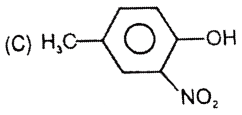
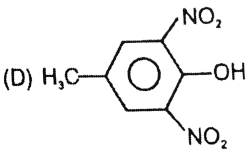
5. Carbolic acid is less acidic than:

A. (A)CH_3COOH

B. 

C. 

D. 

Answer: A::C::D

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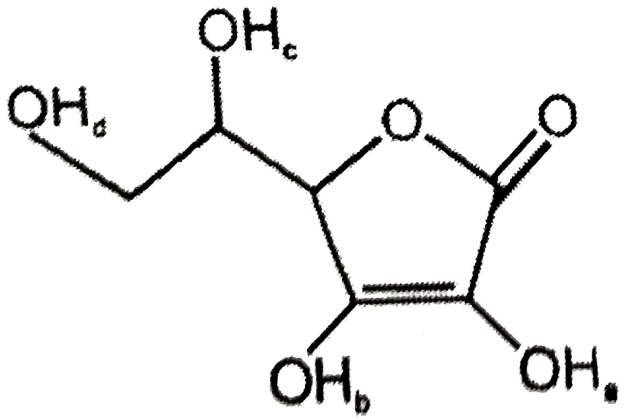
6.



Observe the compound and choose correct statement:

A. It has carboxylic acid group

B. It is Ascorbic acid

C. H_b is most acidic Hydrogen atom

D. H_a is least acidic Hydrogen atom

Answer: B::C

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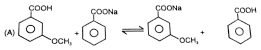
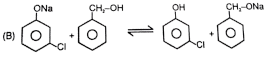
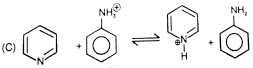
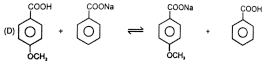
7. Which of the following reactions favour backward direction ?

A. 

B. 

C. 

D. 

Answer: B::D

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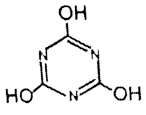
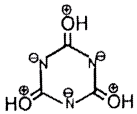
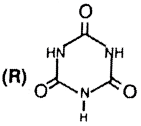
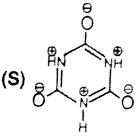
8. The correct statement(s) concerning the structure P,Q,R & S is/are

(P) 

(Q) 

(R) 

(S) 

A. Q & S are not resonating structures

B. R & S are resonating structures

C. P & R are tautomers

D. P & Q are resonating structures

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

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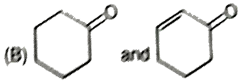
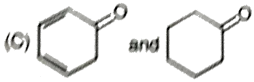
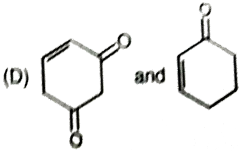
9. Among the given pairs, in which pair second compound has less enol content:

A. 

B. 

C. 

D. 

Answer: A::C::D

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Part-IV : Comprehension

1. Reaction intermdiates are short lived species and are highly reactive. They are formed by heterolytic and homolytic bond fission. There are various types of reaction intermediates in which the most important are carbocation , carbanion and free radical.

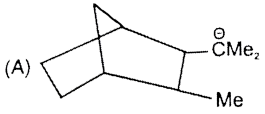
Carbocation is an organic species in which carbon have positive charge and six electrons in its outermost shell. The stability of carbocation can be increased by positive inductive effect, hyperconjugation and delocalisation. If α-atom with respect to carbocation has one or more lone pair of electron then lone pair of electron strongly stabilises the carbocation due to octet completion.

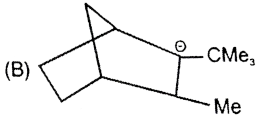
Species in which carbon have negative charge is called carbanion. Carbanion carries three bond pairs and one lone pair. The stability of

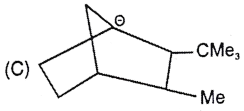
carbanion can be increased by negative inductive effect, negative mesomeric effect and delocalisation.

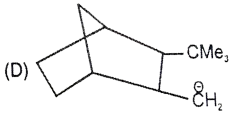
Free radical is a species which have seven electrons in its outermost shell. The stability of free radical can be increased by hyperconjugation and delocalisation.

Which of the following is the most stable carbanion intermediate ?

A. 

B. 

C. 

D. 

Answer: D

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2. Reaction intermdiates are short lived species and are highly reactive. They are formed by heterolytic and homolytic bond fission. There are various types of reaction intermediates in which the most important are carbocation , carbanion and free radical.

Carbocation is an organic species in which carbon have positive charge and six electrons in its outermost shell. The stability of carbocation can be increased by positive inductive effect, hyperconjugation and delocalisation. If α-atom with respect to carbocation has one or more lone pair of electron then lone pair of electron strongly stabilises the carbocation due to octet completion.

Species in which carbon have negative charge is called carbanion. Carbanion carries three bond pairs and one lone pair. The stability of carbanion can be increased by negative inductive effect, negative mesomeric effect and delocalisation.

Free radical is a species which have seven electrons in its outermost shell. The stability of free radical can be increased by hyperconjugation and delocalisation.

The stability order of following free radicals is:

$\underset{I}{C_6H_5\dot{C}H_2}$ $\underset{II}{CH_3\dot{C}H_2}$ $\underset{III}{C_6H_5\dot{C}H_2}$ $\underset{IV}{\dot{C}H_3}$

A. $I > II > III > IV$

B. $II > III > I > IV$

C. $I > III > II > IV$

D. $III > II > I > IV$

Answer: D

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3. Reaction intermdiates are short lived species and are highly reactive. They are formed by heterolytic and homolytic bond fission. There are various types of reaction intermediates in which the most important are carbocation , carbanion and free radical.

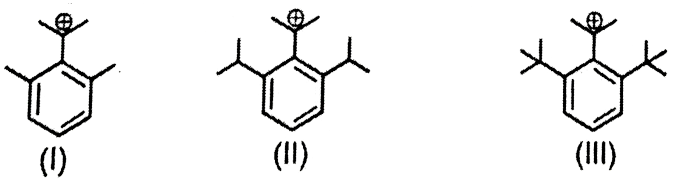
Carbocation is an organic species in which carbon have positive charge and six electrons in its outermost shell. The stability of carbocation can be increased by positive inductive effect, hyperconjugation and

delocalisation. If α-atom with respect to carbocation has one or more lone pair of electron then lone pair of electron strongly stabilises the carbocation due to octet completion.

Species in which carbon have negative charge is called carbanion. Carbanion carries three bond pairs and one lone pair. The stability of carbanion can be increased by negative inductive effect, negative mesomeric effect and delocalisation.

Free radical is a species which have seven electrons in its outermost shell. The stability of free radical can be increased by hyperconjugation and delocalisation.

The stability order of following carbocations is



A. $I > II > III$

B. $II > I > III$

C. $III > I > II$

D. $II > III > I$

Answer: A

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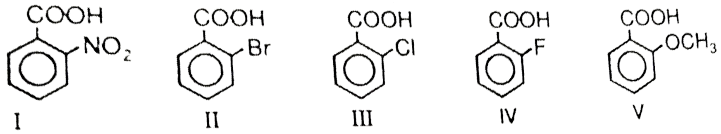
4. Ortho effect is special type of effect that is shown by o-subsituents .This ortho-effect operates at the benzoic acids irrespective of the polar type. Nearly all o-substituted benzoic acid are stronger than benzoic acid. Benzoic acid is a resonance stabilised and so the carboxyl group is coplaner with the ring. An o-subsituent tends to prevent this coplanarity. What is the order of K_a of following compounds ?



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

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

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

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

Answer: A

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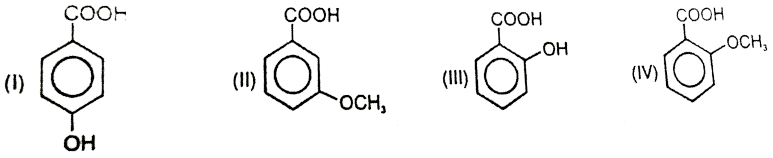
5. Ortho effect is special type of effect that is shown by o-subsituents .This ortho-effect operates at the benzoic acids irrespective of the polar type. Nearly all o-substituted benzoic acid are stronger than benzoic acid. Benzoic acid is a resonance stabilised and so the carboxyl group is coplaner with the ring. An o-subsituent tends to prevent this coplanarity. Which among the following will be the strongest acid ?



A. I

B. II

C. III

D. IV

Answer: C

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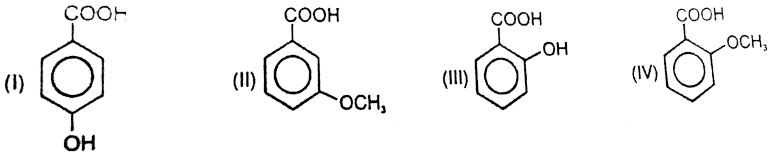
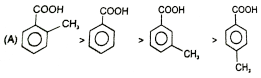
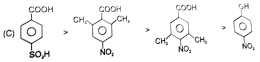
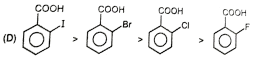
6. Ortho effect is special type of effect that is shown by o-subsituents .This ortho-effect operates at the benzoic acids irrespective of the polar type. Nearly all o-substituted benzoic acid are stronger than benzoic acid. Benzoic acid is a resonance stabilised and so the carboxyl group is coplaner with the ring. An o-subsituent tends to prevent this coplanarity. Which among the following will be the strongest acid ?



A. 

B. 

C. 

D. 

Answer: B

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7. The lone pair of amines makes them basic. They react with acids to form acid-base salts. Amines are more basic than alcohols, ethers and water. When an amine is dissolved in water, an equilibrium is established , where water acts as an acid and transfer a proton to the amine. The basic strength of an amine can be measured by basicity constant K_b.

Arylamines are less basic than alkylamines because the lone pair of nitrogen is delocalised with the aromatic ring and are less available for donation.

Substituted arylamines can be either more basic or less basic than aniline , depending on the substituted . ERG substituents, such as $-CH_3, -NH_2$ and $-OCH_3$ increases the basicity and EWG substituents , such as $-Cl, -NO_2$ and $-CN$ decreases basicity. While $sp^2 -$ hybridized nitrogen atom in pyridine is less basic then the sp^3 -hybridized nitrogen in an alkylamine.

pK_b order of the following compound is :

(I) NH_2OH $(II)NH_2NH_2$ $(III)NH_3$ $(IV)H_2O$

A. $CH_3NH_2 > NaOH$

B. Pyridine $> CH_3 - NH - CH_3$

C. p-Methyl aniline $>$ p-Chloroaniline $>$ p-Amino acetophenone

D. p-Bromoaniline $>$ p-Nitroaniline $>$ p-Amino benzaldehyde

Answer: C

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8. The lone pair of amines makes them basic. They react with acids to form acid-base salts. Amines are more basic than alcohols, ethers and water. When an amine is dissolved in water, an equilibrium is established , where water acts as an acid and transfer a proton to the amine. The basic strength of an amine can be measured by basicity constant K_b.

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pK_b order of the following compound is :

(I) NH_2OH $(II)NH_2NH_2$ $(III)NH_3$ $(IV)H_2O$

A. $IV > I > II > III$

B. $III > II > I > IV$

C. $I > IV > II > III$

D. $III > I > II > IV$

Answer: A

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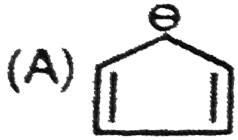
9. The lone pair of amines makes them basic. They react with acids to form acid-base salts. Amines are more basic than alcohols, ethers and water. When an amine is dissolved in water, an equilibrium is established , where water acts as an acid and transfer a proton to the amine. The basic strength of an amine can be measured by basicity constant K_b.

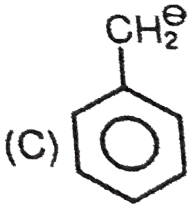
Arylamines are less basic than alkylamines because the lone pair of nitrogen is delocalised with the aromatic ring and are less available for donation.

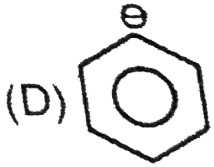
Substituted arylamines can be either more basic or less basic than aniline , depending on the substituted . ERG substituents, such as $-CH_3$, $-NH_2$ and $-OCH_3$ increases the basicity and EWG substituents , such as $-Cl$, $-NO_2$ and $-CN$ decreases basicity. While sp^2- hybridized nitrogen atom in pyridine is less basic then the sp^3 -hybridized nitrogen in an alkylamine.

The most basic carbanion is :

A. 

B. $CH \equiv \overset{\ominus}{C}$

C. 

D. 

Answer: D

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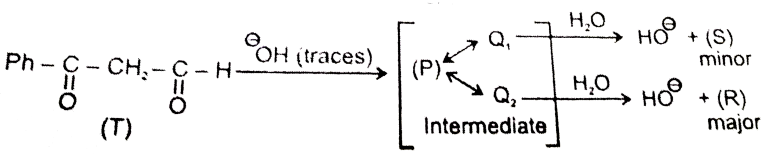
10. Observe the following reaction and answer the following questions :



The product 'R' is :

A. $Ph - \underset{\underset{OH}{|}}{C} = C = \underset{\underset{OH}{|}}{C} - H$

B. $Ph - \underset{\underset{O}{||}}{C} - CH = \underset{\underset{OH}{|}}{C} - OH$

C. $Ph - \underset{\underset{O}{||}}{C} - CH = \underset{\underset{OH}{|}}{C} - H$

D. $Ph - \underset{\underset{OH}{|}}{C} = CH - \underset{\underset{O}{||}}{C} - H$

Answer: D

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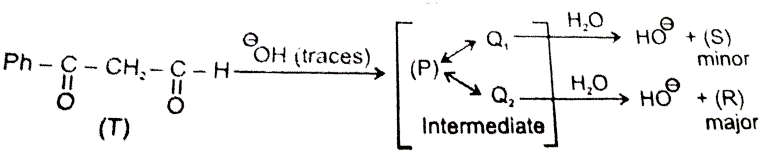
11. Observe the following reaction and answer the following questions :



The structure of Q_1 is :

A. $Ph - \underset{\underset{O^{\ominus}}{|}}{C} = CH - \underset{\underset{O}{||}}{C} - H$

B. $Ph - \underset{\underset{O^{\ominus}}{|}}{C} = C = \underset{\underset{O^{\ominus}}{|}}{C} - H$

C. $Ph - \underset{\underset{O}{||}}{C} - CH = \underset{\underset{O^{\ominus}}{|}}{C} - H$

D. $Ph - \underset{\underset{O}{||}}{-} \overset{\ominus}{C}H - \underset{\underset{O}{||}}{C} - H$

Answer: C

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12. Answer questions 1, 2 and 3 by appropriately matching the information given in the three columns of the following table.

Regarding transition of electrons, match the entries of column 1 with the entries of column 2 and column 3.

Column 1		Column 2		Column 3	
(I)	n = 5 to n = 2	(i)	Lyman series	(P)	Visible range
(II)	n = 8 to n = 4	(ii)	Brackett series	(Q)	Ultravoilet range
(III)	n = 3 to n = 1	(iii)	Paschen series	(R)	Infrared range
(IV)	n = 4 to n = 3	(iv)	Balmer series	(S)	None of these

A. (III) (iii)(P)

B. (II)(ii)(R)

C. (IV)(iv)(Q)

D. (I)(iii)(P)

Answer: C

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Exercise-3 Part:I JEE(Advanced)/IIT-JEE Problems (Previous Years)

1. Which of the following acids has the smallest value of dissociation constant?

A. $CH_3CHFCOOH$

B. FCH_2CH_2COOH

C. $BrCH_2CH_2COOH$

D. $CH_3CHBrCOOH$

Answer: C

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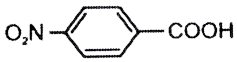
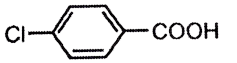
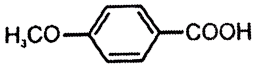
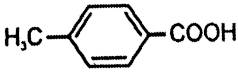
2. Match the K_a values:

	Compounds		K_a
(a)	Benzoic acid	(i)	3.3×10^{-5}
(b)		(ii)	6.3×10^{-5}
(d)		(iii)	30.6×10^{-5}
(e)		(iv)	6.4×10^{-5}
(f)		(v)	4.2×10^{-5}

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3. Compound (A) of molecular formula $C_9H_7O_2Cl$ exists in ketoform and predominantly in enolic form (B). On oxidation with $KMnO_4$, (A) gives m-chlorobenzoic acid. Identify (A) and (B).

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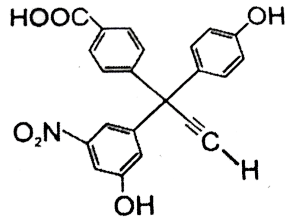
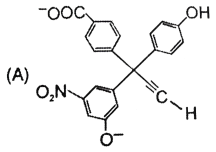
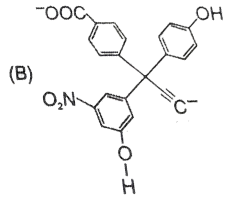
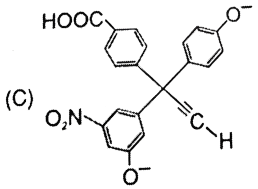
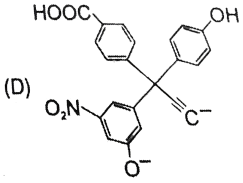
4. 

$\xrightarrow{\text{2 moles } NaNH_2}$ A. The product A will be - . The product A will be-

A. 

B. 

C. 

D. 

Answer: A

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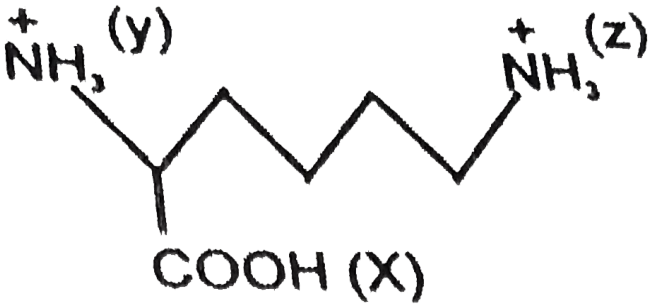
5. What is the acidity order of x,y & z ?



A. $x > y > z$

B. $x > z > y$

C. $y > z > x$

D. $z > y > x$

Answer: A

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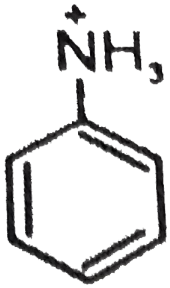
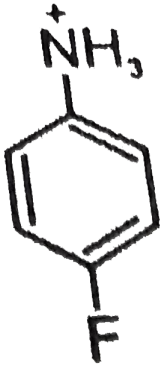
6. Which one of the following two compounds is the stronger acid ? Explain why?





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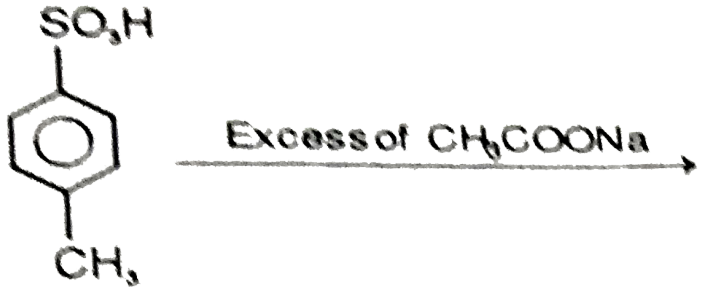
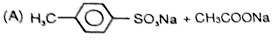
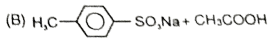
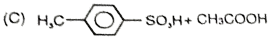
7.

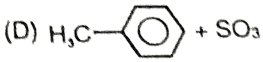


The products will be :

A. 

B. 

C. 

D. 

Answer: B

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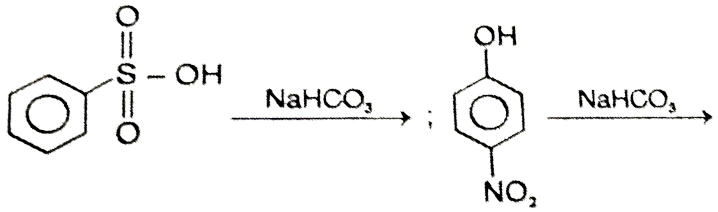
8. 

Benzenesulphonic acid and para nitrophenol react with $NaHCO_3$ separately. The gases produced are respectively.

A. SO_2, CO_2

B. SO_2, CO

C. SO_2, NO_2

D. CO_2, CO_2

Answer: D

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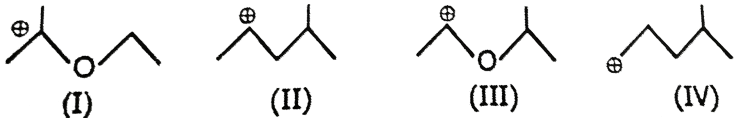
9. The correct stability order for the following species is :



A. $(II) > (IV) > (I) > (III)$

B. $(I) > (II) > (III) > (IV)$

C. $(II) > (I) > (IV) > (III)$

D. $(I) > (III) > (II) > (IV)$

Answer: D

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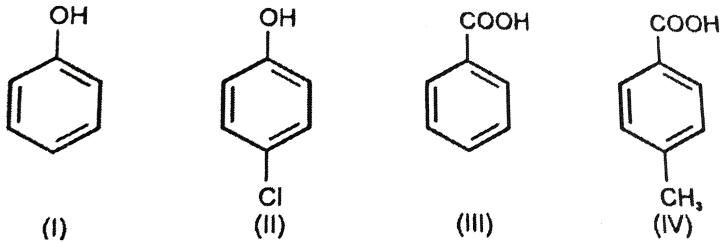
10. The correct acidity order of the following is :



A. $(III) > (IV) > (II) > (I)$

B. $(IV) > (III) > (I) > (II)$

C. $(III) > (II) > (I) > (IV)$

D. $(II) > (III) > (IV) > (I)$

Answer: A

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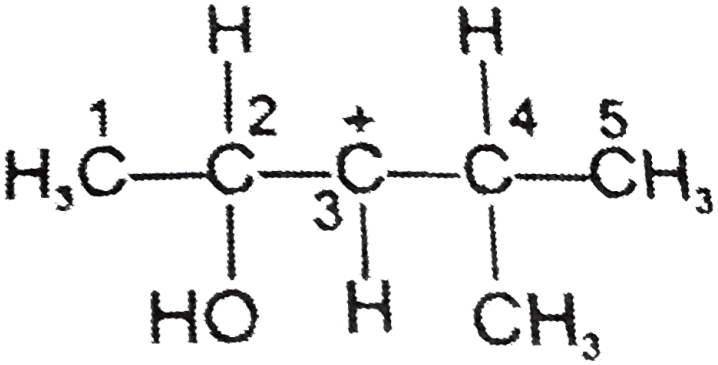
11. In the following carbocation, H / CH_3 that is most likely to migrate to the positively charged carbon is



A. CH_3 at C-4

B. H at C-4

C. CH_3 at C-2

D. H at C-2

Answer: D

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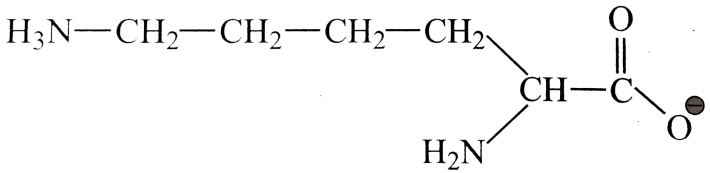
12. The total number of basic groups in the following form of lysine is :



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13. Among the following compounds the most acidic is

A. p-nitrophenol

B. p-hydroxybenzoic acid

C. o-hydroxybenzoic acid

D. p-toluic acid

Answer: C

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14. The carboxyl functional group$(-COOH)$ is present in:

A. picric acid

B. barbituric acid

C. ascorbic acid

D. aspirin

Answer: D

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15. The compound that does not liberate CO_2 on treatment with aqueous sodium bicarbonate solution , is

A. Benzoic acid

B. Benzenesulphonic acid

C. Salicylic acid

D. Carbolic acid (Phenol)

Answer: D

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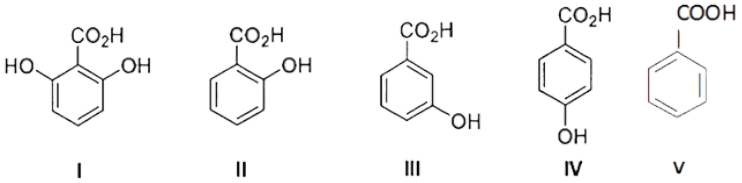
16. The correct order of acidity for the following compounds is



A. $I > II > III > IV$

B. $III > I > II > IV$

C. $III > IV > II > I$

D. $I > III > IV > II$

Answer: A

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17. The order of basicity among the following compounds is

A. $II > I > IV > III$

B. $I > IV > III > II$

C. $IV > II > III > I$

D. $IV > I > II > III$

Answer: D

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Exercise-3 Part:II JEE(MAIN)/AIEEE PROBLEMS (PREVIOUS YEARS)

1. The correct order of increasing basic nature for the bases $NH_3. NH_2$ and $(CH_3)_2NH$ is :

A. $CH_3NH_2 < NH_3 < (CH_3)_2NH$

B. $(CH_3)_2NH < NH_3 < CH_3NH_2$

C. $NH_3 < CH_3NH_2 < (CH_3)_2NH$

D. $CH_3NH_2 < (CH_3)_2NH < NH_3$

Answer: C

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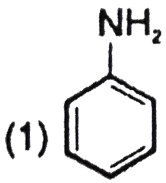
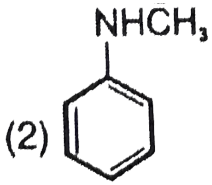
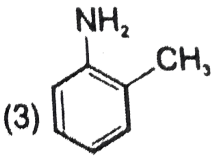
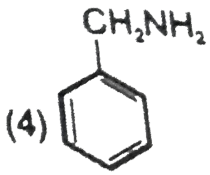
2. Which of the following is the strongest base ?

A. 

B. 

C. 

D. 

Answer: D

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3. Consider the acidity of the carboxylic acids :

$(i) PHCOOH \quad (ii) o - NO_2C_6H_4COOH \quad (iii) p - NO_2C_6H_4COOH$

A. $i > ii > iii > iv$

B. $ii > iii > iv > i$

C. $iii > ii > iv > i$

D. $ii > iv > iii > i$

Answer: B

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4. Among the following acids which has the lowest pk_a value-

A. CH_3CH_3OH

B. $(CH_3)_2CH - COOH$

C. $HCOOH$

D. CH_3COOH

Answer: C

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5. Amongest the following the most basic compounds is-

A. p-Nitroaniline

B. Acetanilide

C. Aniline

D. Benzylamine

Answer: D

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6. The increasing order of stability of the following free radicals is

A. $(CH_3)_2\dot{C}H < (CH_3)_3\dot{C} < (C_6H_5)_2\dot{C}H < (C_6H_5)_3\dot{C}$

B. $(C_6H_5)_2\dot{C} < (C_6H_5)_2\dot{C}H < (CH_3)_3\dot{C} < (CH_3)_2\dot{C}H$

C. $(C_6H_5)_2H\dot{C} < (C_6H_5)_3 < (CH_3)_3\dot{C} < (CH_3)_2\dot{C}H$

D. $(CH_3)_2H\dot{C} < (CH_3)_3\dot{C} < (C_6H_5)_3\dot{C} < (C_6H_5)_2\dot{C}H$

Answer: A

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7. The correct order of increasing acid strength of the compounds is

(a). CH_3CO_2H

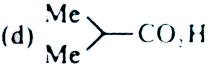
(b). $MeOCH_2CO_2H$

(c) CF_3CO_2H

(a) CH_3CO_2H

(b) $MeOCH_2CO_2H$

(c) CF_3CO_2H

(d) 

(1) d < a < c < b

(2) d < a < b < c

(3) a < d < c < b

(d)

A. $b < d < a < c$

B. $d < a < c < d$

C. $d < a < b < c$

D. $a < d < c < b$

Answer: C

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8. Which one of the following is the strongest base in aqueous solution ?

A. Dimethylamine

B. Methylamine

C. Trimethylamine

D. Aniline

Answer: A

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9. Arange the carbanions, $(CH_3)_3\bar{C}, \bar{C}Cl_3, (CH_3)_2\bar{C}H, C_6H_5\bar{C}H_2$, in order of their decreasing stability

A. $(CH_3)_2\bar{C}H > \bar{C}Cl_3 > C_6H_5\bar{C}H_2 > (CH_3)_3\bar{C}$

B. $\bar{C}Cl_3 > C_6H_5\bar{C}H_2 > (CH_3)_2\bar{C}H > (CH_3)_3\bar{C}$

C. $(CH_3)_3\bar{C} > (CH_3)_2\bar{C}H > C_6H_6\bar{C}H_2 > \bar{C}Cl_3$

D. $C_6H_5\bar{C}H_2 > \bar{C}Cl_3 < (CH_3)_3\bar{C} > (CH_3)_2\bar{C}N$

Answer: B

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10. The correct order of increasing basicity of the given conjugate bases $(R = CH_3)$ is

A. $RCO\overline{O} < HC \equiv \overline{C} < \overline{N}H_2$

B. $\overline{R} < HC \equiv RCO\overline{O} < \overline{N}H_2$

C. $RCO\overline{O} < \overline{N}H_2 < HC \equiv \overline{C} < \overline{R}$

D. $RCO\overline{O} < HC \equiv \overline{C} < \overline{N}H_2 < \overline{R}$

Answer: D

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11. The strongest acid amongst the following compounds is?

A. CH_3COOH

B. $HCOOH$

C. $CH_3CH_2CH(Cl)CO_2H$

D. $ClCH_2CH_2CH_2COOH$

Answer: C

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12. Identify the compound that exhibits tautomerism:

2-butene

lactic acid

2-pentanone

phenol

A. 2-Butene

B. Lactic acid

C. 2-Pentanone

D. Phenol

Answer: C

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13. The correct order of acid strength of the following compounds:

A. Phenol

B. p-Cresol

C. m-Nitrophenol

D. p-Nitrophenol

Answer: A

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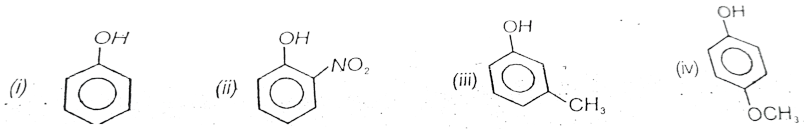
14. Arrange the following in decreasing order of acidic nature of



A. $II > IV > I > III$

B. $I > II > III > IV$

C. $III > I > II > IV$

D. $IV > III > I > II$

Answer: C

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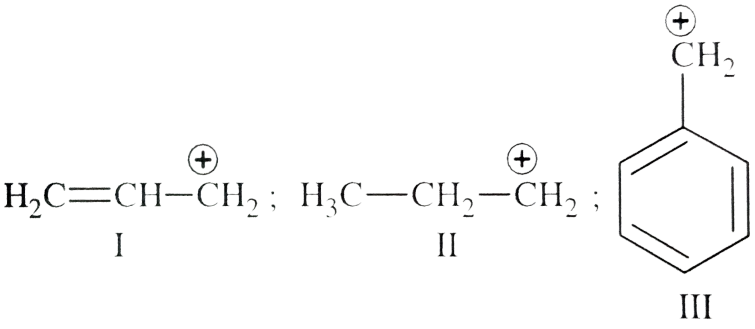
15. The order of stability of the following carbocations:



A. $III > II > I$

B. $II > III > I$

C. $I > II > III$

D. $III > I > II$

Answer: D

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16. Considering the basic strength of amines in aqueous solution, which one has the smallest pK_b value ?

A. $(CH_3)_2Nh$

B. CH_3NH_2

C. $(CH_3)_3N$

D. $C_6H_5NH_2$

Answer: A

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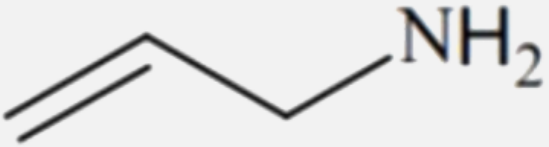
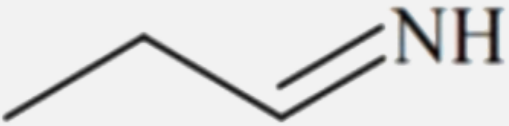
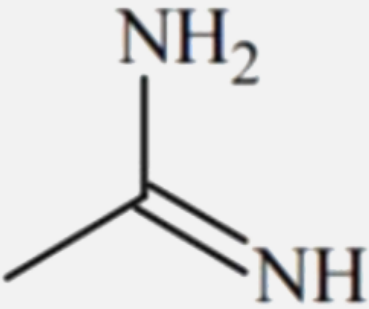
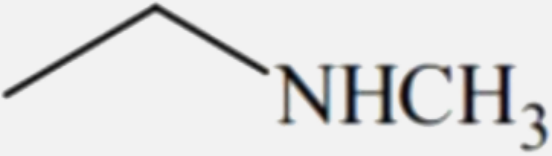
17. The increasing order of basicity of the following compounds is

(1) 

(2) 

(3) 

(4) 

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

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

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

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

Answer: A

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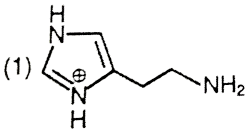
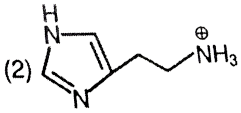
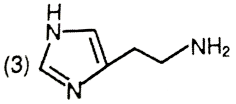
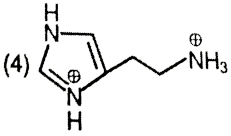
18. The predominant form of histamine present in human blood is (pK_a , Histidine=6.0)

A. 

B. 

C. 

D. 

Answer: B

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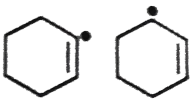
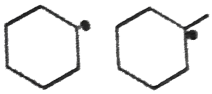
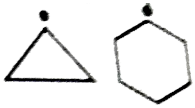
Exercise-3 Part:II JEE(MAIN) ONLINE PROBLEMS

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

A. (1) 

B. (2) 

C. (3) 

D. $Ph_3C^{\cdot}$, $(CH_3)C^{\cdot}$

Answer: D

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2. Which one of the following statements is not correct ?

A. Alcohols are weaker acids than water.

B. Acid strength of alcohols decreases in the following order

$RCH_2OH > R_2CHOH > R_3COH$

C. Carbon-oxygen bond length in methanol , CH_3OH is shorter than that of C-O bond length in phenol.

D. (4) The bond angle  in methanol is 108.9°.

Answer: C

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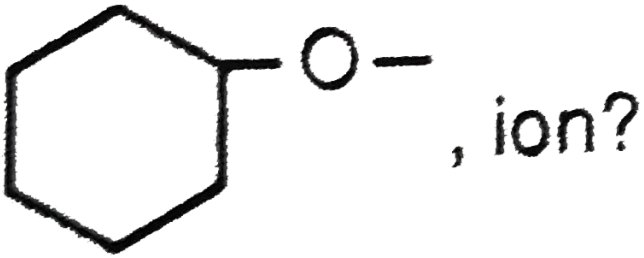
3. Which one of the following substituents at para-position is most effective in stabilizing the phenoixde



, ion ?

A. $-CH_3$

B. $-OCH_3$

C. $-COCH_3$

D. $-CH_2OH$

Answer: C

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4. Which of the following will not be soluble in sodium hydrogen carbonate?

A. 2,4,6-Trinitrophenol

B. Benzoic acid

C. o-Nitrophenol

D. Benzene sulphonic acid

Answer: C

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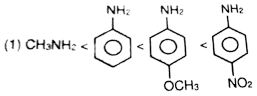
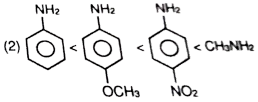
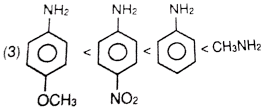
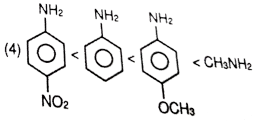
5. Arrange the following amines in the order of increasing basicity :-

A. 

B. 

C. 

D. 

Answer: D

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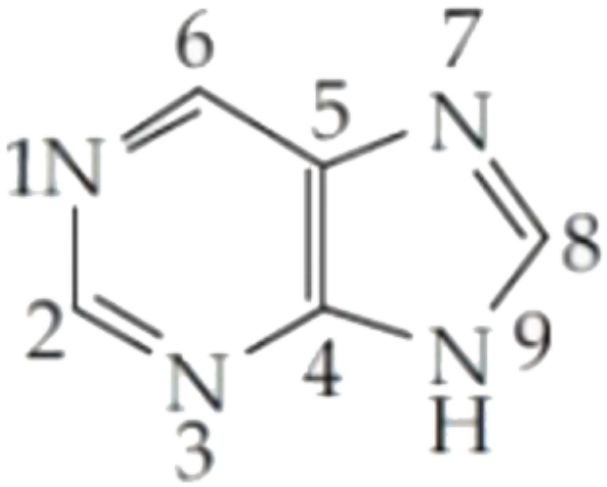
6. The "N" which contribute least to the basicity for the compound is :



A. N 7

B. N 1

C. N 9

D. N 3

Answer: C

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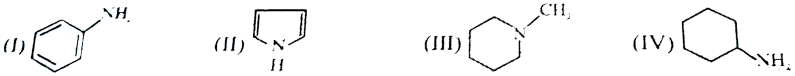
7. Among the following compounds, the increasing order of their basic strength is-



A. $(I)g < (II) < (III) < (IV)$

B. $(I) < (II) < (IV) < (III)$

C. $(II) < (I) < (III) < (IV)$

D. $(II) < (I(< (IV) < (III)$

Answer: D

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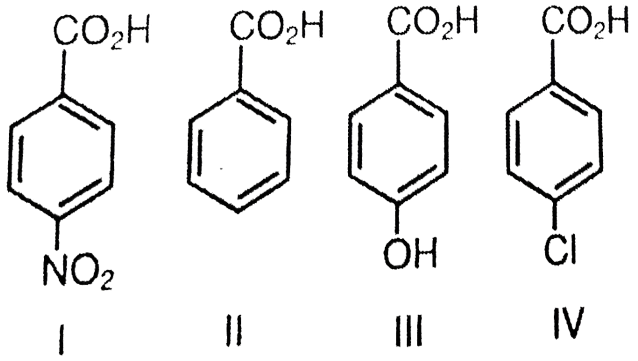
8. The inceasing order of the acidity of the following carboxylic acids is :



A. $I < III < II < IV$

B. $IV < II < III < I$

C. $II < IV < III < I$

D. $III < II < IV < I$

Answer: D

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9. Which amongst the following is the strongest acid ?

A. $CHBr_3$

B. $CHCl_3$

C. CHl_3

D. $CH(CN)_3$

Answer: D

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10. The correct decreasing order for acid strength is :

A.

$$CHCH_2COOH > O_2NCH_2COOH < FCH_2COOH < ClCH_2CO$$

B. $FCH_2COOH > NCCH > NO_2CH_2COOH > ClCH_2COOH$

C.

$$NO_2CH_2COOH > NCCH_2COOH > FCH_2COOH > ClCH_2CO$$

D.

$$NO_2CH_2COOH > FCH_2COOH > CNCH_2COOH > ClCH_2CO$$

Answer: C

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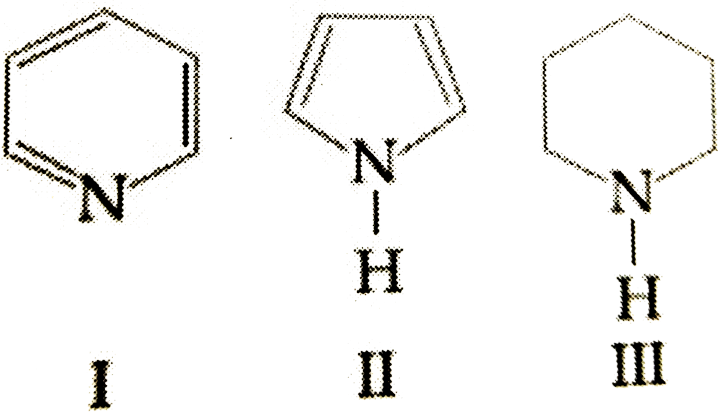
11. Arrange the follwing amines in the decreasing order of basicity :



I II III

A. $I > III > II$

B. $III > I > II$

C. $III > II > I$

D. $I > II > III$

Answer: B

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12. The increasing basicity order of the following compounds is:

(A) $CH_3CH_2NH_2$

(B) $CH_3CH_2\underset{\displaystyle H}{\overset{\displaystyle CH_2CH_3}{\overset{|}{\underset{|}{N}}}}$

(C) $H_3C-\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{N}}}-CH_3$

(D) $Ph-\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{N}}}-H$

A. $(A) < (B) < (C) < (D)$

B. $(D) < (C) < (B) < (A)$

C. $(A) < (B) < (D) < (C)$

D. $(D) < (C) < (A) < (B)$

Answer: D

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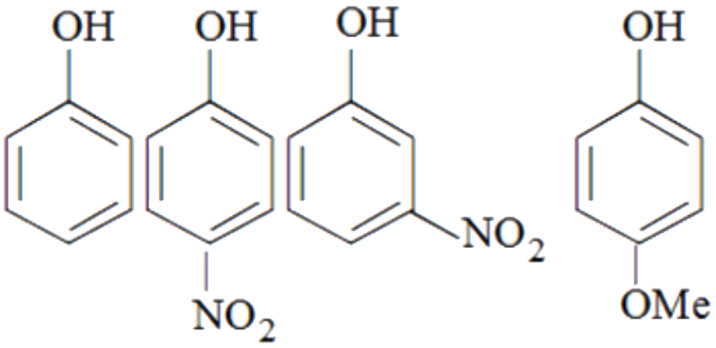
13. The increasing order of the pK_a values of the following compounds is



A B C D

A. $C < B < A < D$

B. $B < C < D < A$

C. $B < C < A < D$

D. $D < A < C < B$

Answer: C

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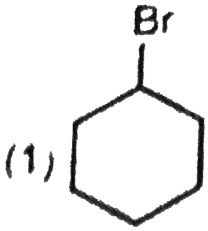
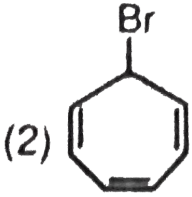
14. Which of the following compounds will produce a precipitate with $aGno_3$?

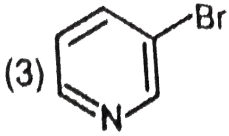
A.



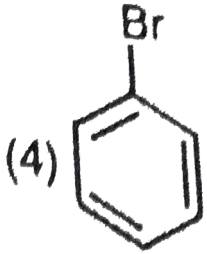
B.



C.



D.



Answer: B

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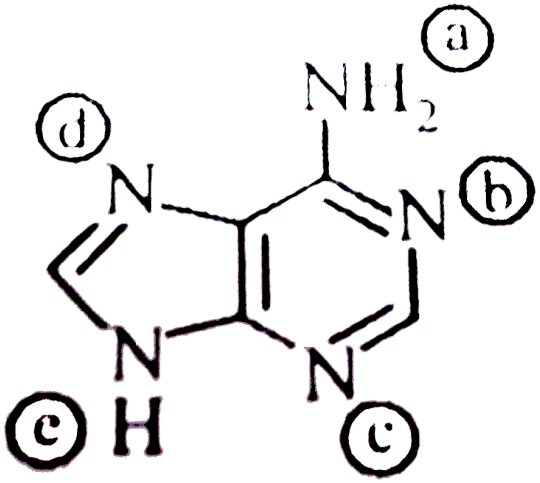
15. In the following compound,



The favourable site/s for protonation is/are:

A. a and e

B. a and d

C. b ,c and d

D. a

Answer: C

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16. The correct order for acid strength of compounds

$CH \equiv CH, CH_3 - C \equiv CH$ and $CH_2 = CH_2$

A. $CH_3 - C = CH > CH = CH > CH_2$

B. $CH_3 - C \equiv Ch > CH_2 = CH_2 > HC = CH$

C. $HC = CH > CH_3 - C = CH > CH_2 = CH_2$

D. $CH = CH > CH_2 = CH_2 > CH_3 - C = CH$

Answer: C

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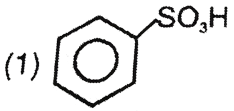
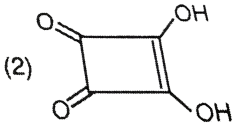
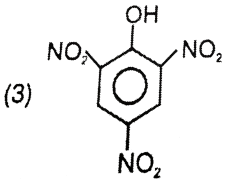
1. Which of the following would produce effervescence with sodium bicarbonate ?

A. (1) 

B. (2) 

C. (3) 

D. All of these

Answer: D

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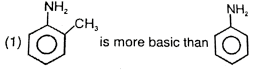
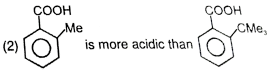
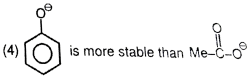
2. Select correct statement from the following:

A. 

B. 

C. $HC \equiv CH$ is more acidic than NH_3

D. 

Answer: C

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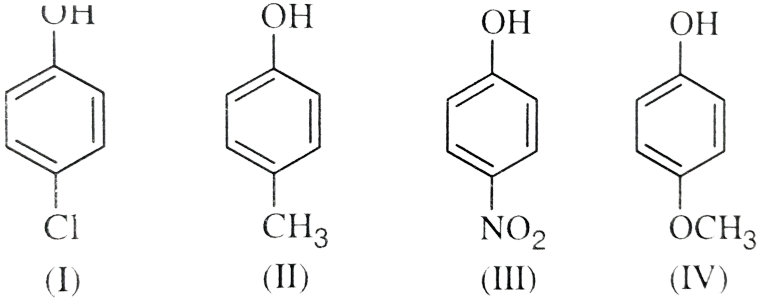
3. Arrange the following compounds in order of decreasing acidity:



A. $(i) > (ii) > (iii) > (iv)$

B. $(iii) > (i) > (ii) > (iv)$

C. $(iv) > (iii) > (i) > (ii)$

D. $(ii) > (iv) > (i) > (iii)$

Answer: B

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4. The order of decreasing basicity in the four halide ions is :

A. $I^- > Br^- > Cl^- > F^-$

B. $Cl^- > Br^- > I^- > F^-$

C. $F^- > Cl^- > Br^- > I^-$

D. $Cl^- > F^- > Br^- > I^-$

Answer: C

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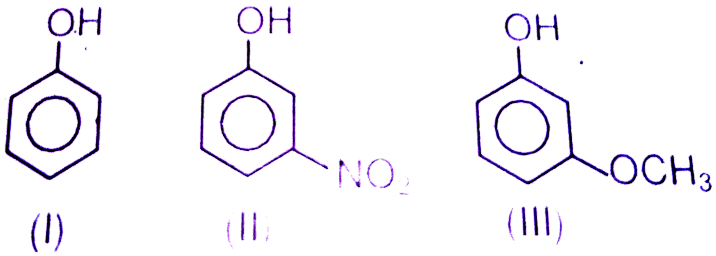
5. Correct order of acidic strength



(I) (II) (III)

A. $(iv) > (i) > (ii) > (iii)$

B. $(iv) > (iii) > (ii) > (i)$

C. $(iv) > (ii) > (iii) > (i)$

D. $(ii) > (iv) > (i) > (iii)$

Answer: C

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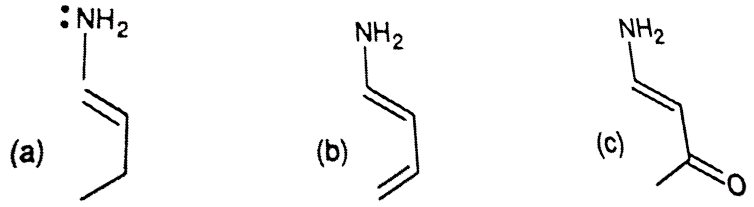
6. Which of the following is incorrect about the given molecules



A. The correct order of basic strength (K_b) is $a > b > c$

B. The correct order of C-N bond length is : $a > b > c$

C. The correct C=C bond length order is $a > b > c$

D. The correct pK_b order is : $c > b > a$

Answer: C

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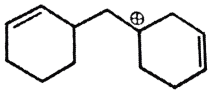
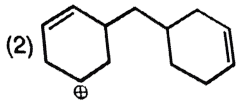
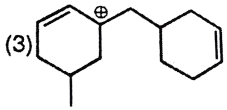
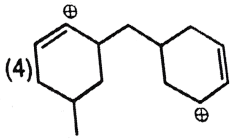
7. Which of the following is the most stabilized carbocation ?

A. (1)



B. 

C. 

D. 

Answer: C

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8. Which one among the following is the least basic:

A. $\overset{\ominus}{C}H_3$

B. $\overset{\ominus}{N}H_2$

C. $\overset{\ominus}{O}H$

D. $\overset{\ominus}{F}$

Answer: D

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9. Which is most basic in aqueous solution ?

A. CH_3NH_2

B. $(CH_3)_2NH$

C. $(CH_3)_3N$

D. $Ph - NH_2$

Answer: B

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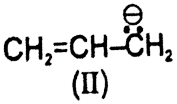
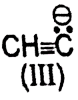
10. Stability order of given anions is :

(I)



(II)



(III)

A. $I > III > II$

B. $I > II > III$

C. $III > II > I$

D. $III > I > II$

Answer: A

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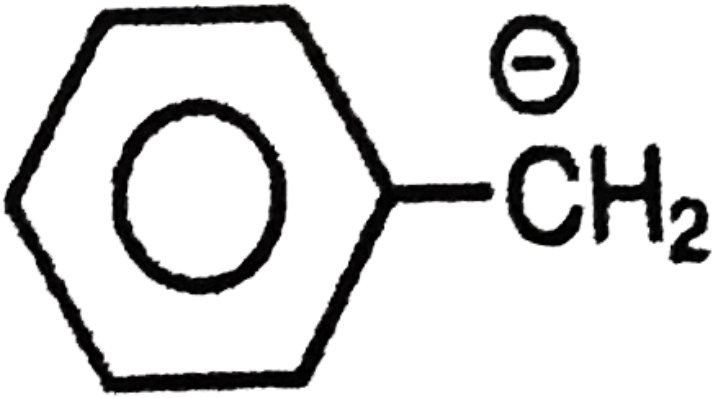
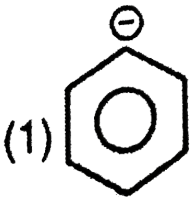
11. Which is less basic than benzyl

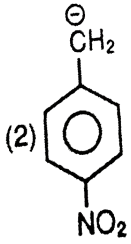


carbanion ?

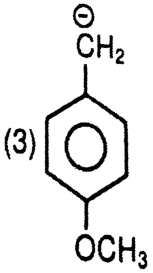
A.



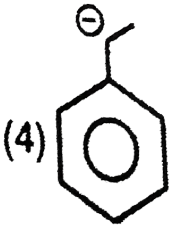
B.



C.



D.



Answer: B

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12. The decreasing order of acidic strength among trichloroacetic acid (I), trifluoroacetic acid (II), acetic acid (III) and formic acid (IV) is:

A. $B > A > D > C$

B. $B > D > C > A$

C. $A > B > C > D$

D. $A > C > B > D$

Answer: A

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13. Consider the following carbanions

$(i) CH_3 - \overset{\ominus}{C}H_2 \quad (ii) CH_2 = \overset{\ominus}{C}H \quad (iii) CH \equiv \overset{\ominus}{C}$

Correct order of stability of these carbanions in decreasing order is

A. $(ii) > (i) > (iii)$

B. $(iii) > (ii) > (i)$

C. $(i) > (iii) > (ii)$

D. $(i) > (ii) > (iii)$

Answer: D

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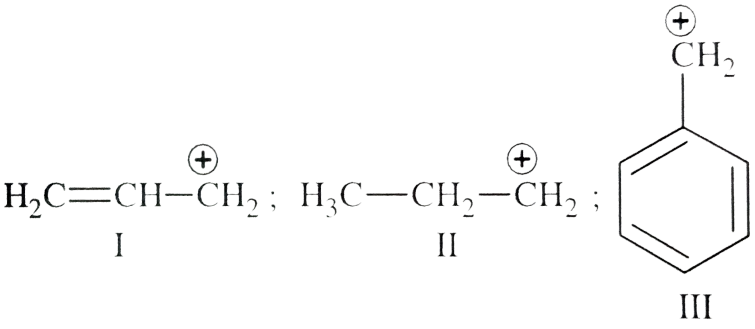
14. The order of stability of the following carbocations:



A. $II > III > I$

B. $I > II > III$

C. $III > I > II$

D. $III > II > I$

Answer: C

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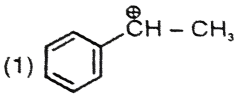
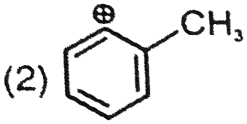
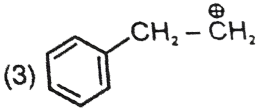
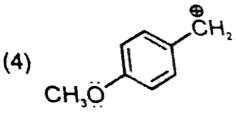
15. The most stable carbocation is

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: D

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16. Pyridine is less basic than triethylamine because

A. Pyridine has aromatic character

B. Nitrogen in pyridine is sp^2 hybridised

C. Pyridine is a cyclic system

D. In pyridine, lone pair of nitrogen is delocalised.

Answer: B

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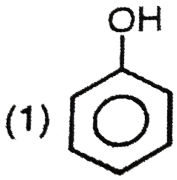
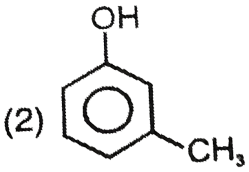
17. Which is the following phenol has lowest pK_a ?

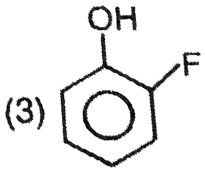
A.



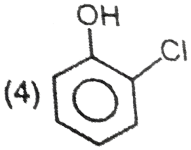
B.



C.



D.



Answer: D

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18. Which is most basic among the followings ?

A. $Ph - NH_2$

B. NH_3

C. $CH_3 - NH_2$

D. $C_2H_5 - CN$

Answer: C

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19. Assertion:The pK_a of acetic acid is lower than that of phenol.

Reason:Phenoxide ion is more resonance stablised.

A. If both assertion and reason are true and reason is a correct explanation of assertion.

B. If both assertion and reason are true but reason is not a correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: C

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

$$CH_2 = \underset{I}{\overset{OH}{\overset{|}{C}} - CH_2} - \overset{O}{\overset{||}{C}} - CH_3 \Leftrightarrow CH_3 - \overset{O}{\overset{||}{C}} - \underset{II}{CH_2} - \overset{O}{\overset{||}{C}} - CH_3 \Leftrightarrow CH_3$$

A. $III > II > I$

B. $II > I > III$

C. $II > III > I$

D. $I > II > III$

Answer: A

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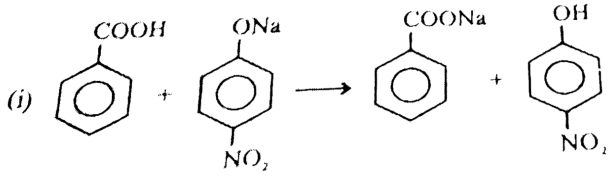
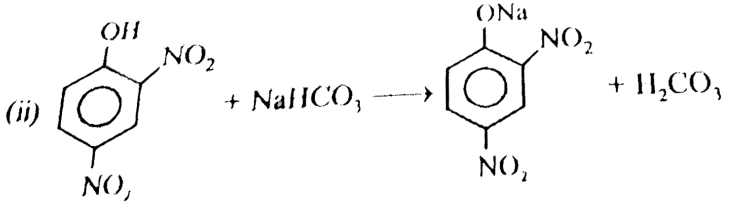
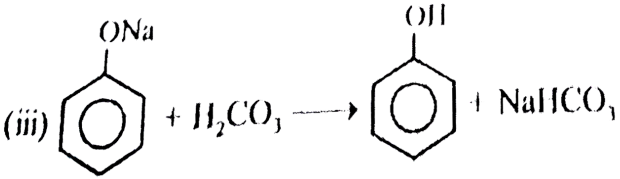
21. Observe the following feasible reaction:





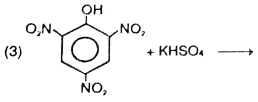


Q. Identify the feasible reactions

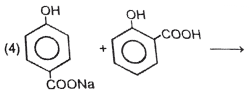
A. $CH_3COOH + NaCl \rightarrow$

B. $C_6H_5COOH + KBr \rightarrow$

C.



D.



Answer: D

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22. In which of following carbocation rearrangement take place with change carbon skeleton :

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

B. $CH_3 - CH_2 - \overset{\oplus}{C}H_2$

C. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_2 - \overset{\oplus}{C}H_2$

D. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_2 - \overset{\oplus}{C}H_2$

Answer: A::D

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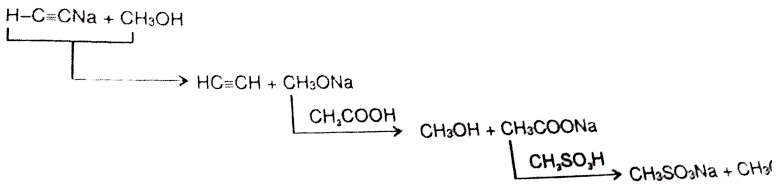
23. Observer the following reaction sequence.



Which is correct acidic strength order :

A. $HC \equiv Ch > CH_3COOH > CH_3SO_3H$

B. $CH_3SO_3H > CH_3COOH > HC \equiv CH$

C. $CH_3SO_3H > HC \equiv CH > CH_3COOH$

D. $CH_3COOH > CH_3SO_3H > HC \equiv CH$

Answer: B

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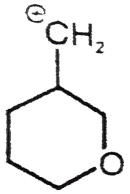
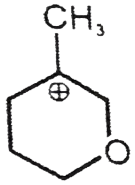
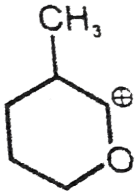
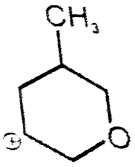
24. Most stable carbocation among the following is

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: C

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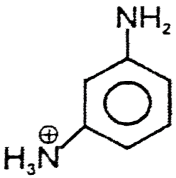
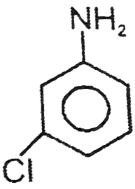
25. Select the most basic compound.

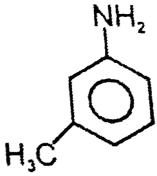
A. (1)



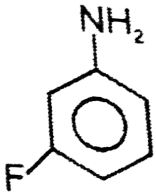
B. (2)



C. (3)



D. (4)



Answer: C

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26. Which of the following compounds will have highest enolic content?

A. CH_3COOCH_3

B. CH_3COCH_3

C. $CH_3 - \underset{\underset{O}{||}}{C} - CH_2 - CHO$

D. $CH_3 - \underset{\underset{O}{||}}{C} - CH_2 - \underset{\underset{O}{||}}{C} - OCH_3$

Answer: C

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27. The hydride ion H^- is stronger base than its hydroxide ion OH^- Which of the following reaction will occur if sodium hydride (NaH) is dissolved in wate?

A. $CH_3 - NH_2$

B. $CH_3 - CH_2 - O^-$

C. F^-

D. $Ph - NH_2$

Answer: B

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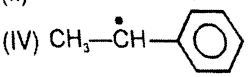
28. Give the stability order of following radicals :

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

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

(III) $CH_2=CH-\dot{C}H-CH_3$

(IV) 

A. $III > IV > II > I$

B. $IV > III > II > I$

C. $I > II > III > IV$

D. $IV > II > III > I$

Answer: B

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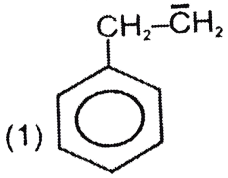
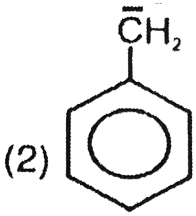
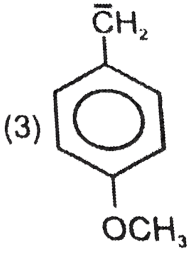
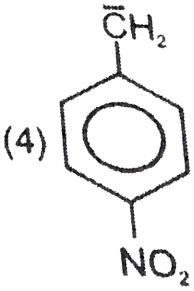
29. The most stable carbanion among the following is

A. 

B. 

C. 

D. 

Answer: D

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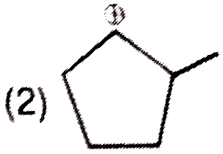
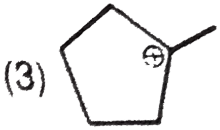
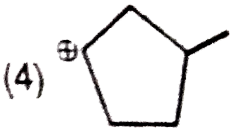
30. Which of the following is the most stabilized carbocation ?

A. 

B. 

C. 

D. 

Answer: C

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Part-II: NSEC (Stage-I)

1. Which is the following is the strongest acid ?

A. 3,5-dinitrophenol

B. 2,4-dinitrophenol

C. phenol

D. 2,4,6-trinitrophenol

Answer: D

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2. Identify the correct statement regarding effect of Cl atom bonded to the carbon atom adjacent to a carbocation carbon ?

A. It has no effect on the stability of the carbocation

B. It destabilizes the carbocation

C. It stabilitizes the carbocation

D. Cannot predict its effect on the carbocation from the given information.

Answer: B

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3. Which of the following is the strongest base ?

A. $HC \equiv C^-$

B. $CH_2 = CH^-$

C. $CH_3CH_2^-$

D. NH_2^-

Answer: C

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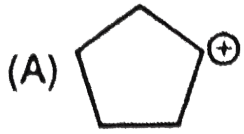
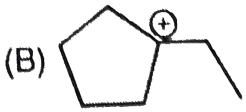
4. Select the most stable carbocation:

A. 

B. 

C. 

D. 

Answer: B

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5. Which of the following orders is true regarding the acidic nature of phenols ?

A. phenol $>$ o-cresol $<$ nitrophenol

B. phenol $<$ o-cresol $<$ nitrophenol

C. phenol $>$ o-cresol $>$ nitrophenol

D. phenol $<$ o-cresol $>$ nitrophenol

Answer: A

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6. Which of the following order is expected to be correct ?

A.

$$pK_a(ClCH_2COOH) > pK_a(CH_3COOH) < pK_a(CH_3CH_2COOH)$$

B.

$$pK_a(ClCH_2COOH) < pK_a(CH_3COOH) < pK_a(CH_3CH_2COOH)$$

C.

$$pK_a(ClCH_2COOH) > pK_a(CH_3COOH) > pK_a(CH_3CH_2COOH)$$

D.

$$pK_a(ClCH_2COOH) < pK_a(CH_3COOH) > pK_a(CH_3CH_2COOH)$$

Answer: B

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7. Arrange the following in the order of increasing stability:

$PhC^+H_2, Ph_3C^+, Me^+, Ph_2C^+H$

A. $Me^+ < PhC^+He < Ph_2C^+H < Ph_3C^+$

B. $PhC^+H_2 < Me^+ < Ph_3C^+ < Ph_2C^+H$

C. $PhC^+H_2 < Ph_3C^+ < Me^+ < Ph_2C^+H$

D. $PhC^+H_2 < Ph_2C^+H < Ph_3C^+ < Me^+$

Answer: A

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8. Which of the following compounds is the most acidic ?

A. HCO_2H

B. CH_3CO_2H

C. $CH_3CH_2CO_2H$

D. CCl_3CO_2H

Answer: D

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9. The acid having the highest pK_A value among the following is

A. acetone

B. formic acid

C. phenol

D. methanol

Answer: A

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10. 

The correct order of acidic character in the above compounds is

A. $a > b > c > d$

B. $c > a > d > b$

C. $b > c > a > d$

D. $a > c > b > d$

Answer: A

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11. The weakest base among the following is

A. $C_6H_5SO_3^-$

B. $C_2H_5O^-$

C. $C_6H_5O^-$

D. $CH_3 - CH = CH - CH_2 - O^-$

Answer: A

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12. The increasing order of basicity for the following intermediates is (from weak to strong)

$$\underset{\text{(i)}}{H_3C - \overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C^{\ominus}}}}}} \qquad \underset{\text{(ii)}}{H_2C = CH - \overset{\ominus}{C}H_2} \qquad \underset{\text{(iii)}}{HC = \overset{\ominus}{C}} \qquad \underset{\text{(iv)}}{\overset{\ominus}{C}H_3} \qquad \underset{\text{(v)}}{\overset{\ominus}{C}N}$$

A. $(iv) < (ii) < (i) < (iii)$

B. $(i) > (ii) > (iii) > (iv)$

C. $(i) > (ii) > (iv) > (iii)$

D. $(i) < (iv) < (ii) < (iii)$

Answer: D

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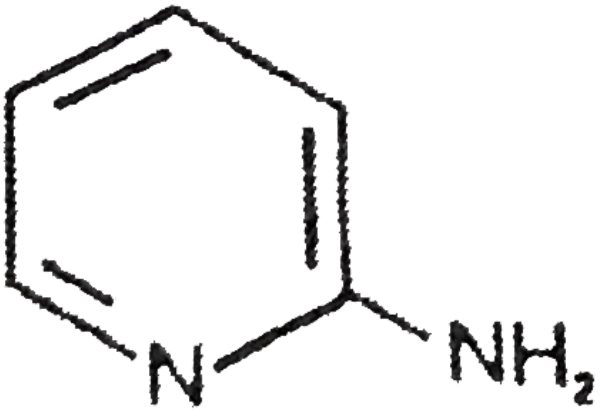
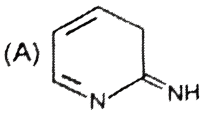
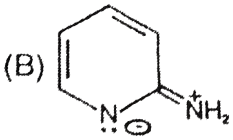
13. The proper tautomeric structure for 2-aminopyridine (X) is



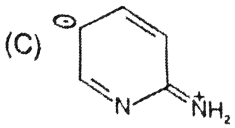
A.



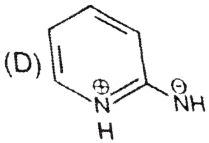
B.



C.



D.



Answer: A

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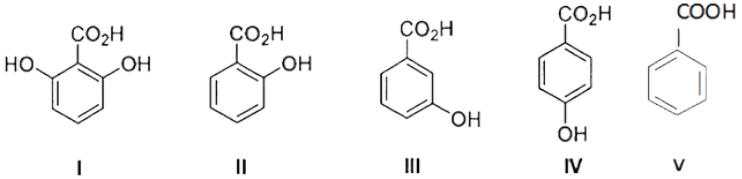
14. The correct order of acidity for the following compounds is



A. Benzoic acid $>$ phenol $>$ p-nitrobenzoic acid $>$ m-nitrobenzoic acid.

B. Phenol > p-nitrobenzoic acid > m-nitrobenzoic acid > benzoic acid

C. p-nitrobenzoic acid > m-nitrobenzoic acid > benzoic acid > phenol.

D. m-nitrobenzoic acid > p-nitrobenzoic acid > benzoic acid > phenol.

Answer: C

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15. In which case, the order of acidic strength is not correct?

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

B. $S^{2-} > HS^- > H_2S$

C. $NH_3 < OH^- > H_2O$

D. $Cl^- > Br > I^-$

Answer: C

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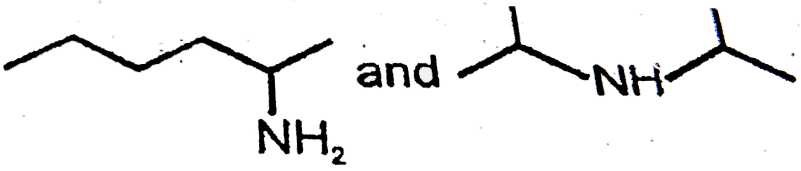
16. The given structures are :



A. 1 and 3

B. 2 and 4

C. 1 and 4

D. 2 and 3

Answer: C

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17. As the base changes from RNH_2 to R_2NH_1 to R_3N the basicity

A. $R_2NH > R_3N > RNH_2$

B. $RNH_2 > R_3H > R_2NH$

C. $RNH_2 > R_2NH > R_3N$

D. $R_3N > RNH_2 > R_2NH.$

Answer: A

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18. Which compound is the most acidic of the following ?

A. aniline

B. p-nitrophenol

C. phenol

D. acetaldehyde.

Answer: B

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19. The order of decreasing stability is :

(I) 

(II) 

(III) 

(IV) 

A. $CH_{3+} > CH_3CH_{2+} > (CH_3)_2CH^+ > (CH_3)_3C^+$

B. $CH_3CH_{2+} > CH_{3+} > (CH_3)_2CH^+ > (CH_3)_3C^+$

C. $(CH_3)_2CH^+ > CH_{3+} > CH_3CH_{2+} < (CH_3)_3C^+$

D. $(CH_3)_3C^+ > (CH_3)_2CH^+ > CH_3CH_{2+} > CH_{3+}$

Answer: D

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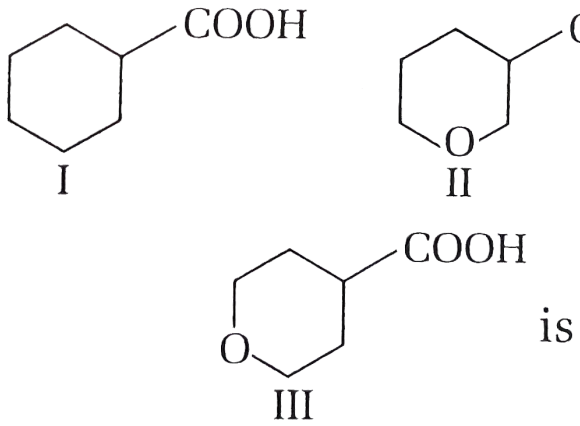
20. The correct order of strengths of the carboxylic acids



is

A. $I > II > III > IV$

B. $II > IV > I > III$

C. $III > I > IV > II$

D. $IV > II > I > III$

Answer: C

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

A. hyperconjugation

B. tautomerism

C. resonance

D. conjugation

Answer: A

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22. The correct order of acidity for the following compounds is

A. acetylene $>$ ethylene $>$ ethane

B. ethylene $>$ ethylene $>$ ethane

C. ethane $>$ ethylene $>$ acetylene

D. acetylene $>$ ethane $>$ ethylene

Answer: A

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23. Statement I : p -hydroxybenzoic acid has a lower boiling point than o-hydroxybenzoic acid.

Statement II : o-hydroxybenzoic acid has intramolecular hydrogene bonding.

A. Steric hindracne

B. Hygrogen bonding

C. Mesomeric effect

D. Solvation energy

Answer: B

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24. Which of the following compounds can be hydrolysed?

A. $HCOOH, pK_a = 3.8$

B. $H_2S, pK_a = 7.0$

C. Toluence , pK_a =41

D. $CH_3NH_2, pK_a = 40$

Answer: A

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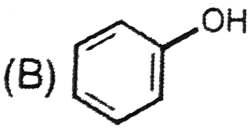
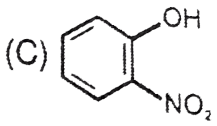
25. The most acidic compound among the following is

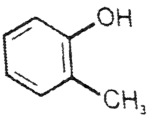
A. $Cl - CH_2 - CH_2 - OH$

B.



C.



(D) 

D.

Answer: C

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26. Keto and enol forms of a compound are related to each other as

A. Resonance structures

B. Conformations

C. Configurational isomers

D. Constitutional isomers

Answer: D

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27. The correct order of acidity of the following compounds is:

$(I)CH_3COOH \quad (II)ClCH_2COOH \quad (III)O_2NCH_2COOH \quad (IV)$

A. $IV > II > III > I$

B. $I > IV > II > III$

C. $II > III > I > IV$

D. $III > II > IV > I$

Answer: D

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28. The order of acidity of the H-atoms underlined in the following compounds is in the order:

(I) Ph-$\underline{CH_2}$-CH_3 (II) Ph–CH=CH–$\underline{CH_3}$ (III) Ph-CH=$\underline{CH_2}$ (IV) 

A. $IV > II > I > III$

B. $II > IV > III > I$

C. $III > IV > I > II$

D. $I > III > II > IV$

Answer: A

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29. Electrophiles are electron seeking species. Which of the following groups contain only electrophiles ?

A. Carbocation

B. Carbanion

C. Free radical

D. None of these

Answer: B

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30. The most stable free radical is

A. Trityl radical

B. Diphenyl methyl radical

C. 2,4,6-Tri-ter-butylphenoxy radical

D. tert-butyl radical

Answer: C

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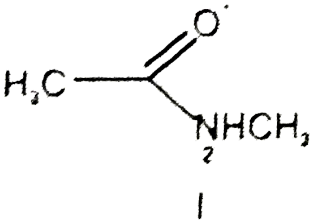
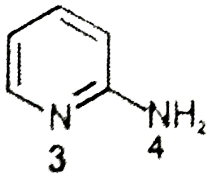
31. The preferred sites of protonation in the following compounds are



I



II

A. 1 and 3

B. 2 and 4

C. 1 and 4

D. 2 and 3

Answer: A

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32. Acetone and propen-2-ol are

A. enantiomers

B. keto-enol tautomers

C. diastereoisomers

D. meso compounds

Answer: B

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33. Which of the following compounds contain active methylene group ?

A. $CH_3CH_2NO_2$

B. $CH_3COCH_2COCH_3$

C. $PhCOCH_2CN$

D. $CH_3CH_2NH_2$

Answer: D

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34. Which of the following phenols is most soluble in aqueous sodium bicarbonate?

A. 2,4-dihydrozyacetophenone

B. p-cyanophenol

C. 3,4-dicyanophenol

D. 2,4,6-tricyanophenol

Answer: D

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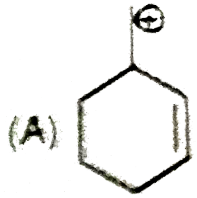
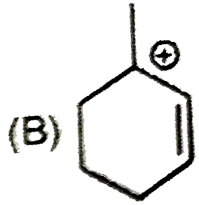
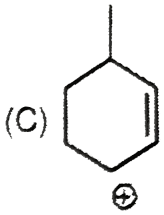
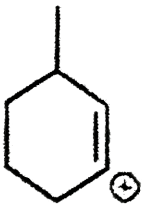
35. The most stable carbocation is

A. 

B. 

C. 

(D) 

D.

Answer: B

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36. Arrange the following anilines in decreasing order of basicity

1. $C_6H_5NH_2$

2. $o-CH_3C_6H_4NH_2$

3. $m-CH_3C_6H_4NH_2$

4. $p-CH_3C_6H_4NH_2$

A. $II > IV > I > III$

B. $III > II > IV > I$

C. $III > IV > II > I$

D. $I > II > IV > III$

Answer: C

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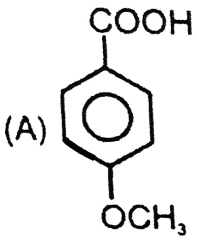
37. The pK_a value for the three ionisable groups X, Y and Z of glutamic acid are 4.3 , 9.7 and 2.2 respectively.

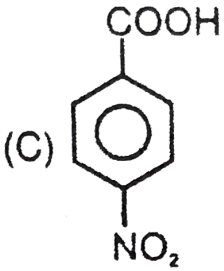
$\underset{X}{HO_2C} - CH_2 - \underset{\underset{\underset{Y}{\cdot^{\oplus} NH_3}}{|}}{CH} - \underset{Z}{CO_2H}$ The isoelectric point for the the amino acid is

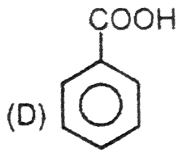
A.



B. CH_3COOH

C.





D.

Answer: C

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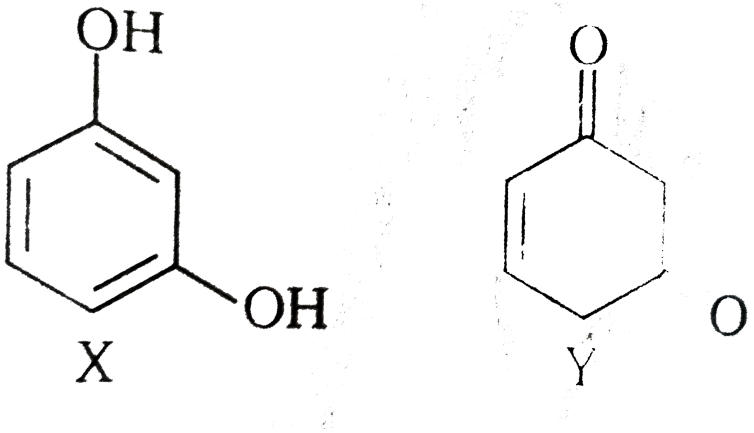
38. At normal temprature ,X and Y



A. Resonance structures

B. tautomers

C. functional isomers

D. positional isomers

Answer: B

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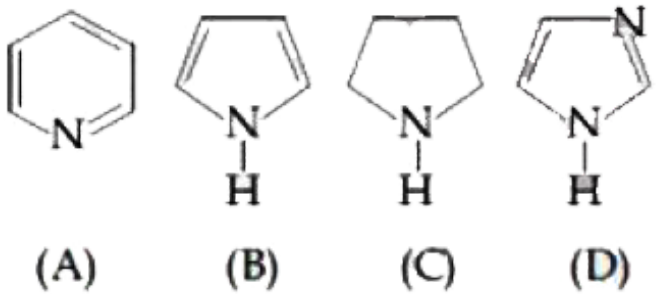
39. The increasing order of the basicity of the following compounds is :



A. $I > II > IV > III$

B. $IV > II > I > II$

C. $III > II > I > IV$

D. $I > II > III > IV$

Answer: A

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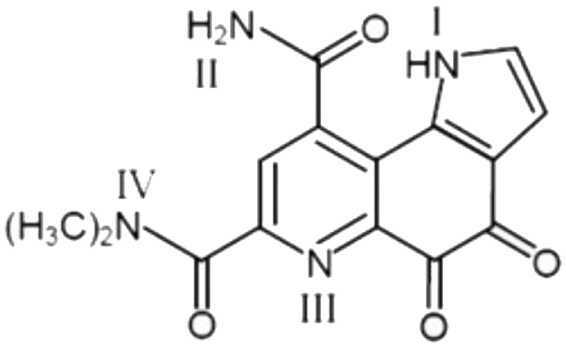
40. The most basic nitrogen in the following compound is



A. I

B. II

C. III

D. IV

Answer: C

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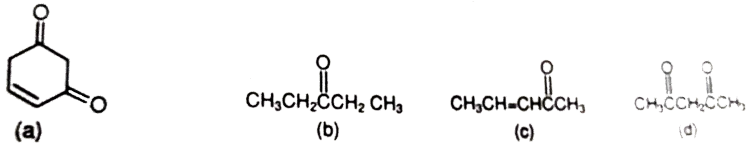
41. The order of enol content in the following molecules is



A. $a > b > c > d$

B. $a > c > d > b$

C. $a > c > b > d$

D. $a > b > c > d$

Answer: A

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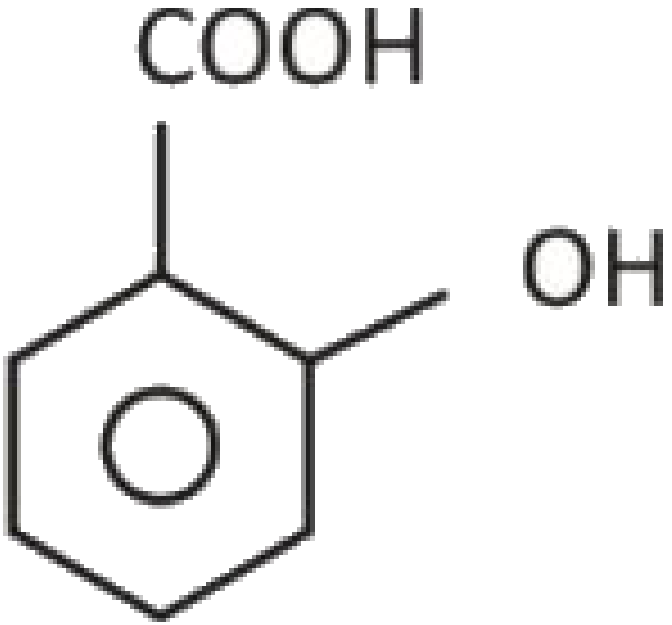
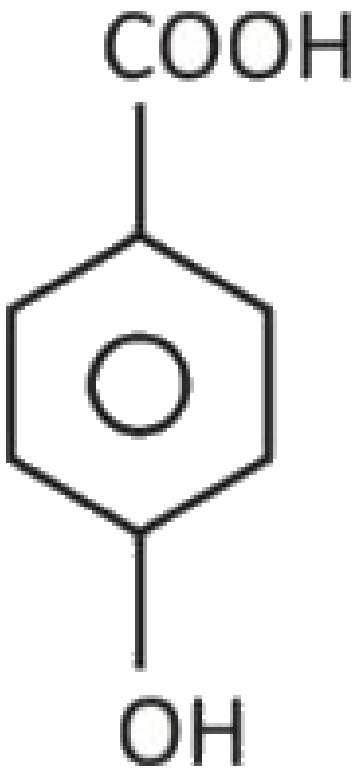
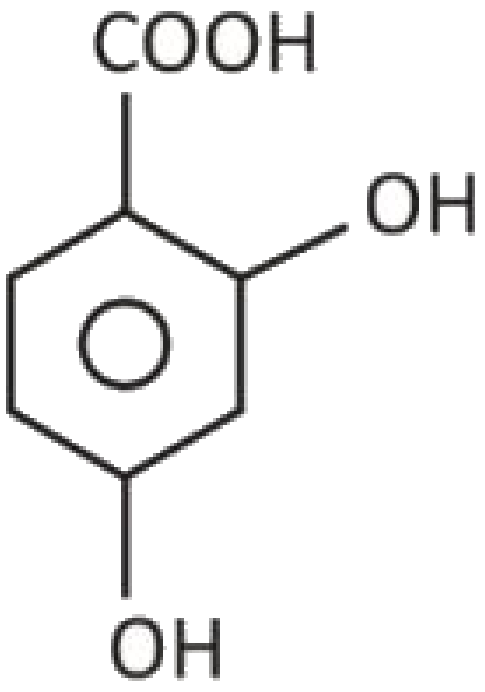
42. The order of ka values of the following acids is:



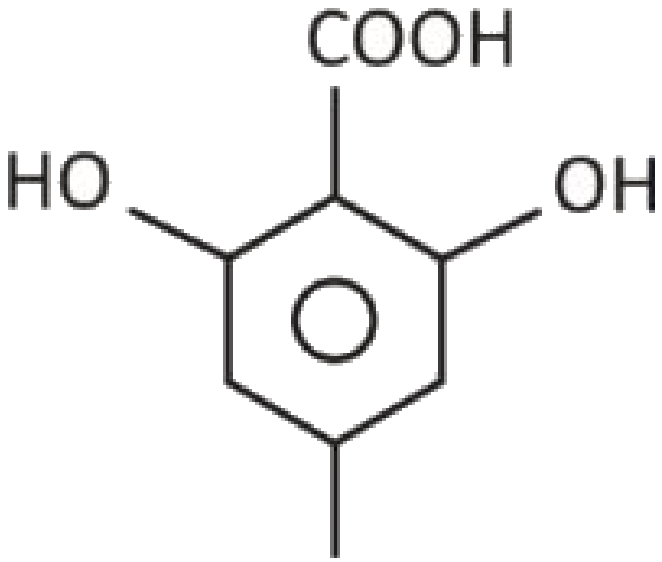
(i)



(ii)



(iii)



(iv)

A. $IV > I > III > II$

B. $III > IV > I > II$

C. $II > I > III > IV$

D. $II > III > I > IV$

Answer: D

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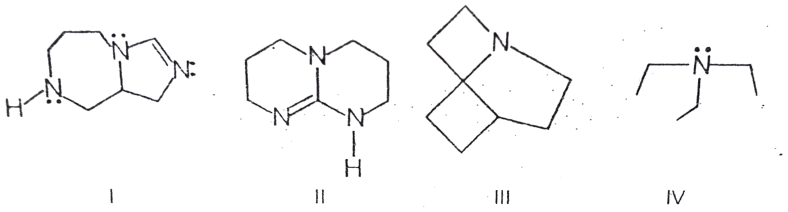
43. Order of basicity of the following species is



I II III IV

A. $III < IV < II < I$

B. $III < I < II < IV$

C. $III < II < I < IV$

D. $IV < I < II < III$

Answer: B

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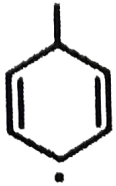
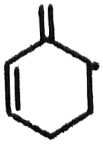
44. The most stable radical among the following is

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: D

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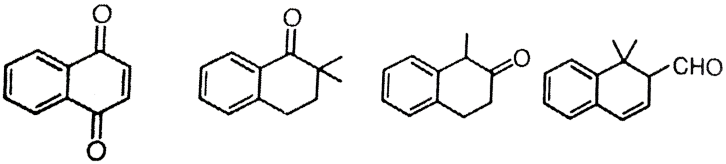
45. The molecules that can exhibit tautomerism are



A. I, IV

B. II , III

C. I,III, IV

D. I,II

Answer: C

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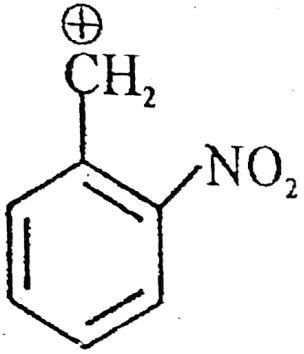
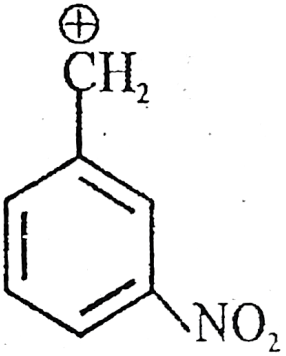
Part-III: Practice Test-2 (IIT-JEE (Advanced Pattern))

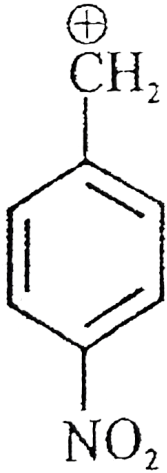
1. The decreasing order of stability of following cations is :-



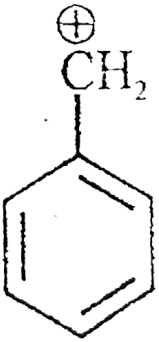
(P)



(Q)



(R)



(S)

A. $IV > III > II > I$

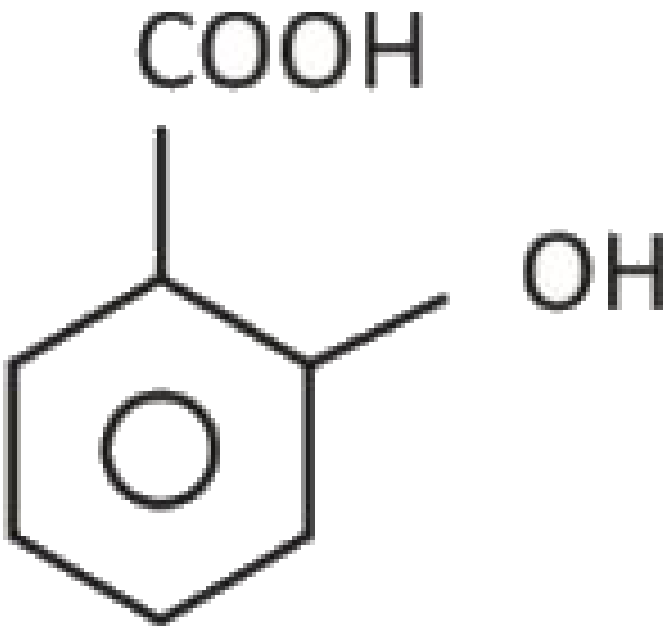
B. $I > II > III > IV$

C. $I > II > IV > III$

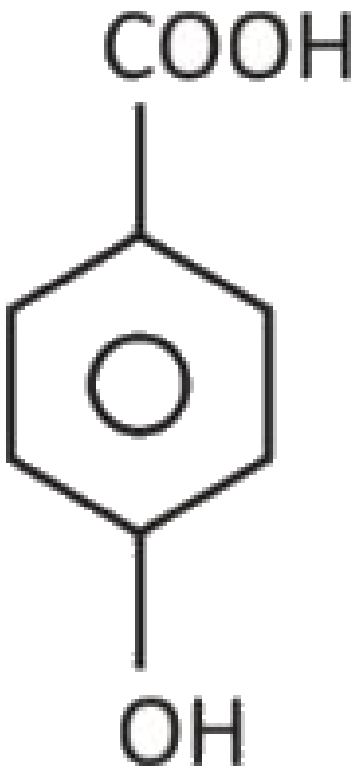
D. $I > III > II > IV$

Answer: B

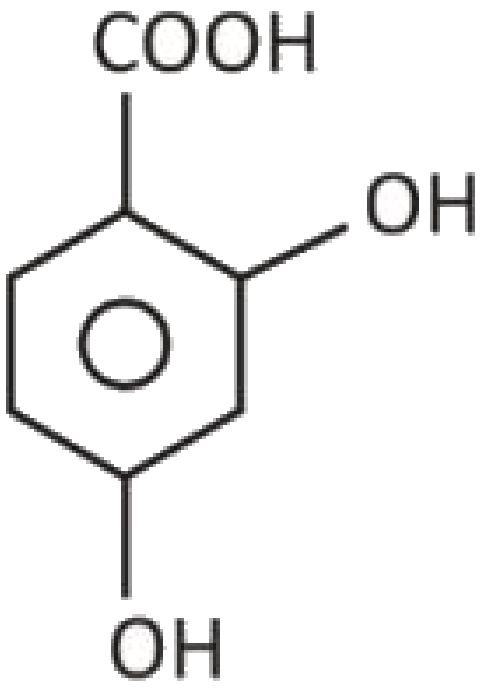
2. The order of ka values of the following acids is:



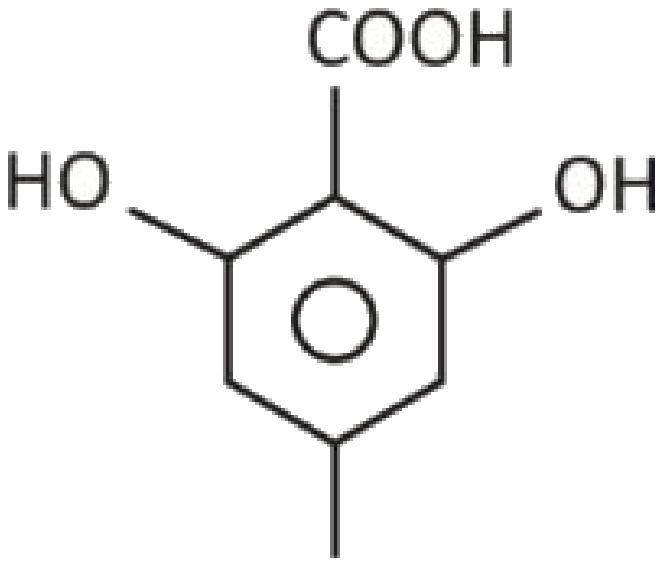
(i)



(ii)



(iii)



(iv)

A. $I > II > III$

B. $I > III > II$

C. $III > II > I$

D. $III > I > II$

Answer: C

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3. The decreasing order of rate of reaction for the following compounds towards S_N2Th (bimolecular nucleophilic substitution with tetrahedral intermediate) reaction is

(i) $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - NH_2$

(ii) $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - Br$

(iii) $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - O - \overset{\overset{O}{||}}{C} - CH_2 - CH_3$

(iv) $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - O - C_2H_5$

A. 1 and 3

B. 2 and 4

C. 1 and 4

D. 2 and 3

Answer: A

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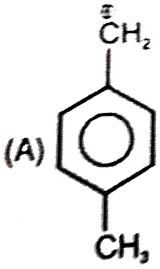
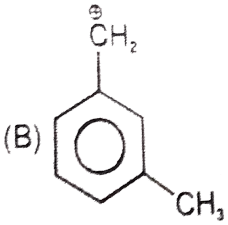
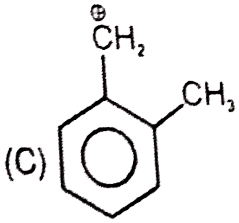
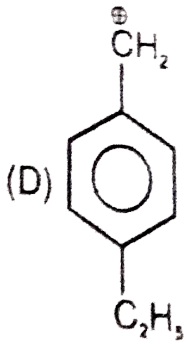
4. Which of the following carbocation is most stable

A. 

B. 

C. 



D.

Answer: C

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5. In which pair the first atom or ion is not larger than the second :-

A. Adipic acid, succinic acid

B. Fumaric acid, maleic acid

C. Pthalic acid, terepthalic acid

D. Benzoic acid, Picric acid

Answer: C

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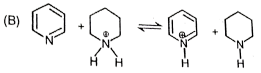
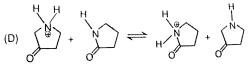
6. Which among the following reactions is favoured in forward direction by increase of temperature?

A. $EtOH + PhO^{\ominus} \Leftrightarrow EtO^{\ominus} + PhOH$

B. 

C. $Ch_3 - \overset{\ominus}{C}H_2 + CH_3 - NH_2 \Leftrightarrow CH_3 - CH_3 + CH_3\overset{\ominus}{N}H$

D. 

Answer: C

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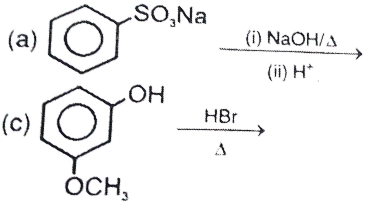
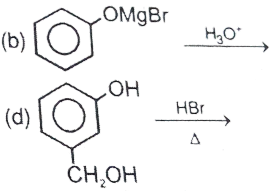
7. Write the products of the following reactions:





A. $(i)\&(ii)$

B. $(ii), (iii)\&(iv)$

C. $(i), (ii)\&(iv)$

D. $(i), (iii)\&(iv)$

Answer: D

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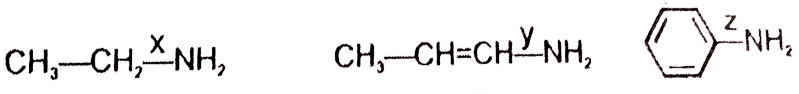
8. Compare the bond lengths and select the correct option:



A. $x = y = z$

B. $x > y > z$

C. $x < y < z$

D. $x > y = z$

Answer: B

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9. Which of the following compounds will show tautomerism ?

A. 2,2-Dimethylpropanal

B. 2,2-Dimethyl-1 nitropropane

C. Acetyl Acetone

D. Benzophenone

Answer: B::C

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10. Which of the following is correct regarding stability of the following pair of species ?

A. $CH_2 = \overset{+}{N} = \overset{-}{N} > \overline{C}H_2 - \overset{+}{N} \equiv N$

B. $CH_2 = CH - \overset{+}{C}H - \overline{O} > \overline{C}H_2 - CH = CH - \overset{+}{O}$

C. $CH_3 - \overset{O}{\overset{||}{C}} - \overline{O} > CH_3 - CH_2 - \overline{O}$

D. Pent-2-ene lt 2-methylbut -2-ene

Answer: A::B::C

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11. Which of the following are correct statements?

A. Guanidine $\left[NH_2 - \underset{NH}{\overset{||}{C}} - NH_2\right]$ is more basic than pyridine because conjugate acid of guanidine has three equal contributing resonating structure.

B. Diethylamine is stronger base than triethylamine in aqueous medium

C. Ortho-methyl aniline is weaker base than para-methyl aniline.

D. 2,4,6-Trinitro-N,N-dimethyl aniline is stronger base than 2,4,6-Trinitro aniline.

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

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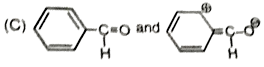
12. The tautomeric pairs are

A. $Me_2C = NOH$ and $Me_2CH - \underset{\oplus}{N} = O$

B. $CH_2 = CH - NHCH_3$ and $CH_3 - CH = N - CH_3$

C. 

D. $CH_2 = CH - \underset{\underset{OH}{|}}{C}H - CH_3$ and $CH_3 - CH_2 - \underset{\underset{O}{||}}{O} - CH_3$

Answer: A::B

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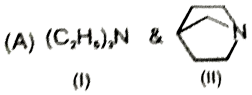
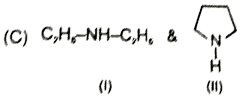
13. In which compounds (II) is more basic than (I)

A. 

B. $H_2N-\underset{(I)}{\overset{\overset{O}{||}}{C}}-NH_2 \& H_2N-\underset{(II)}{\overset{\overset{NH}{||}}{C}}-NH_2$

C. 

D. $\underset{(I)}{CH_3NH_2} \& \underset{(II)}{(CH_3)_2NH}$

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

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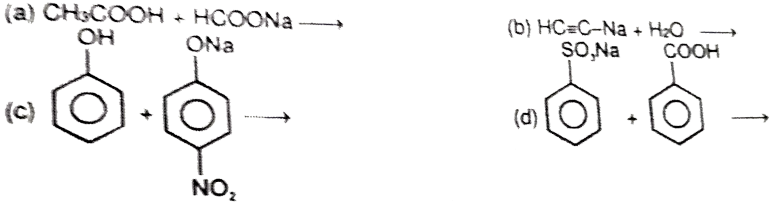
14. Which of the following reactions is/are feasible?

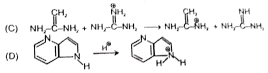


A. $CH_3COONa + NCOOH \rightarrow CH_3COOH + NCOONa$

B. $CH_3COONa + Ph - OH \rightarrow CH_3COOH + PhONa$

C.

$$NH_2 - \overset{CH_2}{\overset{||}{C}} - NH_2 + NH_2 - \overset{\oplus NH_2}{\overset{||}{C}} - NH_2 \rightarrow NH_2 - \overset{CH_2}{\overset{||}{C}} - \overset{\oplus}{N}H_2 + I$$

D. 

Answer: B::C::D

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15. In the given molecules the sites undergoes deprotonation and protonation most readily respectively are x & y the x+y=?

$$\overset{1}{N_2}H - \underset{\overset{2}{||}}{\underset{NH}{C}} - \overset{3}{N}H - CH_2 - CH_2 - CH_2 - \underset{\overset{4}{|}}{\underset{NH_2}{C}} H - overeset(5)(COOH$$

How many of the following compounds will accept $H^{\oplus}$ from ammonium ion.

Pyridine , Aniline, Pyrrole, Tripheryl amine,

Benzyl amine, Methyl amine, Di-methyl amine, Tri-methyl amine

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16. In the given molecules the sites undergoes deprotonation and protonation most readily respectively are x & y the x+y=?

$$\overset{1}{N_2}H - \underset{\underset{{}^2NH}{||}}{\overset{}{C}} - \overset{3}{N}H - CH_2 - CH_2 - CH_2 - \underset{\underset{{}^4NH_2}{|}}{\overset{}{C}}\ H - \overset{5}{C}OOH$$

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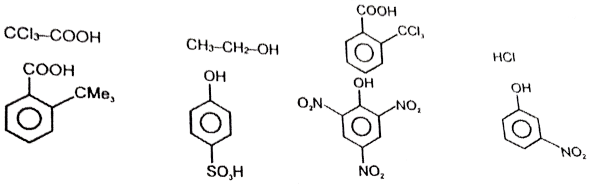
Part-III: Section-4 : Comprehension Type

1. Which of the following acids (given below) react with $NaHCO_3$ and liberate $CO_2(g)$?



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2. Whenever an intermediate carbocation is formed in reaction it may rearranges.

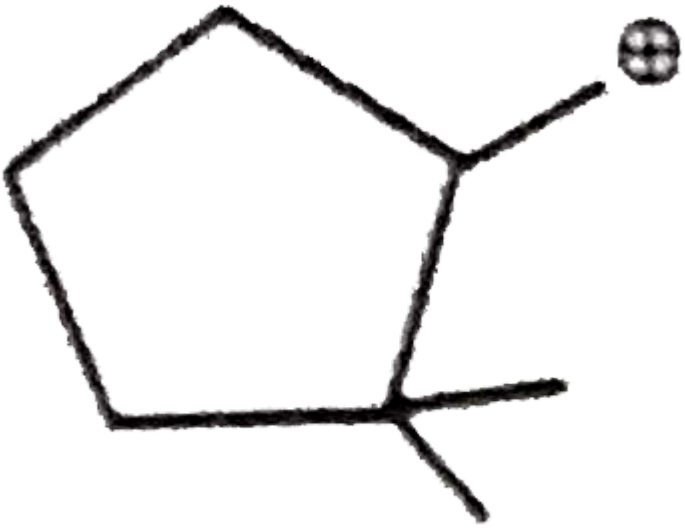
Only those carbocation will rearrange which can produce more stable species . It can be done either by :

(i) Shifting of H, alkyl , aryl, bond (1,2-shifting)

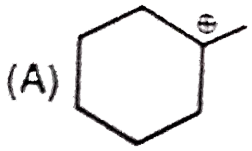
(ii) Ring expansion

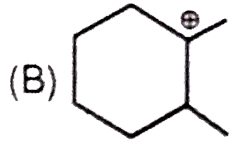
(iii) Ring contraction

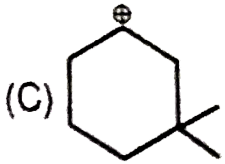
Most stable rearranged carbocation is

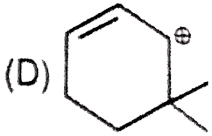


is

A. 

B. 

C. 

D. 

Answer: B

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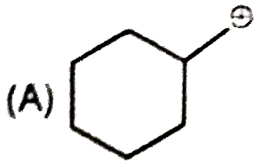
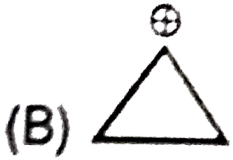
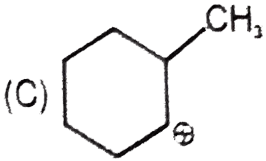
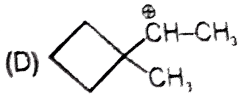
3. Assertion : Phenol is more reactive than benzene towards electrophilic substitution reaction.

Reason : In the case of phenol. The intermediate carbocation is more resonance stabilised.

A. 

B. 

C. 

D. 

Answer: B

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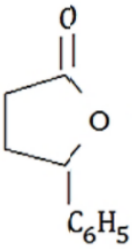
Part-III: Section-5: Matching List Type

1. Match List I with List II and select the correct answer using the codes given below the lists

	List I		List II
P.	$CH_3COOC_2H_5 \rightarrow CH_3COCH_2COOC_2H_5$	1.	Anhy. $AlCl_3$
Q.	 $\rightarrow CH_2OH-(CH_2)_2-CHOH-C_6H_5$	2.	$LiAlH_4$
R.	$C_6H_5CH_2COOH \rightarrow C_6H_5-\underset{\displaystyle Br}{\underset{\vert}{CH}}-COOH$	3.	C_2H_5ONa
S.	$C_6H_6 + CH_3COCl \rightarrow C_6H_5COCH_3$	4.	P/Br_2

A. $\begin{matrix} P & Q & R & S \\ 3 & 1 & 2 & 4 \end{matrix}$

B. $\begin{matrix} P & Q & R & S \\ 1 & 2 & 4 & 3 \end{matrix}$

C. $\begin{matrix} P & Q & R & S \\ 2 & 1 & 3 & 4 \end{matrix}$

D. $\begin{matrix} P & Q & R & S \\ 3 & 2 & 1 & 4 \end{matrix}$

Answer: a

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