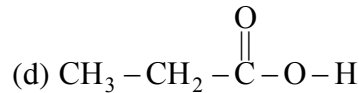
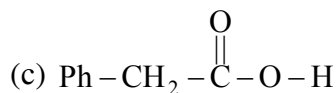
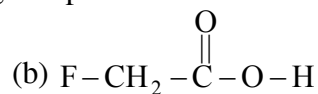
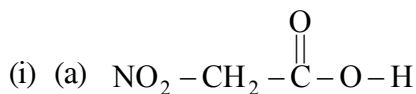


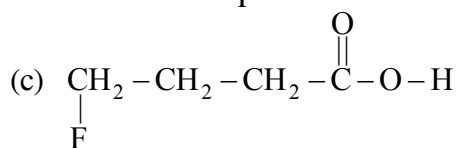
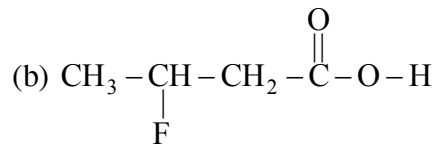
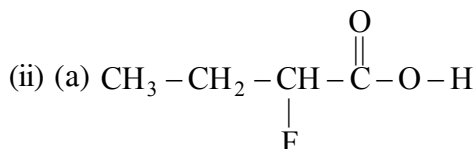
ACID STRENGTH & BASIC STRENGTH

EXERCISE # O-1

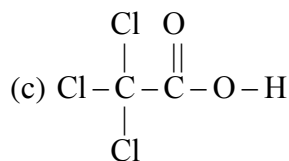
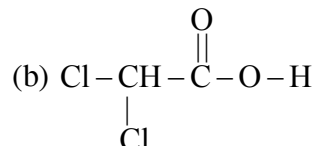
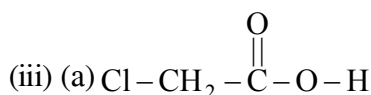
1. Write correct order of acidic strength of following compounds :



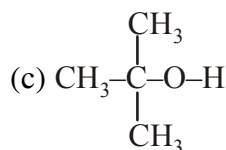
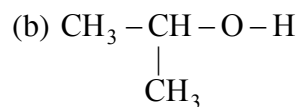
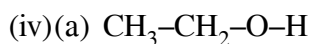
AB0001



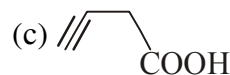
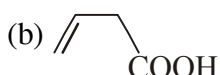
AB0002



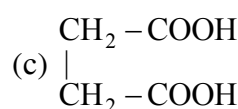
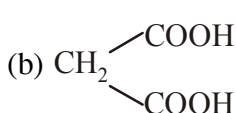
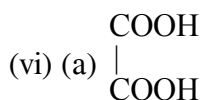
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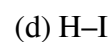
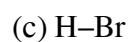
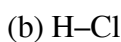
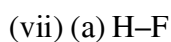
AB0004



AB0005



AB0006



AB0007

(viii) (a) CH_4 (b) NH_3 (c) H_2O (d) H-F **AB0008**

(ix)(a) $\text{F-CH}_2\text{-CH}_2\text{-O-H}$ (b) $\text{NO}_2\text{-CH}_2\text{-CH}_2\text{-O-H}$
 (c) $\text{Br-CH}_2\text{-CH}_2\text{-O-H}$ (d) $\text{NH}_3^+\text{-CH}_2\text{-CH}_2\text{-O-H}$ **AB0009**

(x) (a) CH_3COOH (b) $\text{CH}_3\text{CH}_2\text{OH}$ (c) $\text{C}_6\text{H}_5\text{OH}$ (d) $\text{C}_6\text{H}_5\text{SO}_3\text{H}$ **AB0010**

2. Explain which is a stronger acid.

(a) CH_3CH_3 or BrCH_2NO_2 **AB0011**

(b) $\text{CH}_3\text{-}\overset{\text{O}}{\parallel}\text{C}\text{-CH}_3$ or $\text{CH}_3\text{-}\overset{\text{O}}{\parallel}\text{C}\text{-CH}_2\text{CN}$ **AB0012**

(c)  or **AB0013**

(d)  or **AB0014**

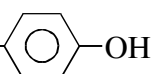
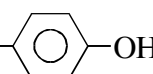
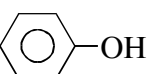
3. Which of the following would you predict to be the stronger acid ?

(a) Benzoic acid or para-nitrobenzoic acid **AB0015**

(b) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$ or $\text{CH}_3\text{-CH=CH-OH}$ **AB0016**

(c) $\text{CH}_3\text{-CH=CH-CH}_2\text{-OH}$ or $\text{CH}_3\text{-CH=CH-OH}$ **AB0017**

4. Arrange the given phenol & its derivative in their decreasing order of acidity :

(I) $\text{C}_6\text{H}_5\text{-OH}$ (II)  (III)  (IV) 

Select the correct answer from the given code:

(A) $\text{IV} > \text{III} > \text{I} > \text{II}$ (B) $\text{IV} > \text{II} > \text{III} > \text{I}$ (C) $\text{IV} > \text{III} > \text{II} > \text{I}$ (D) $\text{IV} > \text{I} > \text{III} > \text{II}$

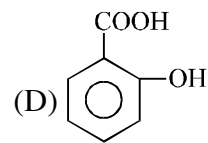
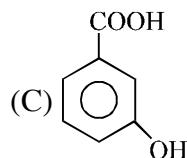
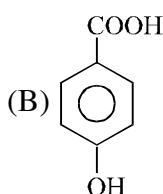
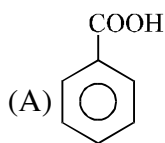
AB0018

5. Which one of the following is the most acidic?

(A)  (B)  (C)  (D) $\text{CH}_2=\text{CH-CH}_3$

AB0019

6. Which of the following is weakest acid?



AB0020

7. Arrange pH of the given compounds in decreasing order:

- (1) Phenol (2) Ethyl alcohol (3) Formic acid (4) Benzoic acid
 (A) $1 > 2 > 3 > 4$ (B) $2 > 1 > 4 > 3$ (C) $3 > 2 > 4 > 1$ (D) $4 > 3 > 1 > 2$

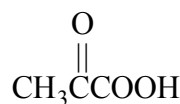
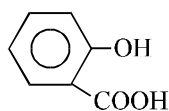
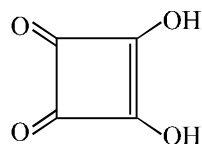
AB0021

8. Arrange acidity of given compounds in decreasing order:

- (I) $\text{CH}_3\text{-NH-CH}_2\text{-CH}_2\text{-OH}$ (II) $\text{CH}_3\text{-NH-CH}_2\text{-CH}_2\text{-CH}_2\text{-OH}$
 (III) $(\text{CH}_3)_3\text{N}^+\text{-CH}_2\text{-CH}_2\text{-OH}$
 (A) $\text{III} > \text{I} > \text{II}$ (B) $\text{III} > \text{II} > \text{I}$ (C) $\text{I} > \text{II} > \text{III}$ (D) $\text{II} > \text{I} > \text{III}$

AB0022

9. Consider the following compound

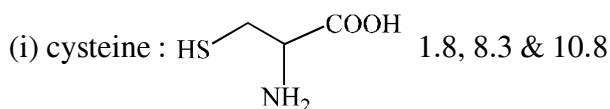


Which of the above compounds reacts with NaHCO_3 giving CO_2

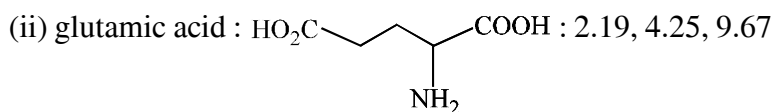
- (A) I, II and III (B) I and III (C) II and III (D) I and II

AB0023

10. Say which pK_a belong to which functional group in case of following amino acids :

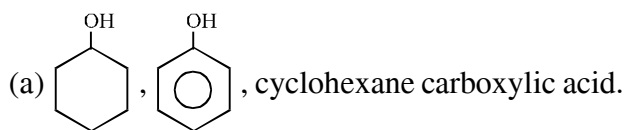


AB0024

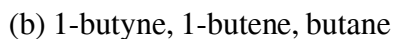


AB0025

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



AB0026



AB0027



AB0028

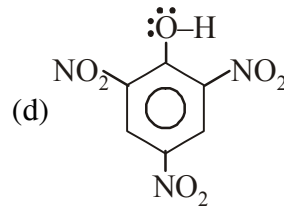
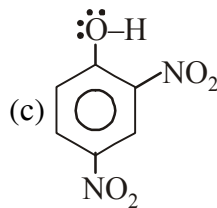
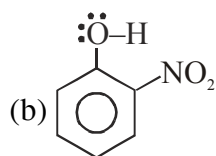
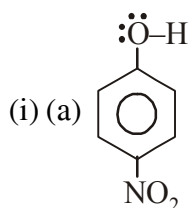


AB0029

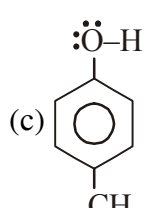
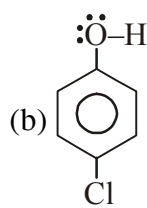
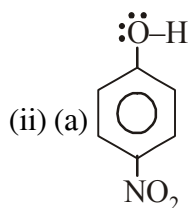


AB0030

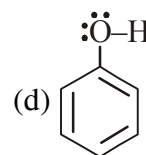
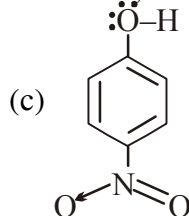
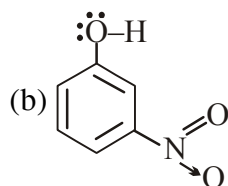
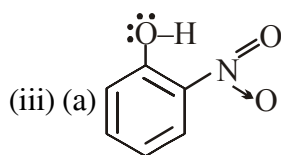
12. Write correct order of acidic strength of following compounds:



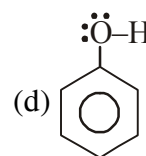
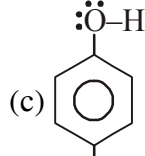
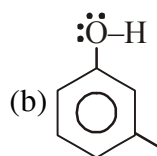
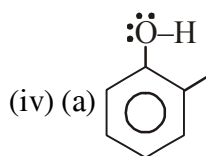
AB0031



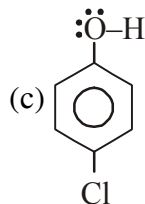
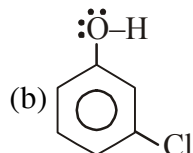
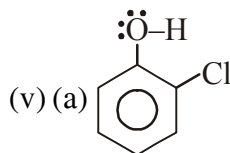
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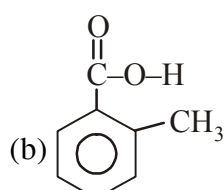
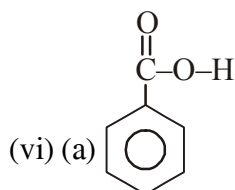
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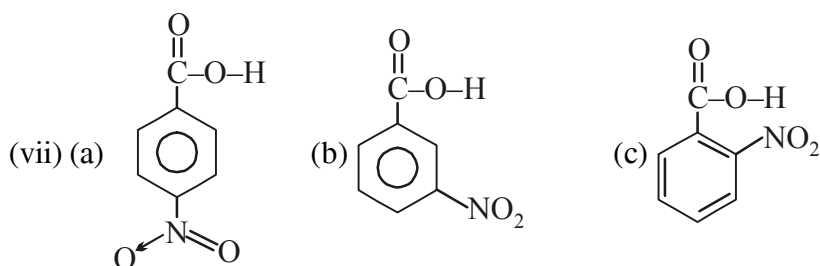
AB0034



AB0035



AB0036

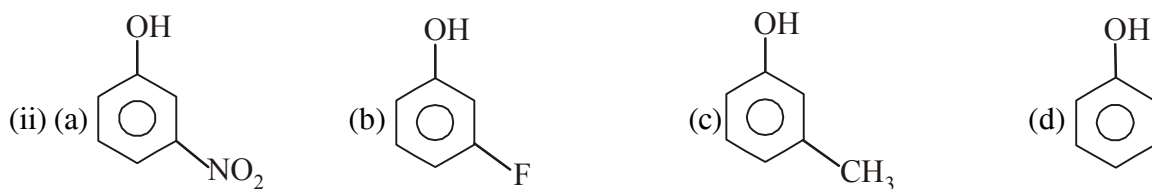


AB0037

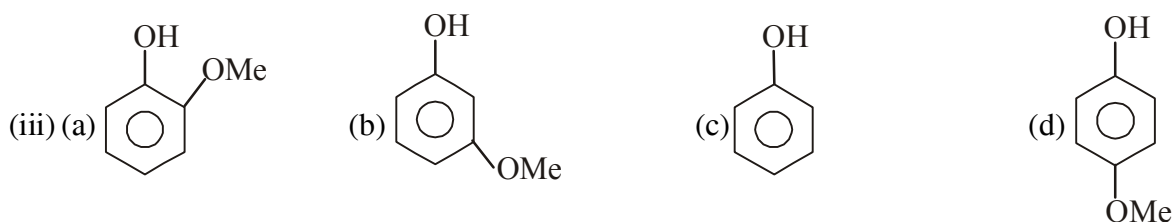
13. Select the strongest acid in each of the following sets :



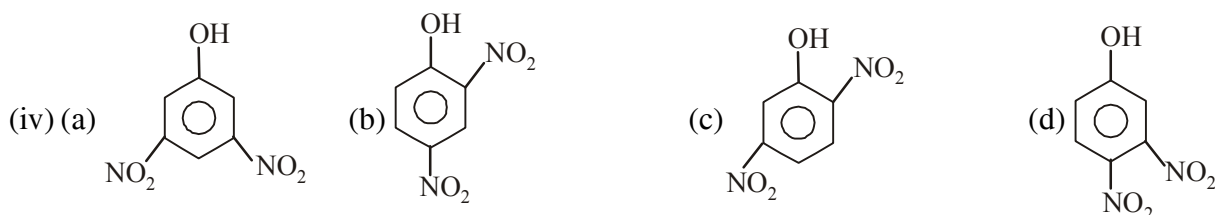
AB0038



AB0039



AB0040



AB0041

14. The strongest acid is :

- (A) HF (B) $\text{CH}_3\text{CO}_2\text{H}$ (C) $\text{HF} + \text{SbF}_5$ (D) H_2S

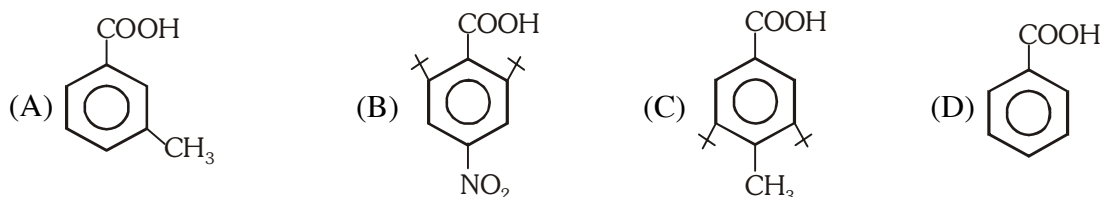
AB0042

15. The weakest acid (does not show acidic character) is :

- (A) $\text{HC} \equiv \text{CH}$ (B) $\text{CH}_2 = \text{CH}_2$ (C) Me_3CH (D) Ph_3CH

AB0043

16. Which of the following is most acidic :



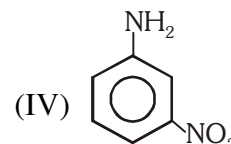
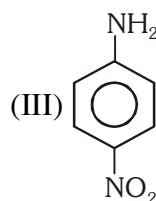
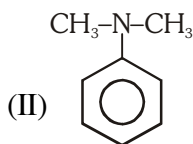
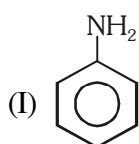
AB0044

Paragraph for Question 17 to 18

The most important condition for resonance to occur is that the involved atoms in resonating structure must be coplanar or nearly coplanar for maximum delocalisation. If this condition does not fulfil, involved orbitals cannot be parallel to each other and as a consequence delocalisation cannot occur. Bulky groups present on adjacent atoms inhibit the planarity of atoms involved in resonance. This phenomenon is known as steric inhibition of resonance. Steric inhibition of resonance has profound effect on

(1) Physical properties (2) Acidity and basicity (3) Reactivity of organic compounds

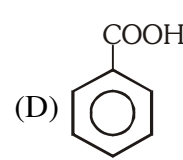
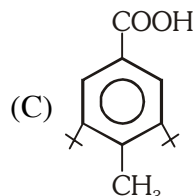
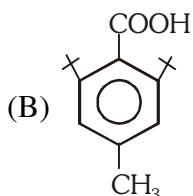
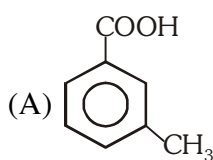
17. Arrange the following in the decreasing order of basicity :



- (A) I > II > III > IV (B) IV > III > II > I (C) II > I > IV > III (D) I > IV > III > II

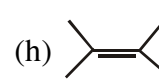
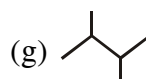
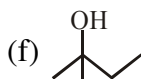
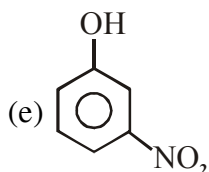
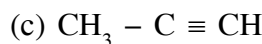
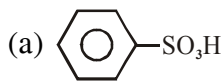
AB0045

18. Which of the following is most acidic :



AB0046

19. How many following compounds are more acidic than water ?



(i) NaOH

AB0047

20. Select correct order regarding acidic strength of given compounds :

(1) o-methylbenzoic acid

(2) m-methylbenzoic acid

(3) p-methylbenzoic acid

(4) benzoic acid

(A) 1 > 2 > 3 > 4

(B) 4 > 3 > 2 > 1

(C) 1 > 4 > 2 > 3

(D) 3 > 2 > 4 > 1

AB0048

EXERCISE # O-2

1. Write decreasing order of basic strength of following :



AB0049



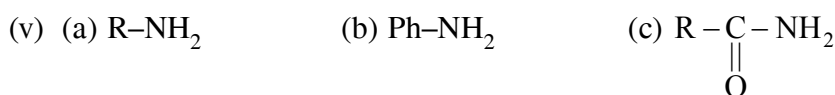
AB0050



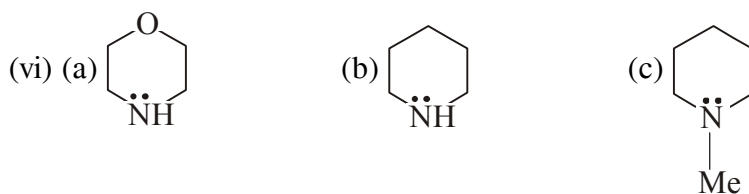
AB0051



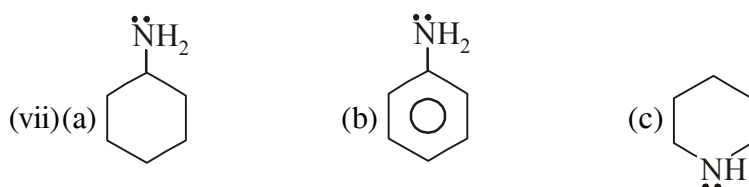
AB0052



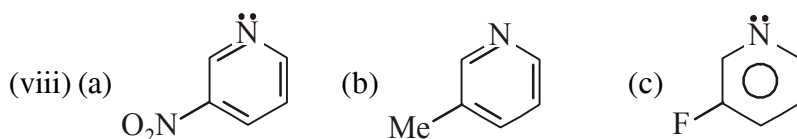
AB0053



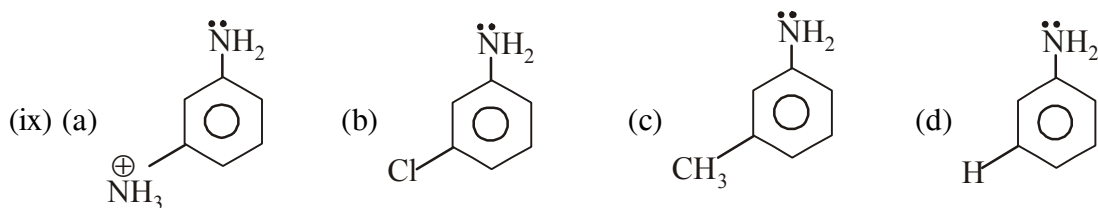
AB0054



AB0055

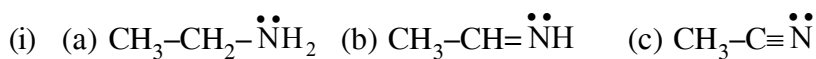


AB0056

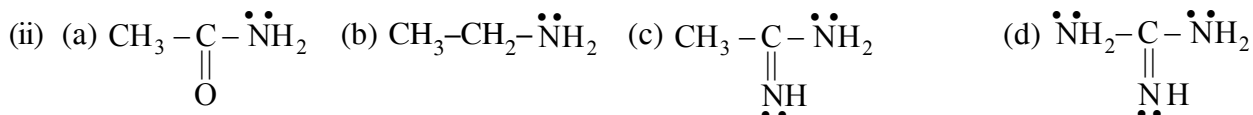


AB0057

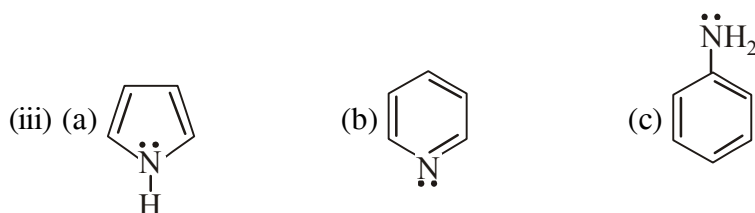
2. Write decreasing order of basic strength of following :



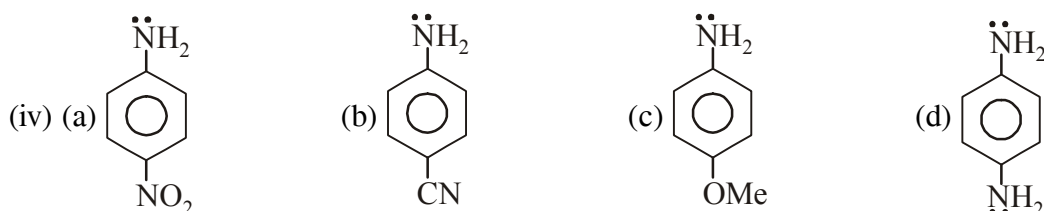
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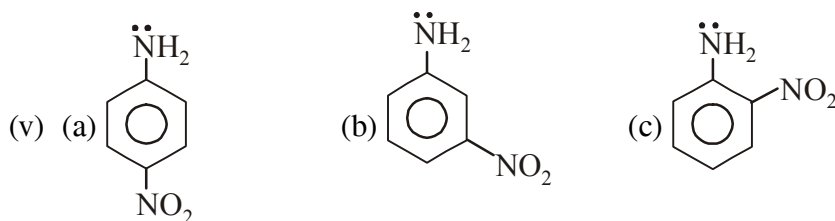
AB0059



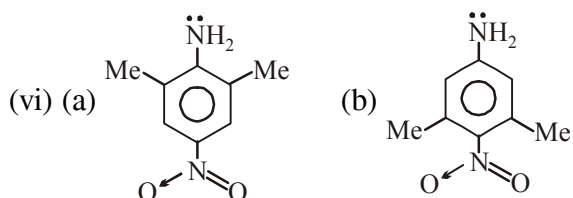
AB0060



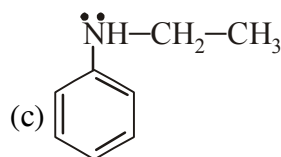
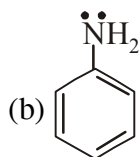
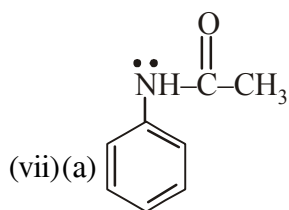
AB0061



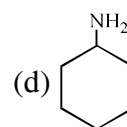
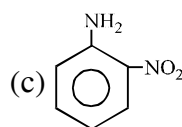
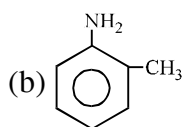
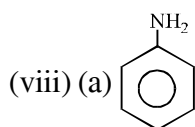
AB0062



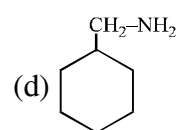
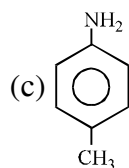
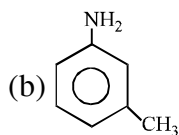
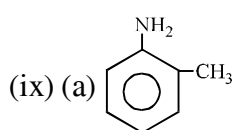
AB0063



AB0064

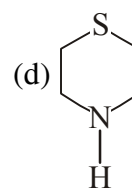
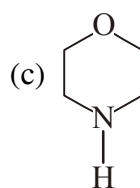
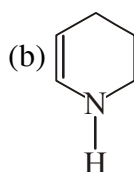
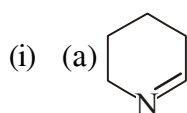


AB0065

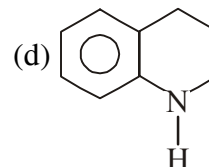
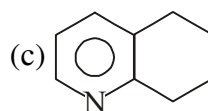
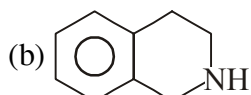
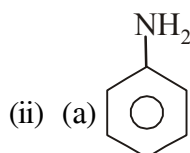


AB0066

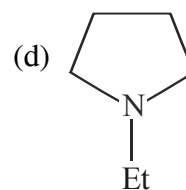
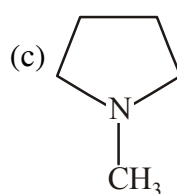
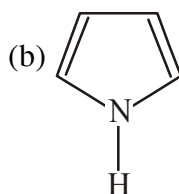
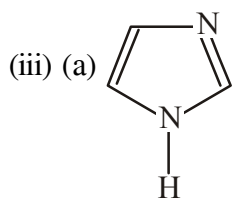
3. Select the strongest base in following compound :



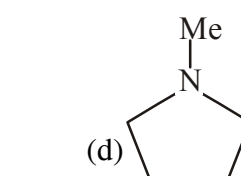
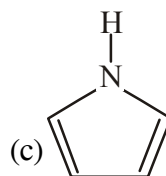
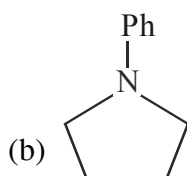
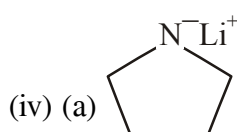
AB0067



AB0068



AB0069

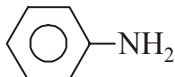
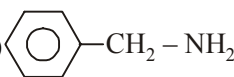
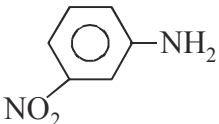
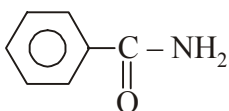


AB0070

4. Arrange the following compound in decreasing order of their basicity.

- (i) (a) $\text{H}_2\text{C}=\text{CHNa}$ (b) $\text{CH}_3\text{CH}_2\text{Na}$ (c) $\text{CH}_3\text{CH}_2\text{ONa}$ (d) $\text{HC}\equiv\text{CNa}$

AB0071

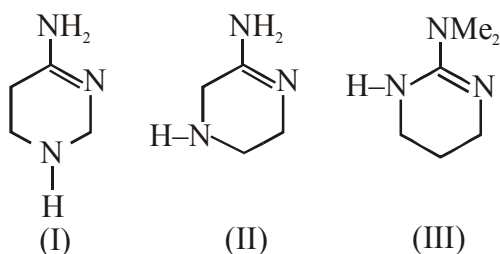
- (ii) (a)  (b)  (c)  (d) 

AB0072

- (iii) (a) HO^- (b) NH_3 (c) H_2O (d) HSO_4^-

AB0073

5. Correct decreasing order of basic strength -



Of following compound -

- (A) $\text{III} > \text{II} > \text{I}$ (B) $\text{II} > \text{I} > \text{III}$ (C) $\text{I} > \text{II} > \text{III}$ (D) $\text{III} > \text{I} > \text{II}$

AB0074

6. Consider the following bases:

- (I) o-nitroaniline (II) m-nitroaniline (III) p-nitroaniline

The decreasing order of basicity is:

- (A) $\text{II} > \text{III} > \text{I}$ (B) $\text{II} > \text{I} > \text{III}$ (C) $\text{I} > \text{II} > \text{III}$ (D) $\text{I} > \text{III} > \text{II}$

AB0075

7. Consider the basicity of the following aromatic amines:

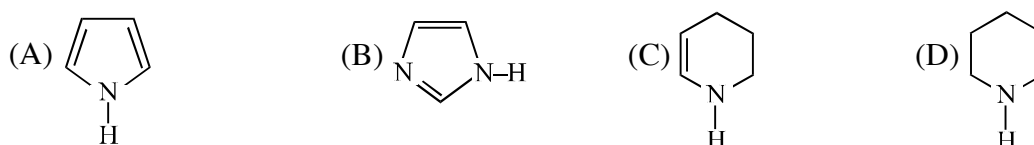
- (I) aniline (II) p-nitroaniline (III) p-methoxyaniline (IV) p-methylaniline

The correct order of decreasing basicity is:

- (A) $\text{III} > \text{IV} > \text{I} > \text{II}$ (B) $\text{III} > \text{IV} > \text{II} > \text{I}$ (C) $\text{I} > \text{II} > \text{III} > \text{IV}$ (D) $\text{IV} > \text{III} > \text{II} > \text{I}$

AB0076

8. Which one of the following is least basic in character?



AB0077

9. In each of the following pair of compounds, which is more basic in aqueous solution?

Give an explanation for your choice:

(a) CH_3NH_2 or CF_3NH_2 AB0078

(b) CH_3CONH_2 or $\text{H}_2\text{N}-\text{C}(=\text{NH})-\text{NH}_2$ AB0078

(c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$ or CH_3CN AB0078

(d) $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2$ or 2,6-dimethyl-N-N-dimethylaniline AB0078

10. Choose the member of each of the following pairs of compounds that is likely to be the weaker base.

(a) H_2O or H_3O^+ AB0079

(b) Cl^- , SH^- AB0079

(c) F^- , OH^- , NH_2^- , CH_3^- AB0079

(d) HF , H_2O , NH_3 AB0079

(e) OH^- , SH^- , SeH^- AB0079

11. Explain which compound is the weaker base.

(a)  or  AB0080

(b) $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH} - \text{CH}_2^-$ or $\text{CH}_2 = \text{CH} - \text{CH}_2^-$ AB0080

(c)  or  AB0080

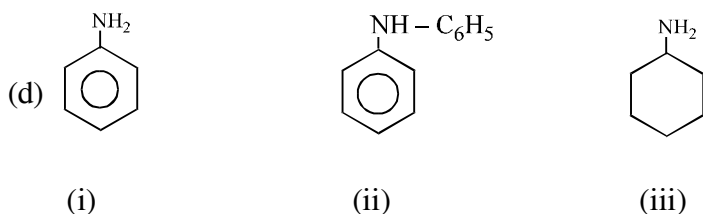
(d)  or  AB0080

12. Arrange the basic strength of the following compounds.

(a) OH^- CH_3COO^- Cl^-
(i) (ii) (iii) AB0081

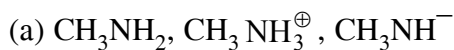
(b) $\text{CH} \equiv \text{C}^-$ $\text{CH}_2 = \text{CH}^-$ CH_3CH_2^-
(i) (ii) (iii) AB0082

(c) $\text{CH}_2 = \text{CHCH}_2\text{NH}_2$ $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$ $\text{CH} \equiv \text{C} - \text{CH}_2\text{NH}_2$
(i) (ii) (iii) AB0083

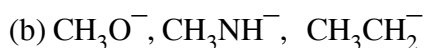


AB0084

13. Arrange the following compounds in order of increasing basicity.

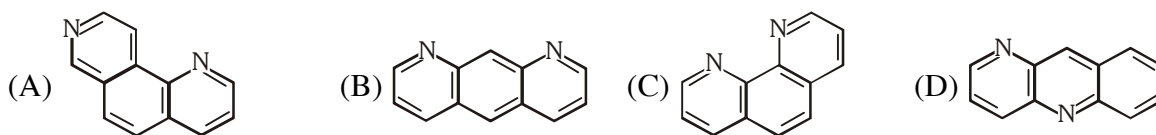


AB0085



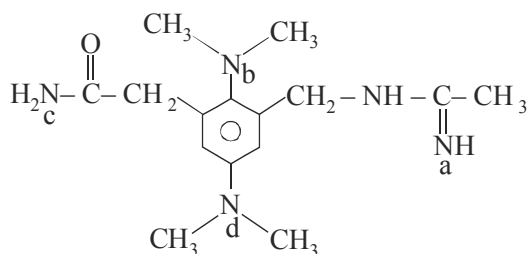
AB0085

14. Which of the following is most basic :



AB0086

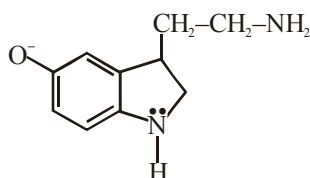
15. Basicity order of N in following compound is :



- (A) $b > d > a > c$ (B) $a > b > d > c$ (C) $a > b > c > d$ (D) $a > c > b > d$

AB0087

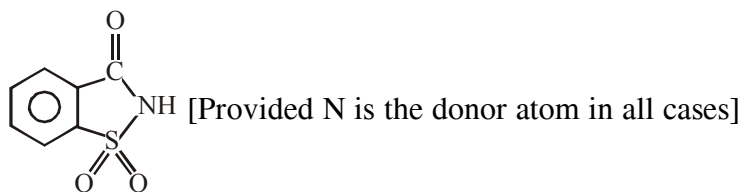
16. The conjugate base of serotonin (used as tranquilisers) is given as follows :



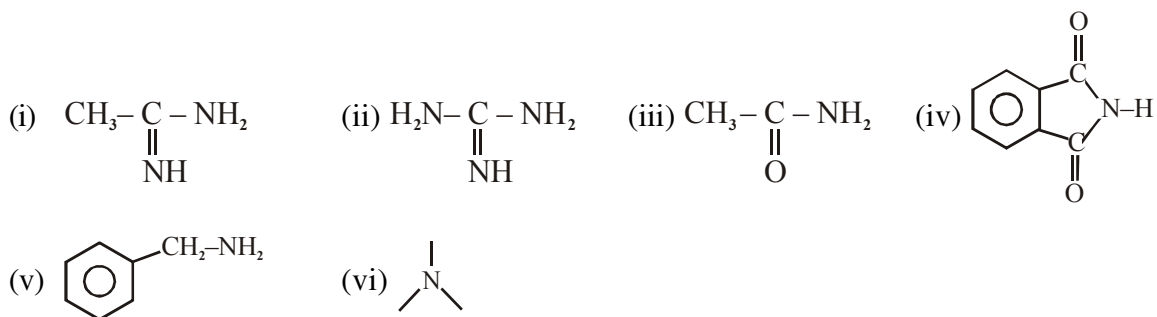
How many basic groups present in following compound ?

AB0088

17. The structure of saccharin is given as follows :



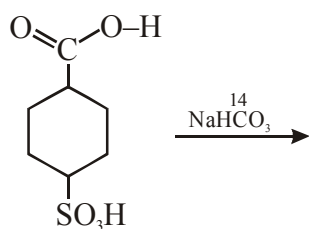
How many following compounds are more basic than saccharin ?



AB0089

EXERCISE # S-1

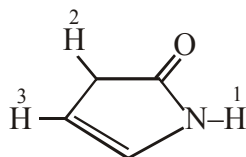
1. In given reaction Gas liberated is/are



- (A) CO_2 & SO_3 (B) SO_3 & $^{14}\text{CO}_2$ (C) $^{14}\text{CO}_2$ only (D) SO_2 only

AB0090

2. Arrange marked atom in decreasing order of acidic strength

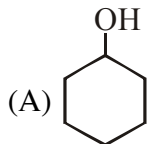


- (A) $1 > 2 > 3$ (B) $3 > 2 > 1$ (C) $2 > 1 > 3$ (D) $2 > 3 > 1$

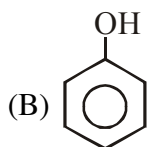
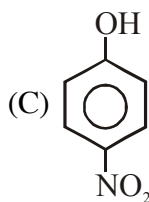
AB0091

3. Column - I

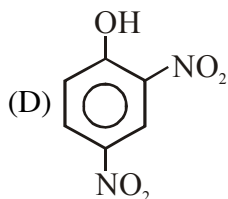
Column-I



(P) React with NaOH

(Q) React with NaHCO_3 

(R) React with NaH

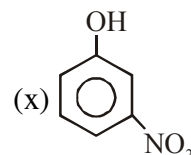
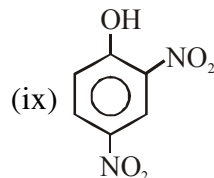
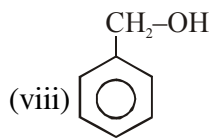
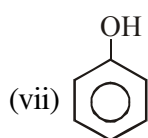
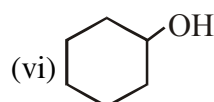
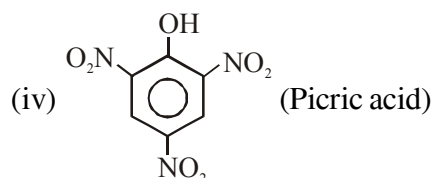
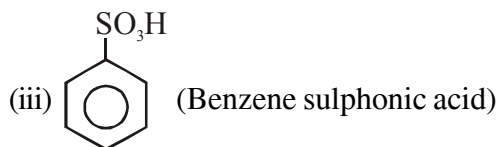
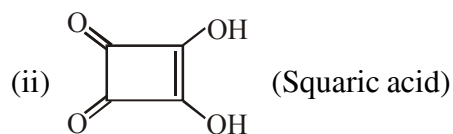
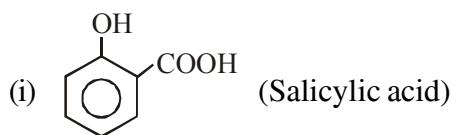


(S) React with Na

(T) React with NaNH_2

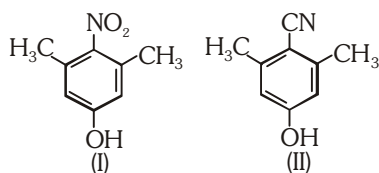
AB0092

4. Compound which can give effervesences with NaHCO_3



AB0093

5. **Statement-1 :** For the given two compounds-I is more acidic than compounds-II.



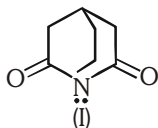
and

Statement-2 : Due to presence of $-\text{CH}_3$ group at ortho positions to $-\text{NO}_2$; the plane of $-\text{NO}_2$ deviates, w.r.t plane of ring.

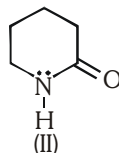
- (A) Statement-1 is True, Statement-2 is True ; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement-2 is True ; Statement-2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement-2 is False.
 (D) Statement-1 is False, Statement-2 is True.

AB0094

6. Statement 1 :



is more basic than



and

Statement 2 : Lone pair electrons on nitrogen in compound (I) does not participate in resonance.

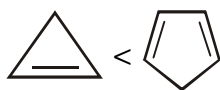
- (A) Statement-1 is True, Statement-2 is True ; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement-2 is True ; Statement-2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement-2 is False.
 (D) Statement-1 is False, Statement-2 is True.

AB0095

7. Match Column-I with Column-II.

Column - I (Facts)

- (A) Guanidine $\text{H}_2\text{N}-\text{C}(\text{NH}_2)=\text{NH}$ is example of strong base
 (B) Carbanion stability $\text{CCl}_3^- > \text{CF}_3^-$
 (C) Alkyne is more acidic than alkene
 (D) Acidity :

**Column - II (Reasons)**

- (P) Resonance stabilisation of conjugate acid of strong base.
 (Q) Due to s-character of central atoms
 (R) Due to d-orbital resonance
 (S) Due to formation of aromatic anion
 (T) Stability of conjugate acid / base due to more number of identical resonating structure

AB0096

8. Match Column-I with Column-II.

Column - I (Compounds)

- (A)
 (B)
 (C)
 (D)

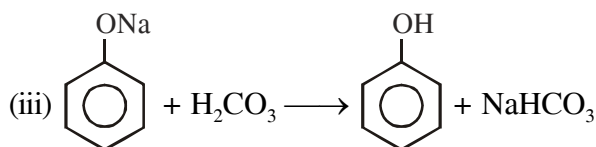
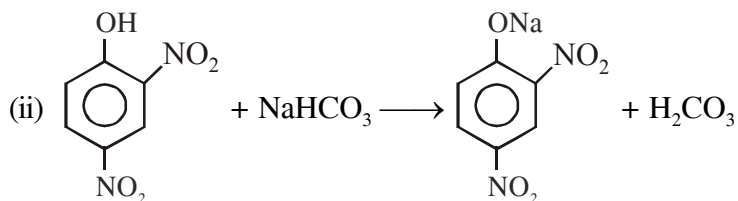
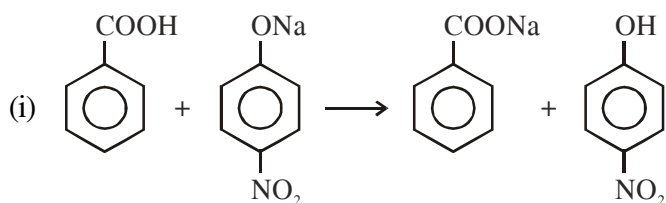
Column - II (pKa)

- (P) 7.15
 (Q) 10.14
 (R) 9.98
 (S) 9.38
 (T) pKa is more than phenol

AB0097

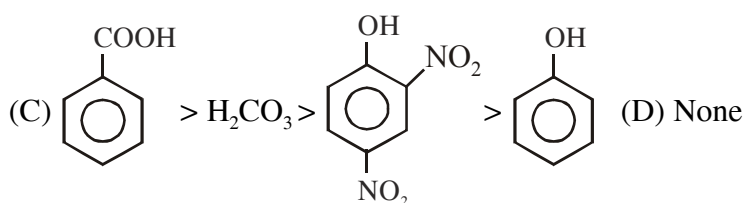
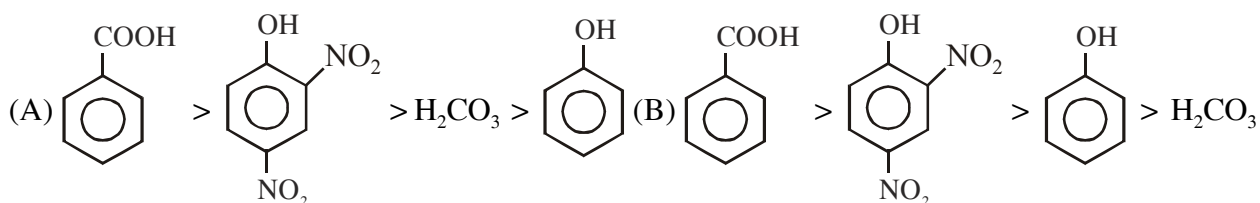
(Comprehension) (Q.9 to Q.11)

Observe the following feasible reactions :



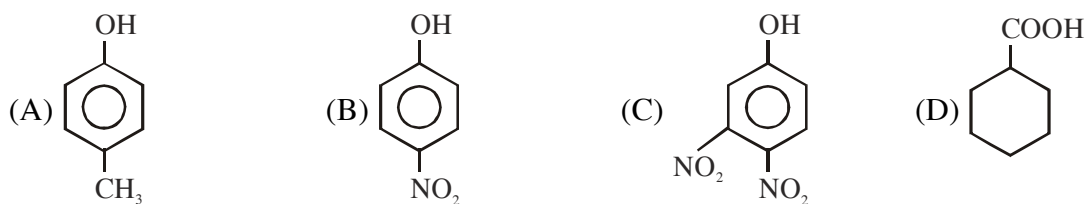
Answer the following question :

9. Which of the following is the correct order of acidic strength.



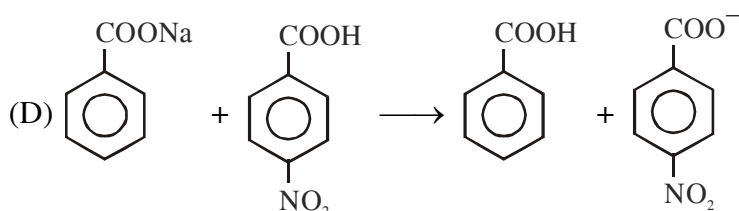
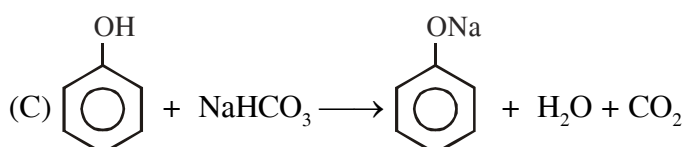
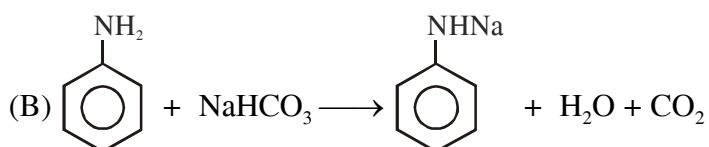
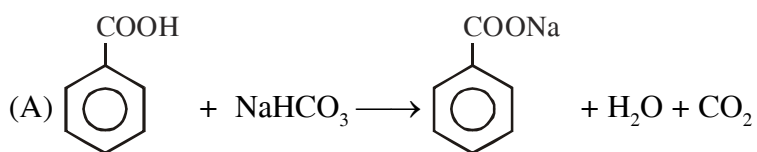
AB0098

10. Which of the following compound does not react with NaHCO_3



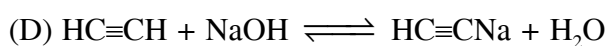
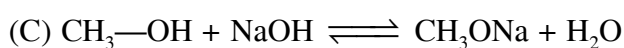
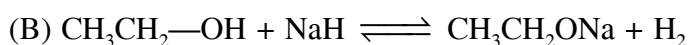
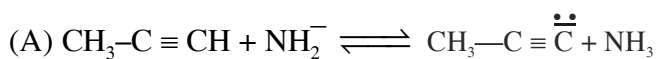
AB0099

11. Identify the feasible reactions



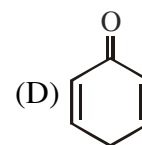
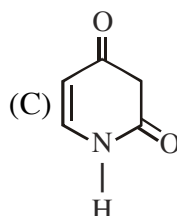
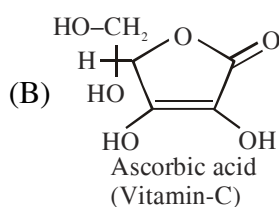
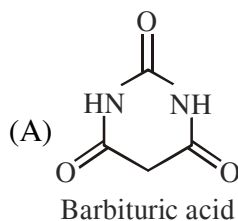
AB0100

12. Identify the non-feasible reaction



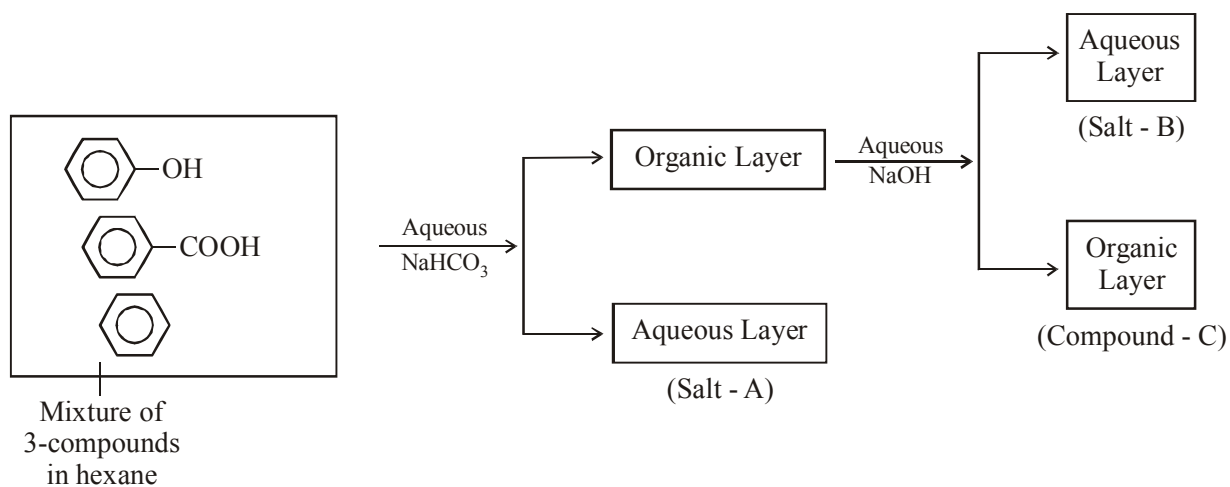
AB0101

13. Select the number of compounds in which deprotonation gives aromatic anion :

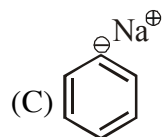
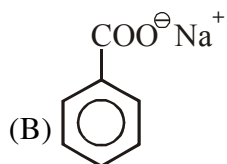
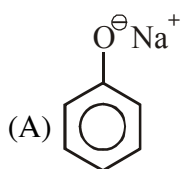


AB0102

Paragraph for Questions 14 and 15



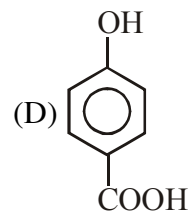
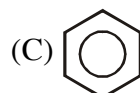
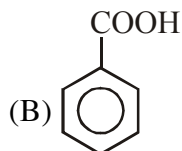
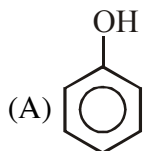
14. Identify salt 'A' ?



(D) All of these

AB0103

15. Identify compound 'C' ?

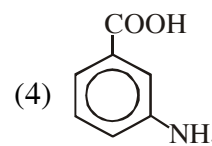
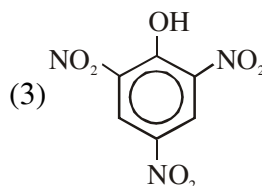
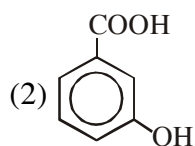
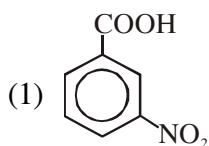


AB0103

EXERCISE # (JEE-MAIN)

1. Picric acid is -

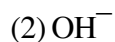
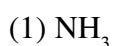
[AIEEE-2002]



AB0104

2. Which of the following species acts both as bronsted acid & base -

[AIEEE-2002]

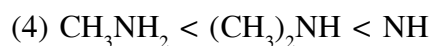
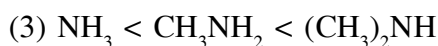
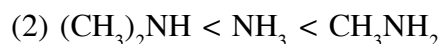


(4) 1 and 3 both

AB0105

3. The correct order of increasing basic nature for the bases NH_3 , CH_3NH_2 and $(\text{CH}_3)_2\text{NH}$ is-

[AIEEE-2003]



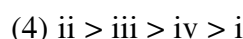
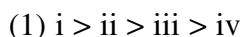
AB0106

4. Consider the acidity of the carboxylic acids-

[AIEEE-2004]



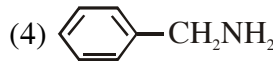
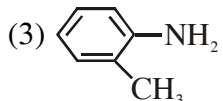
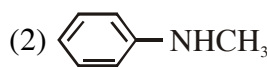
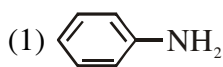
which of the following is the correct order of acidity-



AB0107

5. Which of the following is the strongest base -

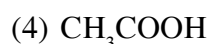
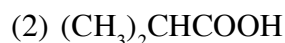
[AIEEE-2004]



AB0108

6. Among the following acids which has the lowest pK_a value-

[AIEEE-2005]



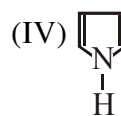
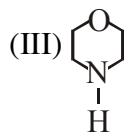
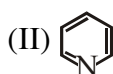
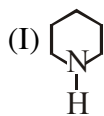
AB0109

7. Amongst the following the most basic compound is- [AIEEE-2005]
 (1) p-nitro aniline (2) Acetanilide
 (3) Aniline (4) Benzylamine
 AB0110
8. What is the conjugate base of OH^- ? [AIEEE-2005]
 (1) H_2O (2) O_2 (3) O^{2-} (4) O^-
 AB0111
9. Among the following acids which has the lowest pK_a value? [AIEEE-2005]
 (1) HCOOH (2) CH_3COOH
 (3) $\text{CH}_3\text{CH}_2\text{COOH}$ (4) $(\text{CH}_3)_2\text{CH}-\text{COOH}$
 AB0112
10. The correct order of increasing acid strength of the compounds is [AIEEE-2006]
 (a) $\text{CH}_3\text{CO}_2\text{H}$ (b) $\text{MeOCH}_2\text{CO}_2\text{H}$
 (c) $\text{CF}_3\text{CO}_2\text{H}$ (d) $\begin{array}{c} \text{Me} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{Me} \end{array} - \text{CO}_2\text{H}$
 (1) $d < a < c < b$ (2) $d < a < b < c$
 (3) $a < d < c < b$ (4) $b < d < a < c$
 AB0113
11. Which one of the following is the strongest base in aqueous solution ? [AIEEE-2007]
 (1) Trimethylamine (2) Aniline
 (3) Dimethylamine (4) Methylamine
 AB0114
12. The correct order of increasing basicity of the given conjugate base ($\text{R}=\text{CH}_3$) is :- [AIEEE-2010]
 (1) $\text{RCOO}^- < \text{HC} \equiv \text{C}^- < \text{NH}_2^- < \text{R}^-$ (2) $\text{RCOO}^- < \text{HC} \equiv \text{C}^- < \text{R}^- < \text{NH}_2^-$
 (3) $\text{R}^- < \text{HC} \equiv \text{C}^- < \text{RCOO}^- < \text{NH}_2^-$ (4) $\text{RCOO}^- < \text{NH}_2^- < \text{HC} \equiv \text{C}^- < \text{R}^-$
 AB0115
13. The strongest acid amongst the following compounds is ? [AIEEE-2011]
 (1) $\text{CH}_3\text{CH}_2\text{CH}(\text{Cl})\text{CO}_2\text{H}$ (2) $\text{ClCH}_2\text{CH}_2\text{CH}_2\text{COOH}$
 (3) CH_3COOH (4) HCOOH
 AB0116
14. The correct order of acid strength of the following compounds :-
 A. Phenol B. p-Cresol
 C. m-Nitrophenol D. p- Nitrophenol
 is :- [AIEEE-2011]
 (1) $\text{C} > \text{B} > \text{A} > \text{D}$ (2) $\text{D} > \text{C} > \text{A} > \text{B}$
 (3) $\text{B} > \text{D} > \text{A} > \text{C}$ (4) $\text{A} > \text{B} > \text{D} > \text{C}$

AB0117

15. In the following compounds :

[JEE(Main)-2012]



the order of basicity is as follows :

(1) IV > III > II > I

(2) II > III > I > IV

(3) I > III > II > IV

(4) III > I > II > IV

AB0118

16. The most basic compound among the following is :-

[JEE(Main)-2012]

(1) Acetanilide

(2) Benzylamine

(3) p-Nitro aniline

(4) Aniline

AB0119

17. The order of basicity of amines in gaseous state is :-

[JEE(Main)-2013]

(1) $3^\circ > 2^\circ > \text{NH}_3 > 1^\circ$

(2) $1^\circ > 2^\circ > 3^\circ > \text{NH}_3$

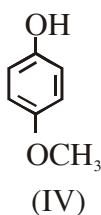
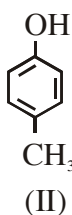
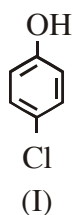
(3) $\text{NH}_3 > 1^\circ > 2^\circ > 3^\circ$

(4) $3^\circ > 2^\circ > 1^\circ > \text{NH}_3$

AB0120

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

[JEE(Main)-2013]



(1) II > IV > I > III

(2) I > II > III > IV

(3) III > I > II > IV

(4) IV > III > I > II

AB0121

19. The conjugate base of hydrazoic acid is :-

[JEE(Main)-2014]

(1) HN_3^-

(2) N_3^-

(3) N_2^-

(4) N^{3-}

AB0122

20. Which one of the following compounds will not be soluble in sodium bicarbonate ?

[JEE(Main)-2014]

(1) Benzene sulphonic acid

(2) Benzoic acid

(3) o-Nitrophenol

(4) 2, 4, 6 - Trinitrophenol

AB0123

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

[JEE(Main)-2014]

- (1) $(CH_3)_3N$ (2) $C_6H_5NH_2$ (3) $(CH_3)_2NH$ (4) CH_3NH_2

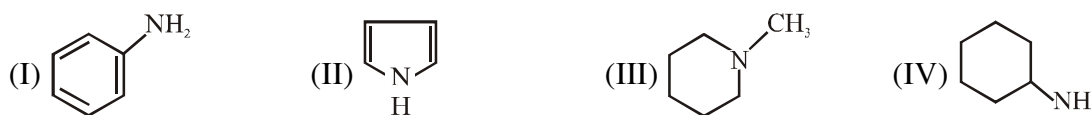
AB0124

22. Among the following oxoacids, the correct decreasing order of acid strength is : [JEE(Main)-2014]

- (1) $HClO_4 > HClO_3 > HClO_2 > HOCl$ (2) $HClO_2 > HClO_4 > HClO_3 > HOCl$
 (3) $HOCl > HClO_2 > HClO_3 > HClO_4$ (4) $HClO_4 > HOCl > HClO_2 > HClO_3$

AB0125

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



- (1) (II) < (I) < (III) < (IV) (2) (I) < (II) < (IV) < (III) [JEE(Main)-On-Line 2017]
 (3) (II) < (I) < (IV) < (III) (4) (I) < (II) < (III) < (IV)

AB0126

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

[JEE(Main)-2018]



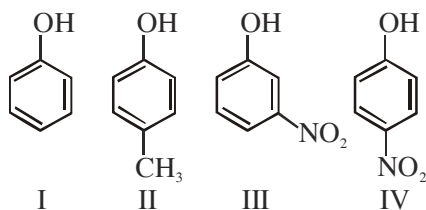
- (1) (b) < (a) < (c) < (d) (2) (b) < (a) < (d) < (c)
 (3) (d) < (b) < (a) < (c) (4) (a) < (b) < (c) < (d)

AB0127

EXERCISE # J-ADVANCED

1. In the following compounds

[IIT-JEE-1996]



The order of acidity is -

- (A) III>IV>I>II (B) I>IV>III>II (C) II>I>III>IV (D) IV>III>I>II

AB0137

2. Although phenoxide ion has more number of resonating structures than benzoate ion, benzoic acid is a stronger acid than phenol. Why ?

[IIT-JEE-1997]

AB0138

3. Amongst the following, the most basic compound is -

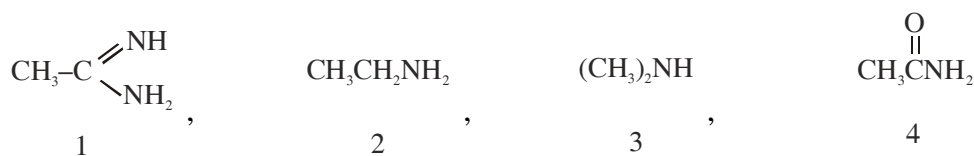
[IIT-JEE-2000]

- (A) $C_6H_5NH_2$ (B) $p\text{-NO}_2\text{-C}_6\text{H}_4\text{NH}_2$ (C) $m\text{-NO}_2\text{-C}_6\text{H}_4\text{NH}_2$ (D) $C_6H_5CH_2NH_2$

AB0139

4. The correct order of basicities of the following compounds is :

[IIT-JEE-2001]



- (A) $2 > 1 > 3 > 4$ (B) $1 > 3 > 2 > 4$ (C) $3 > 1 > 2 > 4$ (D) $1 > 2 > 3 > 4$

AB0140

5. **Statement-I :** p-Hydroxybenzoic acid has a lower boiling point than o-hydroxybenzoic acid.

Because

Statement-II : o-Hydroxybenzoic acid has intramolecular hydrogen bonding. [IIT-JEE-2003]

- (A) Statement-I is True, Statement-II is True ; Statement-II is a correct explanation for Statement-I
 (B) Statement-I is True, Statement-II is True; Statement-II is NOT a correct explanation for Statement-I
 (C) Statement-I is True, Statement-II is False.
 (D) Statement-I is False, Statement-II is True.

AB0141

6. Match K_a values with suitable acid :

[IIT-JEE-2003]

K_a

(A) 3.3×10^{-5}

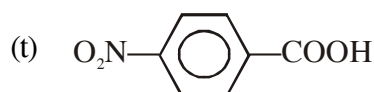
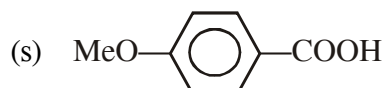
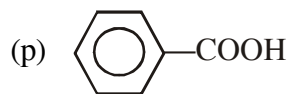
(B) 4.2×10^{-5}

(C) 6.3×10^{-5}

(D) 6.4×10^{-5}

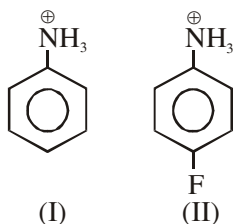
(E) 30.6×10^{-5}

Acid



7. (a) Which of the following is more acidic and why ?

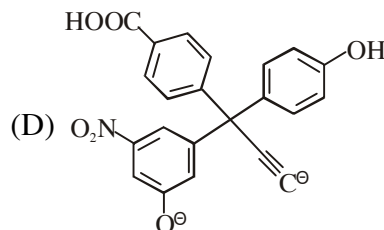
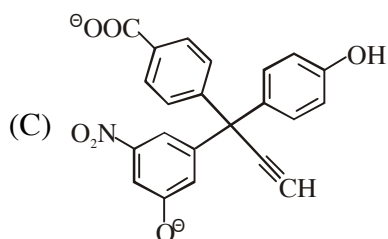
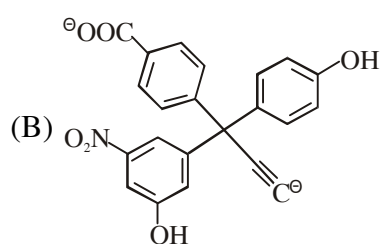
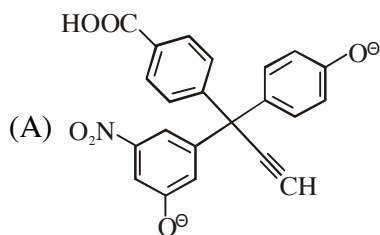
AB0142
[IIT-JEE-2004]



AB0143

8. A. The product (A) will be :

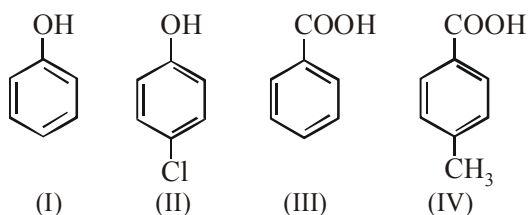
[IIT-JEE-2007]



AB0144

9. The correct acidity order of the following is :

[IIT-JEE-2009]

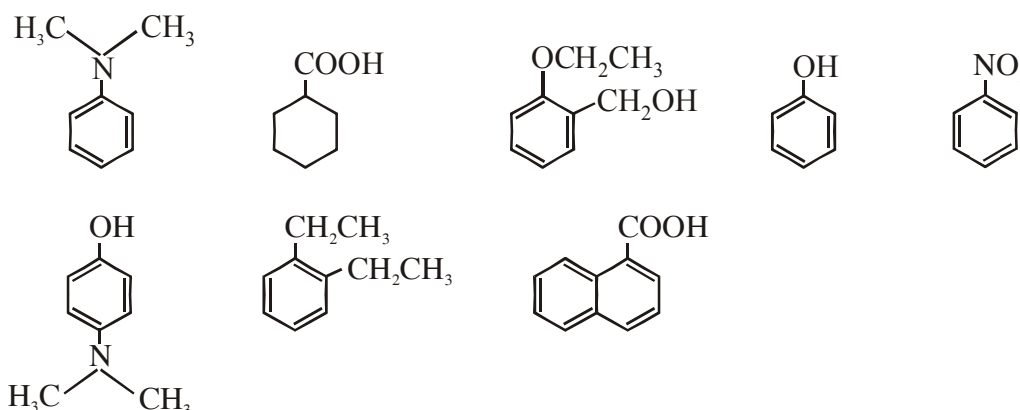


- (A) (III) > (IV) > (II) > (I) (B) (IV) > (III) > (I) > (II)
 (C) (III) > (II) > (I) > (IV) (D) (II) > (III) > (IV) > (I)

AB0145

10. Amongst the following, the total number of compounds soluble in aqueous NaOH is:

[IIT-JEE-2010]



AB0146

11. Among the following compounds, the most acidic is

[IIT-JEE-2011]

- (A) p-nitrophenol (B) p-hydroxybenzoic acid
 (C) o-hydroxybenzoic acid (D) p-toluic acid

AB0147

12. The carboxyl functional group ($-\text{COOH}$) is present in -

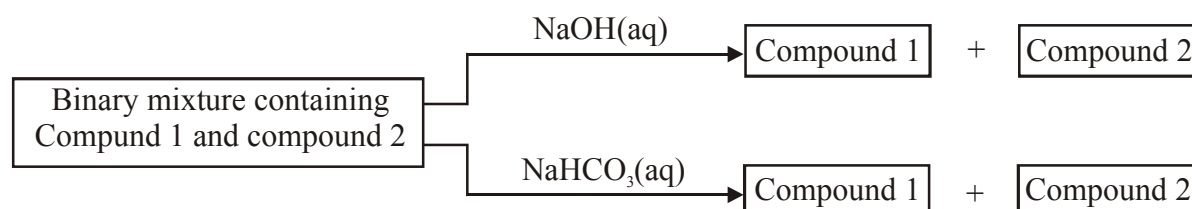
[IIT-JEE-2012]

- (A) picric acid (B) barbituric acid (C) ascorbic acid (D) aspirin

AB0148

13. Identify the binary mixtures (s) that can be separated into the individual compounds, by differential extraction, as shown in the given scheme -

[IIT-JEE-2012]



- (A) $\text{C}_6\text{H}_5\text{OH}$ and $\text{C}_6\text{H}_5\text{COOH}$ (B) $\text{C}_6\text{H}_5\text{COOH}$ and $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
 (C) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ and $\text{C}_6\text{H}_5\text{OH}$ (D) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ and $\text{C}_6\text{H}_5\text{CH}_2\text{COOH}$

AB0149

14. The compound that does NOT liberate CO_2 , on treatment with aqueous sodium bicarbonate solution, is - [JEE-ADVANCED-2013]

(A) Benzoic acid (B) Benzenesulphonic acid (C) Salicylic acid (D) Carbolic acid (phenol)

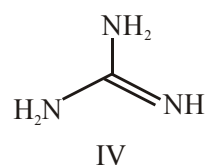
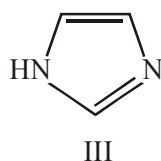
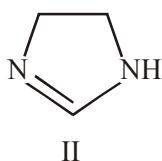
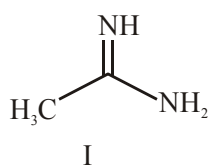
AB0150

15. Hydrogen bonding plays a central role in the following phenomena [JEE-ADVANCED-2014]

(A) Ice floats in water
(B) Higher Lewis basicity of primary amines than tertiary amines in aqueous solutions
(C) Formic acid is more acidic than acetic acid
(D) Dimerisation of acetic acid in benzene

AB0151

16. The order of basicity among the following compounds is [JEE-ADVANCED-2017]



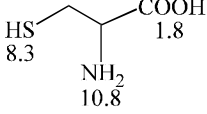
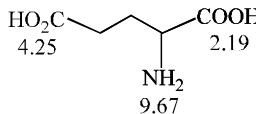
- (A) II > I > IV > III (B) IV > II > III > I
(C) I > IV > III > II (D) IV > I > II > III

AB0152

ANSWER-KEY

EXERCISE # O-1

1. (i) $a > b > c > d$, (ii) $a > b > c$, (iii) $c > b > a$, (iv) $a > b > c$,
 (v) $c > b > a$, (vi) $a > b > c$, (vii) $d > c > b > a$, (viii) $d > c > b > a$,
 (ix) $d > b > a > c$, (x) $d > a > c > b$
2. (a) 2; (b) 2; (c) 1; (d) 1 3. (a) 2; (b) 2; (c) 2 4. (C) 5. (B)
 6. (B) 7. (B) 8. (A) 9. (A)

10. (i) cysteine:  (ii) glutamic acid: 

11. (a) $3 < 2 < 1$; (b) $1 < 2 < 3$; (c) $3 < 2 < 1$; (d) $2 < 1 < 3$; (e) $2 < 3 < 1$
12. (i) $d > c > a > b$, (ii) $a > b > c$, (iii) $c > a > b > d$, (iv) $d > b > c > a$,
 (v) $a > b > c$, (vi) $b > a$, (vii) $c > a > b$
13. (i) b, (ii) a, (iii) b, (iv) b 14. (C) 15. (C) 16. (B)
 17. (C) 18. (B) 19. (4) 20. (C)

EXERCISE # O-2

1. (i) $a > b > c > d$, (ii) $a > b > c > d$, (iii) $c > b > d > a$, (iv) $d > c > b > a$
 (v) $a > b > c$, (vi) $c > b > a$, (vii) $c > a > b$, (viii) $b > c > a$, (ix) $c > d > b > a$
2. (i) $a > b > c$, (ii) $d > c > b > a$, (iii) $b > c > a$, (iv) $d > c > b > a$,
 (v) $b > a > c$, (vi) $b > a$, (vii) $c > b > a$, (viii) $d > a > b > c$
 (ix) $d > c > b > a$
3. (i) d, (ii) b, (iii) a, (iv) a
4. (i) $b > a > d > c$, (ii) $b > a > c > d$, (iii) $a > b > c > d$
5. (A) 6. (A) 7. (A) 8. (A)
9. (a) i, (b) ii, (c) i, (d) ii 10. (a) 2; (b) 1; (c) 1; (d) 1; (e) 3
11. (a) 2; (b) 1; (c) 2; (d) 2 12. (a) $1 > 2 > 3$; (b) $1 < 2 < 3$; (c) $3 < 1 < 2$; (d) $2 < 1 < 3$
13. (a) $2 < 1 < 3$; (b) $1 < 2 < 3$ 14. (C) 15. (B)
16. 3, 3 basic groups are $\ddot{\text{N}}\text{H}_2$; $-\text{NH}-$; O^- 17. (6)

EXERCISE # S-1

1. (C)
2. (C)
3. (A) – R, S, T ; (B) – P, R, S, T ; (C) – P, Q, R, S, T ; (D) – P, Q, R, S, T
4. (i), (ii) (iii) (iv), (v) (ix) 5. (D) 6. (A)
7. (A) – P, T ; (B) – R ; (C) – Q ; (D) – S, T 8. (A) – R ; (B) – S ; (C) – P ; (D) – Q, T
9. (A) 10. (A) 11. (A, D) 12. (D)
13. (A, B, C, D) 14. (B) 15. (C)

EXERCISE # JEE-MAIN

1. (3) 2. (4) 3. (3) 4. (4) 5. (4)
6. (3) 7. (4) 8. (3) 9. (1) 10. (2)
11. (3) 12. (1) 13. (1) 14. (2) 15. (3)
16. (2) 17. (4) 18. (3) 19. (2) 20. (3)
21. (3) 22. (1) 23. (3) 24. (2)

EXERCISE # J-ADVANCED

1. (D) 2. Benzoate has equivalent resonating structures 3. (D)
4. (B) 5. (D) 6. A-(s) ; B-(q) ; C-(p) ; D-(r) ; E-(t)
7. (II is most acidic) 8. (C) 9. (A) 10. (4) 11. (C)
12. (D) 13. (B, D) 14. (D) 15. (A, B, D)
16. (D)