EXERCISE-I (Conceptual Questions) Build Up Your Understanding

ATTACKING REAGENT

1. Which of the following species is an electrophile

(1) RNH_2 (2) SO_3 (3) $NO_3^{\oplus}$ (4) ROH

2. Which of the following acts as a nucleophile?

(1) $\overset{\oplus}{N}O_2$ (2) $:CCl_2$ (3) $\overset{\ominus}{N}O_2$ (4) $^{\bullet}CH_3$

REACTION INTERMEDIATES

3. Which of the following contains only three pair of electrons:

(1) Carbanion (2) Carbocation (3) Carbon free radical (4) None

4. Carbanion is a :-

(1) Base (2) Nucleophile (3) Both the above (4) None

I-EFFECT

5. $\overset{\ominus}{C}H_3$ is less stable than :-

(1) $CH_3-\overset{\ominus}{C}H_2$ (2) $CH_3-\overset{\ominus}{C}H-CH_3$

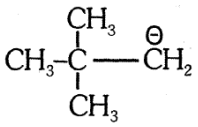
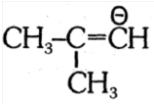
(3) $\overset{\ominus}{C}H_2-NO_2$ (4) $CH_3-\overset{\ominus}{C}H-C_2H_5$

6. Decreasing order of –I effect of the triad [$-NO_2$, $-\overset{\oplus}{N}H_3$, –CN] is:-

(1) $-\overset{\oplus}{N}H_3 > -NO_2 > -CN$ (2) $-\overset{\oplus}{N}H_3 > -CN > NO_2$

(3) $-\overset{\oplus}{N}H_3 > -CN > NO_2$ (4) $-NO_2 > -CN > -\overset{\oplus}{N}H_3$

7. Most stable carbanion is:-

(1) $HC\equiv\overset{\oplus}{C}$ (2) $H_2C=\overset{\oplus}{C}H$ (3)  (4) 

8. The correct order of stability of given carbanions will be:-

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

(I) (II) (III)

(1) I > II > III (2) III > II > I

(3) I > III > II (4) II > I > III

9. Which is most basic among the following :

(1) CH_3NH_2 (2) $CH_3CH_2NH_2$ (3) NH_3 (4) $(CH_3)_2CHNH_2$

10. Which ofthe following has maximum pK_a :

(1) CH_2FCOOH (2) $CH_2ClCOOH$ (3) CH_3COOH (4) HCOOH

11. Which of the following is most acidic
(1) Methoxy acetic acid (2) Acetic acid
(3) Chloro acetic acid (4) Trifluoroacetic acid

12. Which of the following show + I-effect :-
(1) –OH (2) $-OCH_3$ (3) $-CH_3$ (4) –Cl

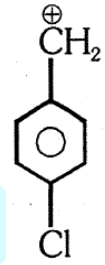
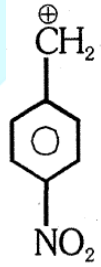
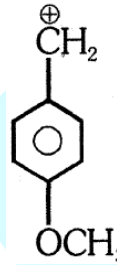
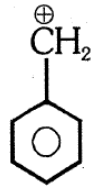
13. Among the following the most highly ionised in water is:
(1) $CH_3CH_2CHClCOOH$ (2) $CH_3CH_2CCl_2COOH$
(3) $CH_3CHClCH_2COOH$ (4) $CH_2ClCH_2CH_2COOH$

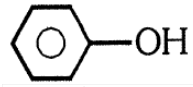
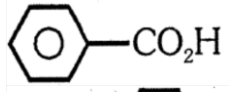
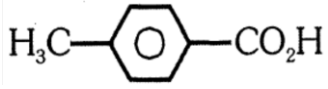
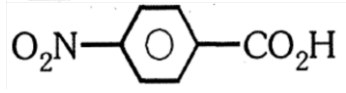
14. The strongest acid amongst the following compounds is ?
(1) $CH_3CH_2CH(Cl)CO_2H$ (2) $ClCH_2CH_2CH_2COOH$
(3) CH_3COOH (4) HCOOH

15. Which of the following acids is stronger than acetic acid :-
(1) Propanoic acid (2) HCOOH (3) Butyric acid (4) $(CH_3)_2CHCOOH$

16. Which of the following acids have the lowest pK_a value :-
(1) 
(2) $Cl–CH_2–CH_2–COOH$
(3) CCl_3COOH (4) $CHCl_2COOH$

R-OR M-EFFECT

17. Most stable carbocation is:-
(1) 
(2) 
(3) 
(4) 

18. Most acidic compound is:-
(1) 
(2) 
(3) 
(4) 

19. Which resonating structure of vinyl chloride is least stable:-

(1) $CH_2=CH-\ddot{Cl}:$ (2) $\overset{\ominus}{C}H_2-CH=\overset{\oplus}{Cl}$

(3) $\overset{\ominus}{C}H_2-\overset{\oplus}{C}H=Cl$ (4) All have equal stability

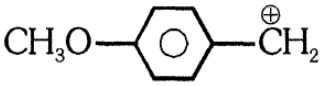
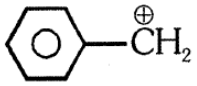
20. The stabilization due to resonance is maximum in

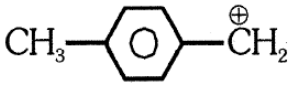
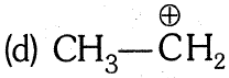
(1)  (2)  (3)  (4) 

21. In which of the following compounds carbon-chlorine bond distance is minimum :-

(1) $CH_3–Cl$ (2) $C_6H_5–CH_2–Cl$ (3) $CH_2=CH–Cl$ (4) $CH_2=CH–CH_2–Cl$

22. Consider the following carbocations

(a)  (b) 

(b)  (d) 

The relative stabilities of these carbocations are such that:-

(1) d < b < c < a (2) b < d < c < a

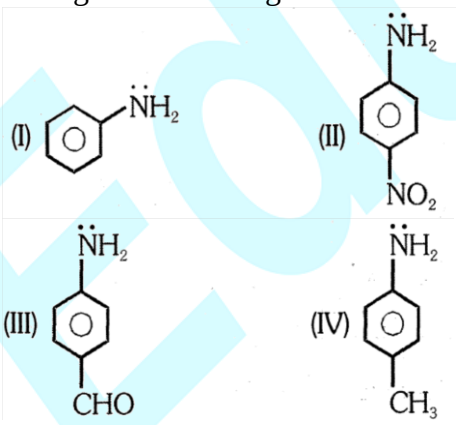
(3) d < b < a < c (4) b < d < a < c

23. Among the following the strongest base is:-

(1) $C_6H_5NH_2$ (2) $p–NO_2–C_6H_4NH_2$

(3) $m\text{-}NO_2–C_6H_4NH_2$ (4) $C_6H_5CH_2NH_2$

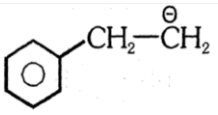
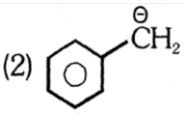
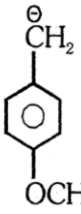
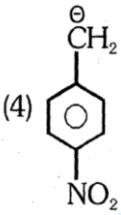
24. Arrange in decreasing order of basic strength :-



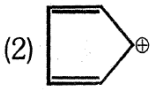
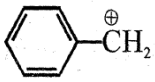
(1) I > II > III > IV (2) II > III > I > IV

(3) IV > I > III > II (4) IV > I > II > III

25. The most stable carbanion among the following is

(1)  (2)  (3)  (4) 

26. Which of the following is most stable carbocation:-

(1)  (2)  (3)  (4) $CH_2=CH-\overset{\oplus}{C}H_2$

27. The oxygen atom in phenol -

(1) exhibits only inductive effect

(2) exhibits only resonance effect

(3) has more dominating resonance effect than inductive effect

(4) has more dominating inductive effect than resonance effect

28. Which is incorrect stability order :-

(1) $CH_2 = CH - \overset{\oplus}{C}H_2 \; > \; CH_3 - \overset{\oplus}{C}H - CH_3$

(2) $CH_2 = \overset{\oplus}{C}H \; < \; CH_3 - \overset{\oplus}{C}H_2$

(3) $CH_3 - CH_2 - \overset{\ominus}{C}H_2 \; > \; CH_3 - \overset{\ominus}{C}H - CH_3$

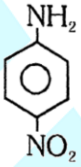
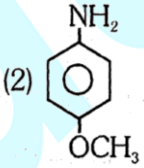
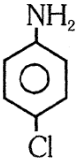
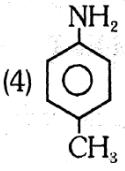
(4) $CH_3 - \overset{\oplus}{C}H_2 \; > \; CH_3O - \overset{\oplus}{C}H_2$

29. Mesomeric effect is due to :

(1) Delocalization of σ e⁻s (2) Delocalization of n e⁻s

(3) Migration of H-atom (4) Migration of proton

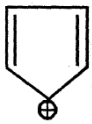
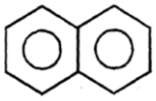
30. Which of the following is least basic :

(1)  (2)  (3)  (4) 

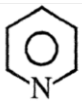
31. Among the following the pK_a is minimum for :-

(1) C_6H_5OH (2) HCOOH (3) C_2H_5OH (4) $CH_3C{\equiv}CH$

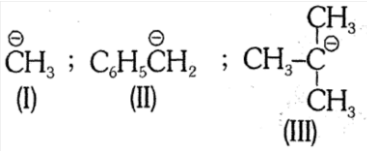
32. Among the following the aromatic compound is :-

(1)  (2)  (3)  (4) 

33. Which is aromatic compound among the following

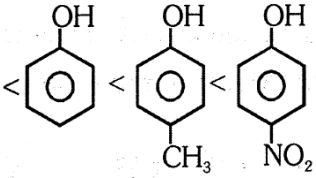
(1)  (2)  (3)  (4) All the above

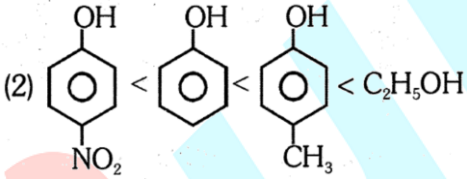
34. Select the correct option for stability of following carbanions :

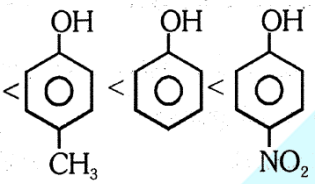


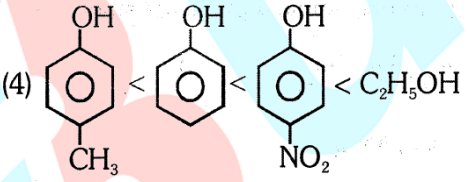
(1) I > II > III (2) II > I > III (3) III > II > I (4) II > III > I

35. Correct increasing order of acidity of the following phenol is:-

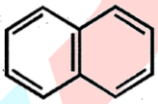
(1) $C_2H_5OH <$ 

(2) 

(3) $C_2H_5OH <$ 

(4) 

36. The non aromatic compound among the following is :-

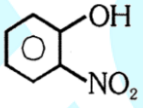
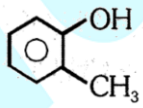
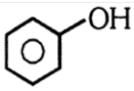
(1)  (2)  (3)  (4) 

37. The correct order of acidic strength of the following compounds is:-

A. Phenol B. p-Cresol C. m-Nitrophenol D. p-Nitrophenol

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

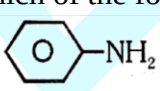
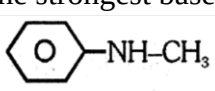
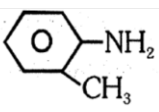
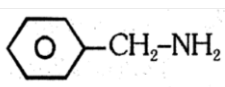
38. Which one of the following compounds is most acidic:-

(1)  (2)  (3)  (4) $ClCH_2CH_2OH$

39. Which of the following is most acidic :-

(1) phenol (2) benzyl alcohol (3) m-chloro phenol (4) cyclohexanol

40. Which of the following is the strongest base :-

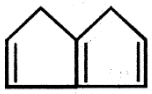
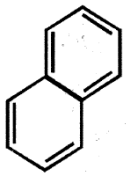
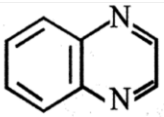
(1)  (2)  (3)  (4) 

41. The dipole moment of vinyl chloride is lower than that of methyl chloride. This is due to:-

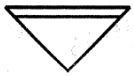
(1) Resonance effect (2) Inductive effect

(3) Electromeric effect (4) Hyperconjugation

42. Which is Aromatic compound :-

(1) 
(2) 
(3) 
(4) 2 and 3 both

43. Which of the following is the most acidic compound:-

(1) $CH_2=CH_2$ (2) $HC^{o}CH$ (3)  (4) 

44. Among the following the strongest acid is :

(l) CH_3COOH (2) C_6H_5COOH
(3) m-$CH_3OC_6H_4COOH$ (4) p-$CH_3OC_6H_4COOH$

45. The least reactive chlorine is present in:-

(1) Methyl chloride (2) Allyl chloride (3) Ethyl chloride (4) Vinyl chloride

46. Which one of the following resonating structures of 1-methoxy-1, 3-butadiene is least stable :-

(1) $\overset{\ominus}{C}H_2-CH=CH-CH=\overset{\oplus}{O}-CH_3$

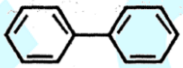
(2) $CH_2=CH-\overset{\ominus}{C}H-CH=\overset{\oplus}{O}-CH_3$

(3) $\overset{\ominus}{C}H_2-\overset{\oplus}{C}H-CH=CH-O-CH_3$

(4) $CH_2=CH-CH=CH-O-CH_3$

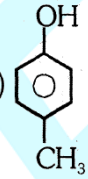
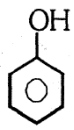
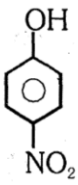
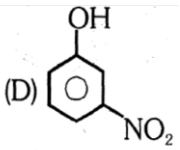
47. Four structures are given in options (a) to (d). Examine them and select the aromatic trucutures.

(a)  (b) 

(c)  (d) 

(1) a and d (2) b and c (3) a and b (4) a and c

48. Order of acidic strength of the following compound will be:-

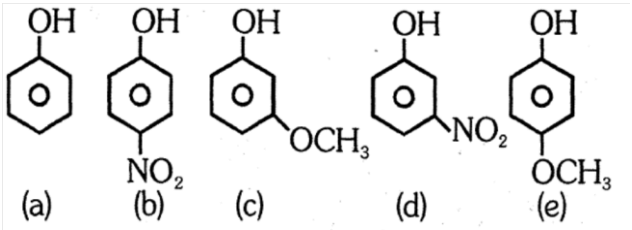
(A)  (B)  (C)  (D) 

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

49. Phenol is less acidic than

(1) Ethanol (2) o-Nitrophenol (3) o-Methylphenol (4) o-Methoxyphenol

50. Mark the correct order of decreasing acid strength of the following compounds.



(1) e > d > b > a > c
(2) b > d > a > c > e
(3) e > d > c > b > a
(4) b > d > c > a > e

HYPERCONJUGATION

51. Which of the following compounds exhibits hyperconjugation :
(1) Phenol (2) Ethyne (3) Ethanol (4) Propene

52. Which of the following is least stable :-

(1) $CH_3-\overset{\oplus}{C}H-CH_3$

(2) $CH_3-CH_2-\overset{\oplus}{C}H_2$

(3) $CH_3-\overset{\oplus}{C}(CH_3)-CH_3$ (CH_3)

(4) $CH_3-\overset{CH_3}{\overset{|}{C}}(CH_3)-\overset{\oplus}{C}H-C_6H_5$

53. Which of the following is most stable alkene:-

(1) $H_2C=CH_2$

(2) $CH_3-CH=CH_2$

(3) $H_5C_2-CH=CH_2$

(4) $(CH_3)_2CH-CH=CH_2$

54. The correct order of increasing stability of ythe given alkenes is
(1) 1-pentene > cis -2- pentene >trans- 2-pentene > 2 - methyl- 2 - butene
(2) 1-pentene > trans-2-pentene > cis-2-pentene > 2 - methyl- 2 - butene
(3) 1-pentene < cis-2-pentene <trans- 2-pentene < 2 - methyl - 2 - butene
(4) 1-pentene <trans- 2-pentene <cis -2- pentene < 2 - methyl- 2 – butane

TAUTOMERISM

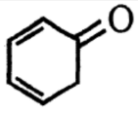
55. Tautomerism is due to :-
(1) Delocalization of sigma electrons (2) Delocalization of pi electrons
(3) Migration of active-H-atom (4) None is correct

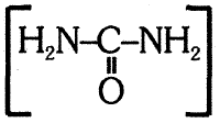
56. Which of the following will lead to maximum enolisation :-

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

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

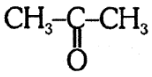
(3) $CH_3-\overset{O}{\overset{\|}{C}}-\underset{Br}{CH}-\overset{O}{\overset{\|}{C}}-CH_3$

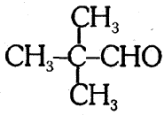
(4) 

57. Urea  molecule exhibits (isomerism):-

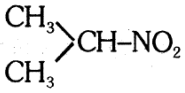
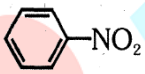
(1) Chain (2) Position (3) Geometrical (4) Tautomerism

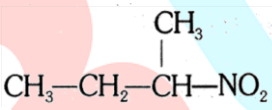
58. Tautomerism is not observed in :-

(1)  (2) Ph–CH=CH–OH

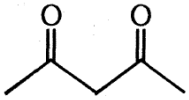
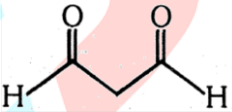
(3) $CH_3–NO_2$ (4) 

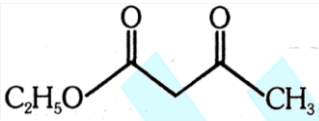
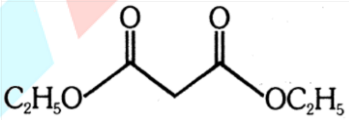
59. Which of the following is not soluble in NaOH solution :

(1)  (2) 

(3) $CH_3CH_2–NO_2$ (4) 

60. Which of the following has highest enol content.

(1)  (2) 

(3)  (4) 

ANSWER KEY

EXERCISE-I (Conceptual Questions)

1.	(2)	**2.**	(3)	**3.**	(2)	**4.**	(3)	**5.**	(3)	**6.**	(1)	**7.**	(1)
8.	(2)	**9.**	(4)	**10.**	(3)	**11.**	(4)	**12.**	(3)	**13.**	(2)	**14.**	(1)
15.	(2)	**16.**	(3)	**17.**	(3)	**18.**	(4)	**19.**	(3)	**20.**	(4)	**21.**	(3)
22.	(1)	**23.**	(4)	**24.**	(3)	**25.**	(4)	**26.**	(1)	**27.**	(3)	**28.**	(4)
29.	(2)	**30.**	(1)	**31.**	(2)	**32.**	(3)	**33.**	(4)	**34.**	(2)	**35.**	(3)
36.	(1)	**37.**	(2)	**38.**	(1)	**39.**	(3)	**40.**	(4)	**41.**	(1)	**42.**	(4)
43.	(4)	**44.**	(3)	**45.**	(4)	**46.**	(3)	**47.**	(4)	**48.**	(1)	**49.**	(2)
50.	(4)	**51.**	(4)	**52.**	(2)	**53.**	(2)	**54.**	(3)	**55.**	(3)	**56.**	(4)
57.	(4)	**58.**	(4)	**59.**	(2)	**60.**	(2)						