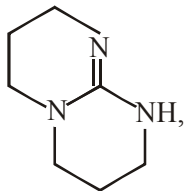


ELECTRONIC DISPLACEMENT EFFECT

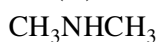
1. The increasing order of pK_b for the following compounds will be :



(A)



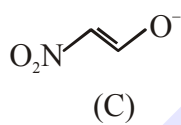
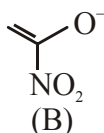
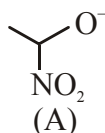
(B)



(C)

- (1) (A) < (B) < (C) (2) (C) < (A) < (B)
 (3) (B) < (A) < (C) (4) (B) < (C) < (A)

2. The correct order of stability for the following alkoxides is :

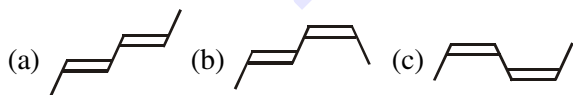


- (1) (C) > (B) > (A) (2) (C) > (A) > (B)
 (3) (B) > (C) > (A) (4) (B) > (A) > (C)

3. Arrange the following compounds in increasing order of C–OH bond length :
 methanol, phenol, p-ethoxyphenol

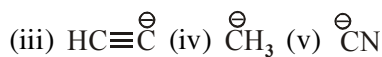
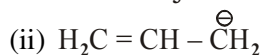
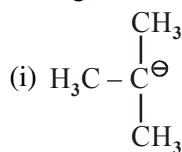
- (1) phenol < methanol < p-ethoxyphenol
 (2) phenol < p-ethoxyphenol < methanol
 (3) methanol < p-ethoxyphenol < phenol
 (4) methanol < phenol < p-ethoxyphenol

4. The correct order of heat of combustion for following alkadienes is :



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

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

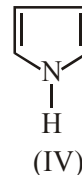
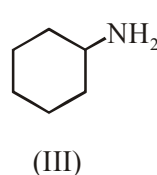
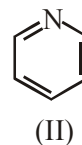


- (1) (v) < (i) < (iv) < (ii) < (iii)
 (2) (iii) < (i) < (ii) < (iv) < (v)
 (3) (v) < (iii) < (ii) < (iv) < (i)
 (4) (iii) < (iv) < (ii) < (i) < (v)

6. Which of the following has the shortest C–Cl bond?

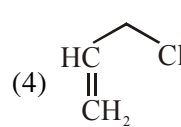
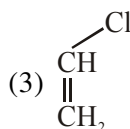
- (1) $Cl-CH=CH-OCH_3$
 (2) $Cl-CH=CH-CH_3$
 (3) $Cl-CH=CH_2$
 (4) $Cl-CH=CH-NO_2$

7. The decreasing order of basicity of the following amines is :

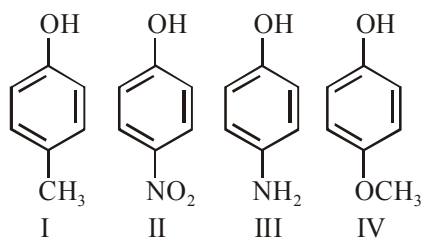


- (1) (I) > (III) > (IV) > (II)
 (2) (III) > (I) > (II) > (IV)
 (3) (III) > (II) > (I) > (IV)
 (4) (II) > (III) > (IV) > (I)

8. Among the following compounds, which one has the shortest C–Cl bond ?



9. The increasing order of boiling points of the following compounds is :

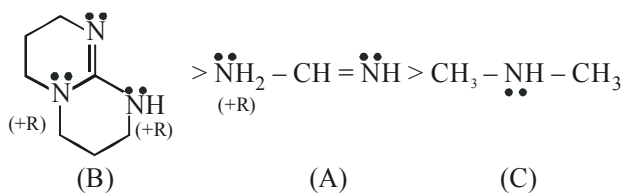


- (1) I < IV < III < II (2) IV < I < II < III
(3) I < III < IV < II (4) III < I < II < IV

SOLUTION

1. NTA Ans. (3)

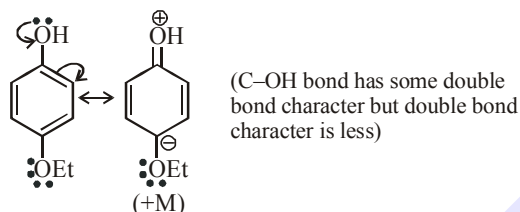
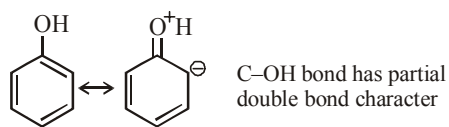
Sol. Base strength order

pK_b order (C > A > B)

2. NTA Ans. (1)

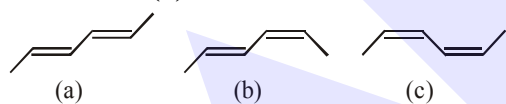
Sol. (C) > (B) > (A)

3. NTA Ans. (2)

Sol. H₃C – OH (100% single bond)Ans. CH₃OH > (p-ethoxyphenol) > OH

4. NTA Ans. (1)

Sol.



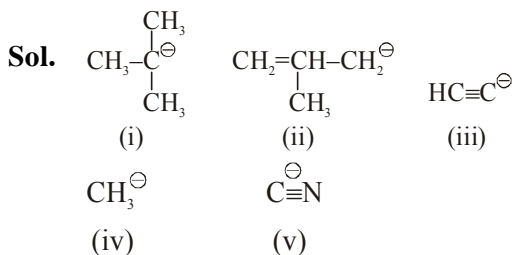
(Trans, Trans) (Trans, Cis) (Cis, Cis)
 ∴ Generally trans is more stable than cis form.

$$\text{Heat of combustion (HOC)} \propto \frac{1}{\text{Stability}}$$

Stability : a > b > c

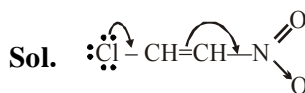
HOC : c > b > a

5. NTA Ans. (3)



Basic strength order : (i) > (iv) > (ii) > (iii) > (v)

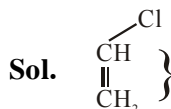
6. NTA Ans. (4)



Due to –M effect of –NO₂ and + M effect of Cl more D.B. character between C – Cl bond. So shortest bond length.

7. NTA Ans. (3)

8. Official Ans. by NTA (3)



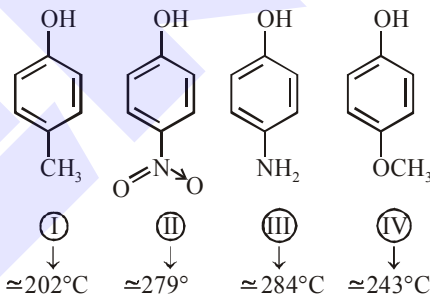
In option (3) C–Cl bond is shortest due to resonance of lone pair of –Cl.

Due to resonance C–Cl bond acquires partial double bond character.

Hence C–Cl bond length is least.

9. Official Ans. by NTA (1)

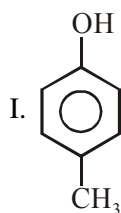
Sol.



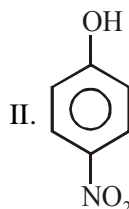
$$\text{BP} \propto \text{dipole moment } (\mu)$$

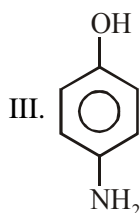
Alter

Increasing order of boiling point is :

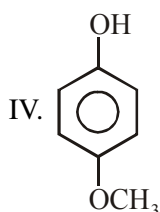


⇒ Shows hydrogen bonding from –O–H group only

⇒ Shows strongest hydrogen bonding from both sides of –OH group as well as –NO₂ group.



⇒ Shows stronger hydrogen from both side of -OH group as well as -NH₂ group.



⇒ Shows stronger hydrogen bonding from one side -OH-group and another side of -OCH₃ group shows only dipole-dipole interaction.

⇒ Hence correct order of boiling point is:

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