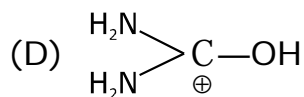
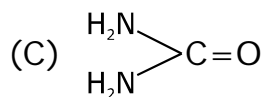
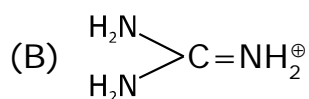
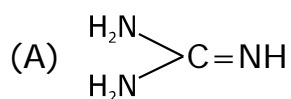
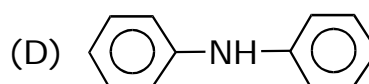
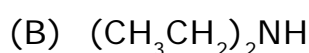
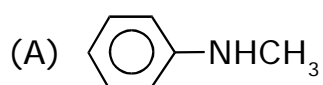


BASICITY

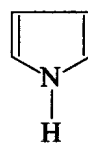
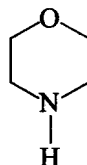
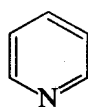
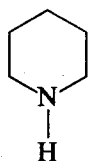
Q.1 Strongest base is :



Q.2 Maximum pK_b value is of :



Q.3 In the following compounds :



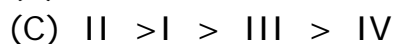
(I)

(II)

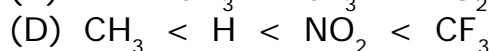
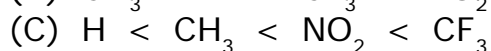
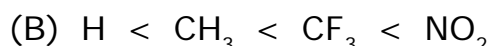
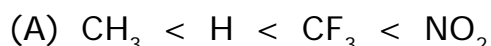
(III)

(IV)

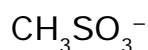
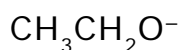
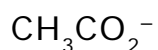
the order of basic nature is :



Q.4 pK_b of amines $\text{X}-\text{C}_6\text{H}_4-\text{NH}_2$ is in order when X is :



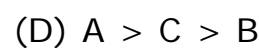
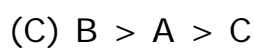
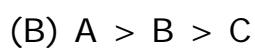
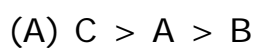
Q.5 Rank in order of decreasing base strength.



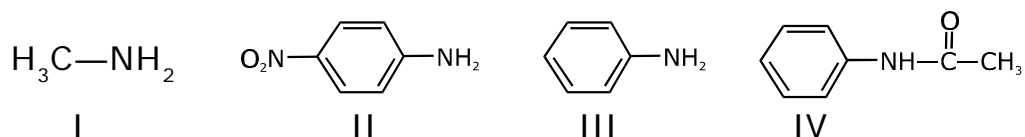
A

B

C



Q.6 Arrange the compounds shown below in order of decreasing basicity (most basic first).



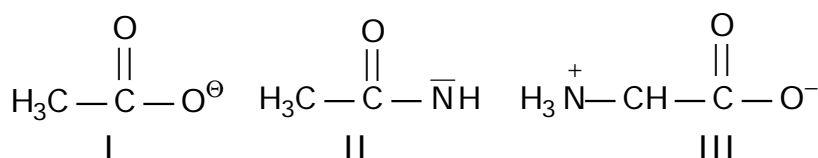
- (A) I > II > III > IV (B) IV > III > II > I
 (C) IV > II > III > I (D) III > II > I > IV
 (E) I > III > II > IV (F) None of these

Q.7 Using the information in the table below, rank the amines, X, Y and Z, in order of decreasing base strength (most basic first) :

Amine	X	Y	Z
pK _a of conjugate acid	-5	5	10

- (A) X > Y > Z (B) Z > Y > X (C) Y > X > Z (D) Z > X > Y

Q.8 Rank the following compounds in order of increasing basicity -



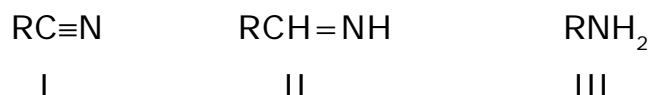
- (A) III < II < I (B) III < I < II
 (C) II < III < I (D) I < II < III

Q.9 What is the order of basicity in gas phase.



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

Q.10 What is the order of basicity

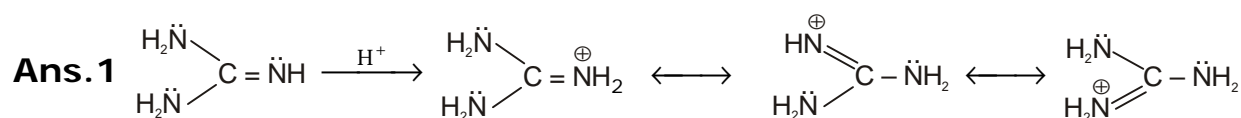


- (A) I > II > III (B) III > II > I
 (C) II > III > I (D) I > III > II

ANSWER KEY

Q.No.	1	2	3	4	5	6	7	8	9	10
Ans.	A	D	D	A	C	E	B	B	A	B

SOLUTIONS (BASICITY)



Resonance involving three equivalent contributing structures which accounts for the large delocalisation and unusual stability of the cation resulting in the enhanced basicity of the guanidine.

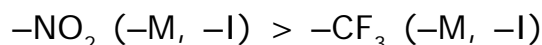
Ans.2 $\text{pK}_b \propto \frac{1}{\text{Basicity}} \propto \text{delocalisation of electrons cloud}$

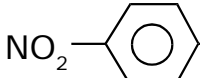
In (D) maximum delocalisation of lone pair of electron of nitrogen takes place so it is least basic.

Ans.3 IV is lesser basic than II because lp of N take part in aromaticity in IV but does not take part in II. I & III more basic than II because in I & III lp is present on sp^3 hybridised N atom. While in II it is present on sp^2 "N" atom.
 $\text{III} < \text{I}$ as in III-I effect of oxygen decreases basicity.

Ans.4 $\text{pK}_b \propto \frac{1}{\text{Basicity}}$

$-\text{NO}_2$, $-\text{CF}_3$ have $-M$ & $-I$ effect which decreases the basicity while $-\text{CH}_3$ has $+M$ & $+I$ effect which increases the basicity.



\therefore  NH_2 is least basic.

Note that $-\text{CF}_3$ has reverse hyperconjugation.

Ans.5 No delocalisation of $-ve$ charge in B so it is most basic.
 Delocalisation is more in (C) than in (A) so basicity of $\text{A} > \text{C}$.

Ans.6 I is most basic as there is no delocalisation of lone pair of nitrogen amount of delocalisation of lone pair of nitrogen is in order.

$$\text{IV} > \text{II} > \text{III}$$

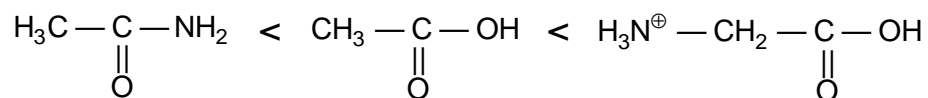
More the delocalisation, lesser is the basicity.

Ans.7 $\text{pK}_b = 14 - \text{pK}_a$

	x	y	z
$\text{pK}_b =$	[14 - (-5)]	(14 - 5)	(14 - 10)
$\text{pK}_b =$	19	9	4

$$\text{pK}_b \propto \frac{1}{\text{Basicity}}$$

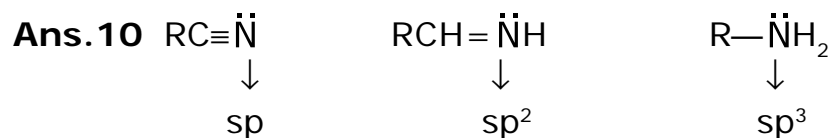
Ans.8 Acidity of conjugate acids of following compounds are



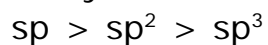
Stronger acid has weaker conjugate base

So. III < I < II

Ans.9 In the gas phase, Inductive effect is controlling the basicity. More the +I group, greater is the basicity.



Electronegative order of hybridised Nitrogen atom.



Greater the electronegativity, lesser is the Basicity.