



# CHEMISTRY

## BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

### IONIC EQUILIBRIUM

#### Others

1. Concentration of the  $Ag^+$  ions in a saturated solution of  $Ag_2CO_3$  is  $2.2 \times 10^{-4} mol L^{-1}$

Solubility product of  $Ag_2C_2O_4$  is:

A.  $2.42 \times 10^{-8}$

B.  $2.66 \times 10^{-12}$

C.  $4.5 \times 10^{-11}$

D.  $5.3 \times 10^{-12}$

**Answer: D**



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2. MY and  $NY_3$  two nearly insoluble salts, have the same  $K_{sp}$  values of  $6.2 \times 10^{-13}$  at room

temperature. Which statement would be true in rearged to MY and  $NY_3$  ?

A. The molar solubility of MY in water is less than that of  $NY_3$ .

B. The salts MY and  $NY_3$  are more soluble in 0.5 M KY than in pure water

C. The addition of the salt of KY to solution of MY and  $NY_3$  will have no effect on their solubilities

D. The molar solubilities of MU and  $NY_3$  in water are identical.

**Answer: A**



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3. The percentage of pyridine ( $C_5H_5N$ ) that forms pyridinium ion ( $C_5H_5N^+H$ ) in a 0.10 M aqueous pyridine solution ( $K_b$  for  $C_5H_5N = 1.7 \times 10^{-9}$ ) is

A. 0.0060 %

B. 0.013 %

C. 0.77 %

D. 1.6 %

**Answer: B**



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4. The solubility product of  $AgCl$  is  $1.8 \times 10^{-10}$  at  $18^\circ C$ . The solubility of  $AgCl$  in  $0.1M$  solution of sodium chloride would be

A.  $1.26 \times 10^{-5} M$

B.  $1.6 \times 10^{-9} M$

C.  $1.6 \times 10^{-11} M$

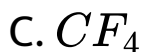
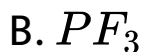
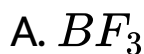
D. zero

**Answer: B**



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5. Which of the of the following fluoro - compounds is most likely to behave as a Lewis base?



D.  $SiF_4$

**Answer: D**



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6. The  $K_{sp}$  of  $Ag_2CrO_4$ ,  $AgCl$ ,  $AgBr$  and  $AgI$  are \_\_\_\_\_ respectively,

$1.1 \times 10^{-12}$ ,  $1.8 \times 10^{-10}$ ,  $5.0 \times 10^{-13}$ ,  $8.3 \times 10^{-17}$

. Which one of the following salts will precipitate last if  $AgNO_3$  solution is added to the solution containing equal moles of  $NaCl$ ,  $NaBr$ ,  $NaI$  and  $Na_2CrO_4$  ?

A. AgI

B. AgCl

C. AgBr

D.  $Ag_2CrO_4$

**Answer: D**



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7. What is the  $pH$  of the resulting solution when equal volumes of  $0.1MNaOH$  and  $0.01MHCl$  are mixed?



A. 12.65

B. 2.0

C. 7.0

D. 1.04

**Answer: A**



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**8.** Which one of the following pairs of solution is not an acidic buffer?

A.  $HClO_4$  and  $NaClO_4$

B.  $CH_3COOH$  and  $CH_3COONa$

C.  $H_2CO_3$  and  $Na_2CO_3$

D.  $H_3PO_4$  and  $Na_3PO_4$

**Answer: A**

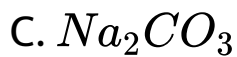


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9. Which of the following salts will give highest  $pH$  in water?

A. KCl

B. NaCl

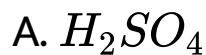


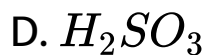
**Answer: C**



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**10.** Which is the strongest acid in the following ?



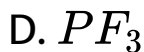


**Answer: C**



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**11.** Which of these is least likely to act as Lewis base?

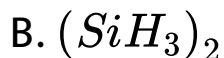


**Answer: C**



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**12. Which of the following is electron deficient ?**



**Answer: C**



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13.  $pH$  of saturated solution of  $Ba(OH)_2$  is 12.

The value of solubility product ( $K_{sp}$ ) of  $Ba(OH)_2$  is

A.  $3.3 \times 10^{-7}$

B.  $5.0 \times 10^{-7}$

C.  $4.0 \times 10^{-6}$

D.  $5.0 \times 10^{-6}$

**Answer: B**

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14. Equimolar solutions of the following substances were prepared separately. Which one of these will record the highest  $pH$  value?



**Answer: A**



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15. Buffer solutions have constant acidity and alkalinity because

A. these given unionised acid or base on reaction with added acid or alkali

B. acids and alkalies in these solutions are shielded from attack by other ions

C. they have large excess of  $H^+$  or  $OH^-$  ions

D. they have fixed value of pH



**Answer: A**



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**16.** A buffer solution is prepared in which the concentration of  $NH_3$  is  $0.30M$  and the concentration of  $NH_4^+$  is  $0.20M$ . If the equilibrium constant,  $K_b$  for  $NH_3$  equals  $1.8 \times 10^{-5}$ , what is the  $pH$  of this solution? ( $\log 2.7 = 0.43$ )

**A. 9.43**

**B. 11.72**

C. 8.73

D. 9.08

**Answer: A**



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17.  $pH$  of saturated solution of  $Ba(OH)_2$  is 12.

The value of solubility product ( $K_{sp}$ ) of

$Ba(OH)_2$  is

A.  $4.00 \times 10^{-6} M^3$

B.  $4.00 \times 10^{-7} M^3$

C.  $5.00 \times 10^{-7} M^3$

D.  $5.00 \times 10^{-6} M^3$

**Answer: D**



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**18.** What is  $[H^+]$  in  $mol/L$  of a solution that is  $0.20M$  in  $CH_3COONa$  and  $0.1M$  in  $CH_3COOH$ ?  $K_a$  for  $CH_3COOH$  is  $1.8 \times 10^{-5}$ ?

A.  $3.5 \times 10^{-4}$

B.  $1.1 \times 10^{-5}$

C.  $1.8 \times 10^{-5}$

D.  $9.0 \times 10^{-6}$

**Answer: D**



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**19.** In a buffer solution containing equal concentration of  $B^-$  and  $HB$ , the  $K_b$  for  $B^-$  is  $10^{-10}$ . The  $pH$  of buffer solution is

A. 10

B. 7

C. 6

D. 4

**Answer: D**



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**20.** What is the  $[OH^-]$  in the final solution prepared by mixing  $20.0\text{mL}$  of  $0.050\text{M HCl}$  with  $30.0\text{mL}$  of  $0.10\text{M Ba(OH)}_2$ ?

A.  $0.10\text{M}$

B.  $0.40\text{M}$

C.  $0.0050M$

D.  $0.12M$

**Answer: A**



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**21.** The ionization constant of ammonium hydroxide is  $1.77 \times 10^{-5}$  at  $298K$ . Hydrolysis constant of ammonium chloride is

A.  $5.65 \times 10^{-10}$

B.  $6.50 \times 10^{-12}$

C.  $5.65 \times 10^{-13}$

D.  $5.65 \times 10^{-12}$

**Answer: A**



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**22.** Which of the following molecules acts as a Lewis acid?



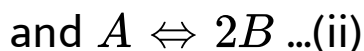
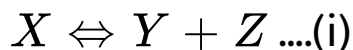


**Answer: A**



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**23.** The values of  $K_{p1}$  and  $K_{p2}$  for the reactions



are in ratio of 9 : 1. If degree of dissociation of X and A be equal, then total pressure at equilibrium (i) and (ii) are in the ratio.



A. 3 : 1

B. 1 : 9

C. 36 : 1

D. 1 : 1

**Answer: C**



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**24.** The dissociation equilibrium of a gas AB, can be represented as The degree of dissociation is  $x$  and is small compared to 1. The expression

relating the degree of dissociation ( $x$ ) with equilibrium constant  $K_p$ , and total pressure  $p$  is

A.  $(2K_p / p)$

B.  $(2K_p / p)^{1/3}$

C.  $(2K_p / p)^{1/2}$

D.  $(K_p / p)$

**Answer: B**



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25. Equal volumes of three acid solutions of  $pH$  3, 4 and 5 are mixed in a vessel. What will be the  $H^+$  ion concentration in the mixture?

A.  $1.11 \times 10^{-4} M$

B.  $3.7 \times 10^{-4} M$

C.  $3.7 \times 10^{-3} M$

D.  $1.11 \times 10^{-3} M$

**Answer: B**



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**26.** A weak acid, HA, has a  $K_a$  of  $1.00 \times 10^{-5}$ . If 0.100 mol of the acid is dissolved in 1 L of water, the percentage of the acid dissociated at equilibrium is the closed to

A. 99.0 %

B. 1.00 %

C. 99.9 %

D. 0.100 %

**Answer: B**



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27. Calculate the  $pOH$  of solution at  $25^{\circ}C$  that contains  $1 \times 10^{-10}M$  of hydronium ions, i.e.,  $H_3O^{+}$

A. 7.00

B. 4.00

C. 9.00

D. 1.00

**Answer: B**



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28. The hydrogen ion concentration of a  $10^{-8}M HCl$  aqueous solution at  $298K$  ( $K_w = 10^{-14}$ ) is

A.  $1.0 \times 10^{-6}M$

B.  $1.0525 \times 10^{-7}M$

C.  $9.525 \times 10^{-8}M$

D.  $1.0 \times 10^{-8}M$

**Answer: B**



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29. Which of the following constitutes a buffer ?

A.  $HNO_2$  and  $NaNO_2$

B. NaOH and NaCl

C.  $HNO_3$  and  $NH_4NO_3$

D. HCl and KCl

**Answer: A**



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30.  $H_2S$  gas when passed through a solution of cations containing  $HCl$  precipitates the cations of second group in qualitative analysis but not those belonging to the fourth group. It is because

A. presence of  $HCl$  decreases the sulphide ion concentration

B. presence of  $HCl$  increases the sulphide ion concentration

C. solubility product of group II sulphides is more than that of group IV sulphides



D. sulphides of group IV cations are unstable  
in HCl

**Answer: A**



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**31.** What is the correct relationship between the pH of isomolar solutions of sodium oxide ( $pH_1$ ), sodium sulphide ( $pH_2$ ), sodium selenide ( $pH_3$ ), and sodium telluride ( $pH_4$ ) ?

$$\text{A. } pH_1 > pH_2 \approx pH_3 > pH_4$$

B.  $pH_1 < pH_2 < pH_3 < pH_4$

C.  $pH_1 < pH_2 < pH_3 \approx pH_4$

D.  $pH_1 > pH_2 > pH_3 > pH_4$

**Answer: D**



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**32.** At  $25^\circ C$ , the dissociation constant of a base. BOH is  $1.0 \times 10^{-12}$ . The concentration of hydroxyl ions in 0.01M aqueous solution of the base would be

A.  $2.0 \times 10^{-6} \text{ mol L}^{-1}$

B.  $1.0 \times 10^{-5} \text{ mol L}^{-1}$

C.  $1.0 \times 10^{-6} \text{ mol L}^{-1}$

D.  $1.0 \times 10^{-7} \text{ mol L}^{-1}$

**Answer: D**



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**33.** The rapid change of  $pH$  near the stoichiometric point of an acid-base titration is the basis of indicator detection.  $pH$  of the

solution is related to the ratio of the concentration of conjugate acid ( $HIn$ ) and base ( $In^-$ ) forms of the indicator by the expression

A.  $\log. \frac{[In^-]}{[HIn]} = pK_{In} - pH$

B.  $\log. \frac{[HIn]}{[In^-]} = pK_{In} - pH$

C.  $\log. \frac{[HIn]}{[In^-]} = pH - pK_{In}$

D.  $\log. \frac{[In^-]}{[HIn]} = pH - pK_{In}$

**Answer: D**



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**34.** The solubility product of a sparingly soluble salt  $AX_2$  is  $3.2 \times 10^{-11}$ . Its solubility (in  $mo/L$ ) is

A.  $5.6 \times 10^{-6}$

B.  $3.1 \times 10^{-4}$

C.  $2 \times 10^{-4}$

D.  $4 \times 10^{-4}$

**Answer: C**



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35. The solubility product of  $AgI$  at  $25^{\circ}C$  is  $1.0 \times 10^{-16} mol^2 L^{-2}$ . The solubility of  $AgI$  in  $10^{-4}N$  solution of  $KI$  at  $25^{\circ}C$  is approximately ( in  $mol L^{-1}$  )

A.  $1.0 \times 10^{-10}$

B.  $1.0 \times 10^{-8}$

C.  $1.0 \times 10^{-16}$

D.  $1.0 \times 10^{12}$

**Answer: D**



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36. Solution of  $0.1N NH_4OH$  and  $0.1N NH_4Cl$  has  $pH 9.25$ , then find out  $K_b$  of  $NH_4OH$ .

A. 9.25

B. 4.75

C. 3.75

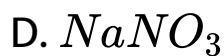
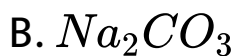
D. 8.25

**Answer: B**



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37. Which has the highest  $pH$ ?



**Answer: B**



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38. Solubility of  $MX_2$  type electrolytes is  $0.5 \times 10^{-4} \text{ mol/L}$ , then find out  $K_{sp}$  of electrolytes.

A.  $5 \times 10^{-12}$

B.  $25 \times 10^{-10}$

C.  $1 \times 10^{-13}$

D.  $5 \times 10^{-13}$

**Answer: D**



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**39.** Solubility if  $M_2S$  type salt is  $3.5 \times 10^{-6}$ , then find out its solubility product

A.  $1.7 \times 10^{-6}$

B.  $1.7 \times 10^{-16}$

C.  $1.7 \times 10^{-18}$

D.  $1.7 \times 10^{-12}$

**Answer: B**



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**40.** Ionisation constant of  $CH_3COOH$  is  $1.7 \times 10^{-5}$  and concentration of  $H^+$  ions is  $3.4 \times 10^{-4}$ . Then, find out initial concentration of  $CH_3COOH$  molecules.

A.  $3.4 \times 10^{-4}$

B.  $3.4 \times 10^{-3}$

C.  $6.8 \times 10^{-4}$

D.  $6.8 \times 10^{-3}$

**Answer: D**



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41. Which one of the following is true for any diprotic acid,  $H_2X$ ?

A.  $K_{a_2} = K_{a_1}$

B.  $K_{a_2} > K_{a_1}$

C.  $K_{a_2} < K_{a_1}$

D.  $K_{a_2} = \frac{1}{K_{a_1}}$

**Answer: C**



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42. Which of the following statements about pH and  $H^+$  ion concentration is incorrect ?

A. Addition of one drop of concentrated HCl in  $NH_4OH$  solution decreases pH of the solution

B. A solution of the mixture of one equivalent of each of  $CH_3COOH$  and NaOH has a pH of 7.

C. pH of pure neutral water is not zero

D. A cold and concentrated  $H_2SO_4$  has lower  $H^+$  ion concentration than a dilute solution of  $H_2SO_4$ .

**Answer: B**

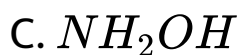


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43. The conjugate acid of  $NH_2^\ominus$  is

A.  $N_2H_4$

B.  $NH_4^+$



**Answer: D**



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**44.** The solubility of a saturated solution of calcium fluoride is  $2 \times 10^{-4}$  mol/L. Its solubility product is

A.  $12 \times 10^{-2}$

B.  $14 \times 10^{-4}$

C.  $22 \times 10^{-11}$

D.  $32 \times 10^{-12}$

**Answer: D**

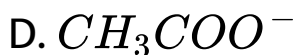


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**45.** The strongest conjugate base is







**Answer: D**



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**46.** The concentration of  $[H^+]$  and concentration of  $[OH^-]$  of a 0.1 aqueous solution of 2% ionised weak acid is [Ionic product of water  $= 1 \times 10^{-14}$ ]

A.  $0.02 \times 10^{-3}M$  and  $5 \times 10^{-11}M$

B.  $1 \times 10^{-3}M$  and  $3 \times 10^{-11}M$

C.  $2 \times 10^{-3} M$  and  $5 \times 10^{-12} M$

D.  $3 \times 10^{-2} M$  and  $4 \times 10^{-13} M$

**Answer: C**



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**47.** A physician wishes to prepare a buffer solution at  $\text{pH} = 3.58$  that efficiently resist changes in  $\text{pH}$  yet contains only small concentration of the buffering agents. Which one of the following weak acid together with its sodium salt would be best to use ?

- A. m-chlorobenzoic acid ( $pK_a = 3.98$ )
- B. p-chlorocinnamic acid ( $pK_a = 4.41$ )
- C. 2,5-dihydroxy benzoic acid ( $pK_a = 2.97$ )
- D. Acetoacetic acid ( $pK_a = 3.58$ )

**Answer: D**



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**48.** The solubility product of CuS, CdS and HgS are  $10^{-31}$ ,  $10^{-44}$ ,  $10^{-54}$  respectively. The solubility of these sulphides are in the order

A.  $\text{CdS} \text{ gt } \text{HgS} \text{ gt } \text{CuS}$

B.  $\text{HgS} \text{ gt } \text{CdS} \text{ gt } \text{CuS}$

C.  $\text{CdS} \text{ gt } \text{CuS} \text{ gt } \text{HgS}$

D.  $\text{CuS} \text{ gt } \text{CdS} \text{ gt } \text{HgS}$

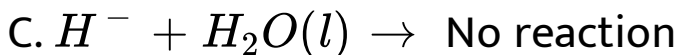
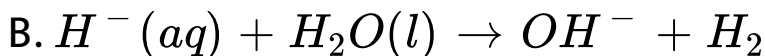
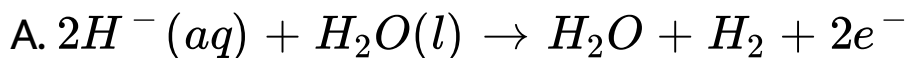
**Answer: D**



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**49.** The hydride ion  $\text{H}^-$  is a stronger base than its hydroxide ion  $\text{OH}^-$ . Which of the following

reactions will occurs if sodium hydride (NaH) is dissolved in water ?



D. None of the above

**Answer: B**



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50. The pH value of blood does not change appreciably by a small addition of an acid or base, because the blood

- A. is a body fluid
- B. can be easily coagulated
- C. contains iron as a part of the molecule
- D. contains serum protein that acts as buffer

**Answer: D**



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51. The pH value of a 10 M solution of HCl is

A. less than 0

B. equal to 0

C. equal to 1

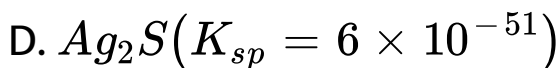
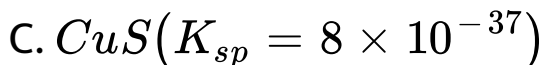
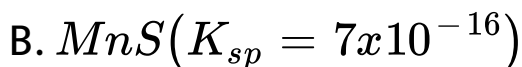
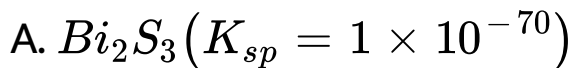
D. equal to 2

**Answer: A**



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52. Which of the following is most soluble?



**Answer: B**



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**53.** In which of the following the solubility of  $AgCl$  will be minimum ?





B. Water

C.  $0.1MNaCl$

D.  $0.1MNaBr$

**Answer: C**



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**54.**  $0.1M$  solution of which of the substances will behave basic?

A. Sodium borate

B. Calcium nitrate

C.  $NH_4Cl$

D. Sodium sulphate

**Answer: A**



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**55.** Aqueous solution of acetic acid contains

A.  $CH_3COO^-$  and  $H^+$

B.  $CH_3COO^-$ ,  $H_3O^+$

C.  $CH_3COO^-$ ,  $H_3O^+$  and  $H^+$

D.  $CH_3COOH$ ,  $CH_3COO^-$  and  $H^+$

**Answer: d**



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**56.** A compound whose aqueous solution will have the highest  $pH$

A.  $NaCl$

B.  $NaHCO_3$

C.  $Na_2CO_3$

D.  $NH_4Cl$

**Answer: C**



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