

1. Among the following, the correct acid strength trend is represented by

- (a) $[\text{Al}(\text{H}_2\text{O})_6]^{3+} < [\text{Fe}(\text{H}_2\text{O})_6]^{3+} < [\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{3+} < [\text{Al}(\text{H}_2\text{O})_6]^{3+} < [\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+} < [\text{Fe}(\text{H}_2\text{O})_6]^{3+} < [\text{Al}(\text{H}_2\text{O})_6]^{3+}$
 (d) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+} < [\text{Al}(\text{H}_2\text{O})_6]^{3+} < [\text{Fe}(\text{H}_2\text{O})_6]^{3+}$

2. The gases SO_2 and SO_3 were reacted separately with ClF gas under ambient conditions. The major products expected from the two reactions respectively, are

- (a) SO_2ClF and ClOSO_2F (b) SOF_2 and SO_2F_2
 (c) SO_2ClF and SO_2F_2 (d) SOF_2 and ClOSO_2F

3. "Magic Acid" is a superacid that is a

- (a) 1:1 mixture of fluorosulfuric acid (HSO_3F) and antimony pentafluoride (SbF_5)
 (b) 1:2 mixture of fluorosulfuric acid (HSO_3F) and antimony pentafluoride (SbF_5)
 (c) 2:1 mixture of fluorosulfuric acid (HSO_3F) and antimony pentafluoride (SbF_5)
 (d) 1:1 mixture of fluorosulfuric acid (HSO_3F) and antimony pentafluoride (SbF_5)

4. $[\text{Fe}(\text{OH}_2)_6]^{3+}$ is prepared in acidic solution because:

- (a) $[\text{Fe}(\text{OH}_2)_6]^{3+}$ is a Brønsted acid in aqueous solution
 (b) $[\text{Fe}(\text{OH}_2)_6]^{3+}$ is stabilized against reduction in acid
 (c) $[\text{Fe}(\text{OH}_2)_6]^{3+}$ is not soluble in water at pH 7.0
 (d) $[\text{Fe}(\text{OH}_2)_6]^{3+}$ is a Brønsted base in aqueous solution

5. When Fe^{2+} reacts with SCN^- a bright red colour is observed due to formation of

- (a) $[\text{Fe}(\text{SCN})]^+$ ion (b) $[\text{Fe}(\text{NCS})]^+$ ion
 (c) $[\text{Fe}(\text{CN})]^+$ ion (d) $[\text{Fe}(\text{SCN})]^{2+}$ ion

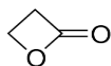
6. Which of the following reactions is unusual

- (a) $\text{AsF}_3 + \text{PI}_3 \longrightarrow \text{AsI}_3 + \text{PF}_3$
 (b) $\text{MgS} + \text{BaO} \longrightarrow \text{MgO} + \text{BaS}$
 (c) $2\text{PF}_2\text{I} + 2\text{Hg} \longrightarrow \text{Hg}_2\text{I}_2 + \text{P}_2\text{F}_4$
 (d) all are unusual

7. Hard Lewis acids are not characterized

- (a) with high energy HOMOs
 (b) Strongly solvated, empty orbitals in the valence shell
 (c) With high energy LUMOs
 (d) Small ionic radii and high positive charge

8. In β -propiolactone given below, ring can be opened by nucleophilic Lewis bases and nucleophiles exhibit regioselectivity:



Find out the correct statement about the reaction

- (a) Harder nucleophiles attack the acyl carbon and Softer nucleophiles attack the β -alkyl carbon
 (b) Harder nucleophiles attack the β -alkyl carbon and Softer nucleophiles attack the acyl carbon
 (c) Both the nucleophiles attack the acyl carbon
 (d) Both the nucleophiles β -alkyl carbon

9. BF_3 reacts in liquid HF to give:

- (a) HBF_4 (b) $[\text{BF}_2]^+$ (c) $[\text{H}_2\text{F}]^+$ (d) $[\text{HF}_2]^-$

10. In BrF_3 , which reaction does not occur?

- (a) $\text{BrF}_3 + \text{CsF} \rightarrow \text{Cs}^+ + [\text{BrF}_4]^-$
 (b) $\text{BrF}_3 + \text{AsF}_5 \rightarrow [\text{BrF}_2]^+ + [\text{AsF}_6]^-$
 (c) $\text{BrF}_3 + \text{BrF}_3 \rightarrow [\text{BrF}_2]^+ + [\text{BrF}_4]^-$
 (d) $\text{BrF}_3 + \text{AuF}_3 \rightarrow [\text{AuF}_2]^+ + [\text{BrF}_4]^-$

11. Which of the following is a Lewis acid?

- (a) BF_3 (b) $[\text{SbF}_6]^-$ (c) $[\text{AlCl}_4]^-$ (d) NF_3

12. Which statement is incorrect about carbaborane superacids in the family $\text{HCHB}_{11}\text{R}_5\text{X}_6$ ($\text{R} = \text{H}, \text{Me}; \text{X} = \text{Cl}, \text{Br}, \text{I}$)?

- (a) The conjugate base of $\text{HCHB}_{11}\text{R}_5\text{X}_6$ is extremely weak
 (b) The conjugate base of $\text{HCHB}_{11}\text{R}_5\text{X}_6$ is a strongly coordinating anion
 (c) $\text{HCHB}_{11}\text{R}_5\text{X}_6$ protonates benzene
 (d) $\text{HCHB}_{11}\text{R}_5\text{X}_6$ protonates SO_2

13. Self-ionization of BrF_3 gives $[\text{BrF}_2]^+$ and $[\text{BrF}_4]^-$. Which list of species and molecular shape is correct?

- (a) BrF_3 , T-shaped; $[\text{BrF}_2]^+$, linear; $[\text{BrF}_4]^-$, tetrahedral
 (b) BrF_3 , trigonal planar; $[\text{BrF}_2]^+$, linear; $[\text{BrF}_4]^-$, square planar
 (c) BrF_3 , T-shaped; $[\text{BrF}_2]^+$, non-linear; $[\text{BrF}_4]^-$, square planar
 (d) BrF_3 , trigonal pyramidal; $[\text{BrF}_2]^+$, non-linear; $[\text{BrF}_4]^-$, square planar

14. Which reaction is not likely to occur?

- (a) $\text{ClF}_3 + \text{BF}_3 \rightarrow [\text{BF}_2][\text{ClF}_4]$
 (b) $\text{CsF} + \text{BrF}_3 \rightarrow \text{Cs}[\text{BrF}_4]$
 (c) $2\text{SbF}_5 + \text{BrF}_5 \rightarrow [\text{BrF}_4][\text{Sb}_2\text{F}_{11}]$
 (d) $\text{CsF} + \text{IF}_7 \rightarrow \text{Cs}[\text{IF}_8]$

15. pK_a of HOCl is

- (a) 8 (b) 5 (c) -2 (d) -7

16. Which of the following oxyacid is least acidic

- (a) $\text{SO}_2(\text{OH})_2$ (b) $\text{SO}_2(\text{OH})(\text{NH}_2)$
 (c) $\text{SO}_2(\text{OH})\text{F}$ (d) all are equally acidic

17. $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ cation has pale lilac color. However, $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ in water has orange colour due to

- (a) presence of the $[\text{Fe}(\text{H}_2\text{O})_5\text{OH}]^{2+}$ ion
 (b) Formation of the $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ ion
 (c) Presence of the $[\text{Fe}(\text{H}_2\text{O})_5\text{OH}]^+$ ion
 (d) presence of the $[\text{Fe}(\text{H}_2\text{O})_5\text{OH}]^{3+}$ ion

18. Which of the following oxide is most acidic

- (a) MnO (b) Mn_2O_3 (c) MnO_2 (d) Mn_2O_7

19. Acidity of the following oxyacids decreases in the order

- (a) $\text{HOClO}_3 > \text{HOBrO}_3 > \text{HOIO}_3$ (b) $\text{HOIO}_3 > \text{HOBrO}_3 > \text{HOClO}_3$
 (c) $\text{HOClO}_3 > \text{HOIO}_3 > \text{HOBrO}_3$ (d) $\text{HOBrO}_3 > \text{HOClO}_3 > \text{HOIO}_3$

20. Arrange the following intermediates in the order of decreasing basicity (strongest to weakest):

- (I) $\text{H}_2\text{C}=\text{CH}^-$ (II) CH_3CH_2^- (III) $\text{CH}_3\text{CH}_2\text{O}^-$ (IV) $\text{HC}\equiv\text{C}^-$
 (a) $\text{IV} > \text{I} > \text{II} > \text{III}$ (b) $\text{III} > \text{II} > \text{I} > \text{IV}$
 (c) $\text{III} > \text{IV} > \text{I} > \text{II}$ (d) $\text{II} > \text{I} > \text{IV} > \text{III}$

21. The compound that contains the most acidic hydrogen is

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

22. The species responsible for the superacidity of $\text{SbF}_5\text{-HSO}_3\text{F}$ system is

- (a) HSO_3F (b) SbF_5 (c) HF (d) $\text{H}_2\text{SO}_3\text{F}^+$

23. The correct order of the pK_a values for the conjugate acids of heterocyclic compounds given below is



- (a) $\text{II} > \text{III} > \text{I} > \text{IV}$ (b) $\text{IV} > \text{II} > \text{III} > \text{I}$
 (c) $\text{III} > \text{II} > \text{IV} > \text{I}$ (d) $\text{III} > \text{IV} > \text{II} > \text{I}$

24. The correct order of acidic character is:

- (a) $\text{Al}_2\text{O}_3 > \text{MgO} > \text{SiO}_2 > \text{P}_4\text{O}_{10}$ (b) $\text{P}_4\text{O}_{10} > \text{Al}_2\text{O}_3 > \text{MgO} > \text{SiO}_2$
 (c) $\text{P}_4\text{O}_{10} > \text{SiO}_2 > \text{Al}_2\text{O}_3 > \text{MgO}$ (d) $\text{SiO}_2 > \text{P}_4\text{O}_{10} > \text{Al}_2\text{O}_3 > \text{MgO}$

25. The acidity of molecules is usually measured by a parameter called the pK_a . Metal ions n (M^{+n}) solubilized in water form solvated aqua complexes commonly denoted by $[\text{M}(\text{H}_2\text{O})_m]^{+n}$. It is known that the pK_a of coordinated water in such metal-aqua complexes will be different from that of bulk water. For the following set of metal-aqua complexes: Ca^{+2} , Fe^{+2} , Mn^{+2} , Fe^{+3} ; arrange the complexes with decreasing value of expected pK_a of the coordinated water molecule

- (a) $\text{Fe}^{+2} > \text{Mn}^{+2} > \text{Ca}^{+2} > \text{Fe}^{+3}$ (b) $\text{Ca}^{+2} > \text{Mn}^{+2} > \text{Fe}^{+2} > \text{Fe}^{+3}$
 (c) $\text{Fe}^{+3} > \text{Fe}^{+2} > \text{Mn}^{+2} > \text{Ca}^{+2}$ (d) $\text{Mn}^{+2} > \text{Ca}^{+2} > \text{Fe}^{+2} > \text{Fe}^{+3}$

26. What are the products of the following reaction?



- (a) $\text{H}_2 + \text{Et}_3\text{N} + \text{LiCl} + \text{AlH}_3$ (b) $\text{LiH} + \text{Et}_3\text{N} + \text{HCl} + 0.5\text{Al}_2\text{H}_6$
 (c) $\text{LiCl} + \text{H}_3\text{Al} + \text{NEt}_3 + \text{H}_2$ (d) $\text{LiCl} + \text{Et}_3\text{N} + \text{H}_2 + 0.5\text{Al}_2\text{H}_6$

27. Free water pK_a is 15.7 at 25°C . Based on the free water pK_a benchmark, arrange the acidity of the "bound" water molecules in increasing order within the following metal aqua complexes: $[\text{Mn}(\text{H}_2\text{O})_6]^{+2}$, $[\text{Cu}(\text{H}_2\text{O})_5]^{+2}$, $[\text{Ca}(\text{H}_2\text{O})_8]^{+2}$, $[\text{Sr}(\text{H}_2\text{O})_8]^{+2}$

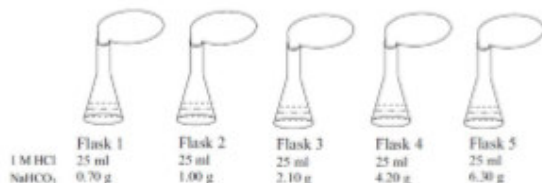
- (a) $\text{Ca}^{+2} < \text{Mn}^{+2} < \text{Cu}^{+2} < \text{Sr}^{+2}$
 (b) $\text{Mn}^{+2} < \text{Cu}^{+2} < \text{Ca}^{+2} < \text{Sr}^{+2}$
 (c) $\text{Sr}^{+2} < \text{Ca}^{+2} < \text{Mn}^{+2} < \text{Cu}^{+2}$
 (d) All have equal acidities

28. Which of the following statements is TRUE regarding the electrical conductivity of HCl in aqueous solution, HCl as a gas and HCl in benzene?

- (a) All three conduct electricity because HCl is a strong acid
 (b) HCl in aqueous solution only conducts electricity because it is ionized but not HCl gas and HCl in benzene
 (c) HCl in benzene is not conducting because benzene is a non-polar solvent and but HCl gas and HCl in aqueous solution conduct electricity
 (d) HCl in aqueous solution and HCl in benzene are conducting because they are solutions but not HCl gas

29. Each of the following flasks contains 25ml of 1M HCl solution in water. To them a certain amount of sodium bicarbonate is added and, as shown the picture, then the mouths of the flasks are quickly closed by rubber balloons of identical size. The masses of 3 NaHCO_3 added

to the flask 1 through the flask 5 are 0.70 g, 1.00g, 2.10 g, 4.20 g and 6.30 g respectively. After waiting for a sufficiently long time, predict the relative size of the 5 balloons.



- (a) The Size of Balloon 1 = Balloon 2 = Balloon 3 = Balloon 4 = Balloon 5.
 (b) The Size of Balloon 1 < Balloon 2 < Balloon 3 < Balloon 4 < Balloon 5.
 (c) The Size of Balloon 1 < Balloon 2 < Balloon 3 = Balloon 4 = Balloon 5.
 (d) The Size of Balloon 1 < Balloon 2 < Balloon 3 < Balloon 4 = Balloon 5.

30. If $\text{HSO}_3\text{F} + \text{SbF}_5 \rightarrow \text{B}$

B + neo-pentane \rightarrow [tert-Butyl] $^+$ + CH_4 then B is

- (a) SbF_6^- (b) $\text{FSO}_3\text{SbF}_5^-$ (c) H_2F^+ (d) $\text{H}_2\text{SO}_3\text{F}^+$

31. The incorrect order of acid and bases is:

- (a) $\text{CH}_3\text{NH}_2 > \text{NH}_3 > \text{H}_2\text{N}-\text{NH}_2 > \text{NH}_2\text{OH}$ (Bases)
 (b) $\text{SiF}_4 > \text{SiCl}_4 > \text{SiBr}_4 > \text{SiI}_4$ (Acids)
 (c) $\text{SnF}_4 > \text{CH}_3\text{SnF}_3 > (\text{CH}_3)_2\text{SnF}_2 > (\text{CH}_3)_3\text{SnF}$ (Acids)
 (d) $\text{BH}_3 < \text{BMe}_3 < \text{BF}_3 < \text{BCl}_3$ (Acids)

32. Which of the following compounds behave as acid in liquid HF:

- (1) C_6H_6 (2) BF_3 (3) SbF_5 (4) HNO_3

- (a) 2 and 3 (b) 3 only (c) 2, 3 and 4 (d) all behave as acid

33. Identify the species that is amphiprotic:

- (a) HI (b) H_2PO_4^- (c) NH_4^+ (d) CO_3^{2-}

34. Some molecule and their properties in liquid ammonia are given in column A and B respectively. Match column A with column B

Column A	Column B
(A) Cl_2	1. Weak acid
(B) S_8	2. Strong acid
(C) CH_3COOH	3. Disproportionation
(D) Urea	4. Solvolysis and Disproportionation

The correct match is:

- (a) A - 1; B - 2; C - 3; D - 4 (b) A - 3; B - 4; C - 1; D - 4
 (c) A - 4; B - 3; C - 2; D - 1 (d) A - 4; B - 1; C - 2; D - 4

35. Which statement is correct about Na in liquid NH_3 :

- (a) It is an oxidising agent
 (b) It is a reducing agent
 (c) It gradually liberates H_2
 (d) It gives a blue solution when dilute

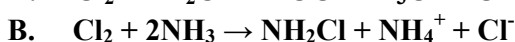
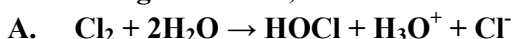
36.	Column A	Column B
	1. $\text{SbF}_5 + \text{BrF}_3 \rightarrow [\text{BrF}_2]^+ + [\text{SbF}_6]^-$	A. Lewis acid behaviour of BrF_3
	2. $[\text{BrF}_2][\text{SbF}_6] + \text{Ag}[\text{BrF}_4] \rightarrow \text{Ag}[\text{SbF}_6] + 2\text{BrF}_3$	B. Lewis base behaviour of BrF_3
	3. $\text{KF} + \text{BrF}_3 \rightarrow \text{K}^+ + [\text{BrF}_4]^-$	C. Self ionisation
	4. $2\text{BrF}_3 \rightarrow [\text{BrF}_2]^+ + [\text{BrF}_4]^-$	D. Neutralisation

Match items in column A with items in column B:

The Correct answer is

- (a) 1 – C, 2 – B, 3 – A, 4 – D (b) 1 – B, 2 – D, 3 – A, 4 – C
 (c) 1 – B, 2 – D, 3 – C, 4 – A (d) 1 – C, 2- D, 3 – B, 4 –

37. the reactions given below,



are examples of

- (a) Disproportionation only
 (b) Disproportionation (A) and solvation (B)
 (c) Solvation (A) and Disproportionation (B)
 (d) Solvolysis as well as disproportionation

38. Which Statement is incorrect about AgCl :

- (a) AgCl is sparingly soluble in water
 (b) AgI is less soluble in water than is AgCl
 (c) AgCl precipitates when aqueous AgNO_3 and NaCl are mixed
 (d) AgCl is more soluble in aqueous KCl than in water

39. Within the HSAB principle, a hard acid:

- (a) is not very polarizable
 (b) has a low charge density
 (c) shows a preference for soft bases
 (d) shows a preference for donor atoms of low electronegativity

40. Comparing H_2O and NH_3 as solvents leads to analogies between which pair of species?

- (a) NH_3 and $[\text{OH}]^-$ (b) $[\text{NH}_2]^-$ and H_2O
 (c) $[\text{NH}_2]^-$ and $[\text{OH}]^-$ (d) $[\text{NH}_4]^+$ and H_2O

41. Which of the following is most basic in gaseous state:

- (a) CH_3^- (b) NH_2^- (c) OH^- (d) F^-

42. BH_3CO is stable than BF_3CO because

- (a) CO is a hard base and BH_3 and BF_3 are hard and soft acids respectively.
 (b) CO is a hard base and BH_3 and BF_3 are soft and hard acids respectively.
 (c) CO is a soft base and BH_3 and BF_3 are hard and soft acids respectively.
 (d) CO is a hard base and BH_3 and BF_3 are soft and hard acids respectively.

43. The CORRECT order of the soft character (as per HSAB principle) of the central metal ion is: (a)

- $[\text{CrO}_4]^{2-} < [\text{CrCl}_4]^- < [\text{Cr}(\text{H}_2\text{O})_6] < [\text{Cr}(\text{CO})_5]^{-2}$
 (b) $[\text{CrCl}_4]^- < [\text{Cr}(\text{H}_2\text{O})_6] < [\text{CrO}_4]^{2-} < [\text{Cr}(\text{CO})_5]^{-2}$
 (c) $[\text{Cr}(\text{CO})_5]^{-2} < [\text{Cr}(\text{H}_2\text{O})_6] < [\text{CrCl}_4]^- < [\text{CrO}_4]^{2-}$
 (d) $[\text{Cr}(\text{H}_2\text{O})_6] < [\text{CrCl}_4]^- < [\text{Cr}(\text{CO})_5]^{-2} < [\text{CrO}_4]^{2-}$

44. The compound which dissolves in POCl_3 to give a solution with highest chloride ion concentration, is

- (a) Et_3N (b) KCl (c) FeCl_3 (d) SbCl_5

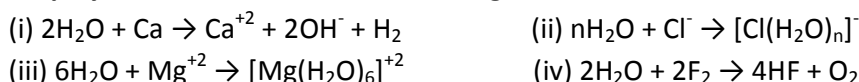
45. Consider the following reactions:



Reactions which will give $[\text{NO}]^+$ as a major product are:

- (a) A and B (b) C and D
 (c) A and C (d) B and D

46. Water plays different roles in the following reactions.



The correct role of water in each reaction is,

- (a) (i) reductant, (ii) acid, (iii) base and (iv) oxidant
 (b) (i) oxidant, (ii) base, (iii) acid and (iv) reductant
 (c) (i) oxidant (ii) acid, (iii) base and (iv) reductant
 (d) (i) reductant, (ii) base, (iii) acid and (iv) oxidant

47. The compound that gives a basic solution in HF is,

- (a) AsF_5 (b) PF_5 (c) BF_3 (d) BrF_3

48. In the reaction: $\text{Cl}_2 + \text{ClF} + \text{SbF}_5 \rightarrow [\text{Cl}_3][\text{SbF}_6]$ the role of chlorine is to

- (a) stabilize Cl^- (b) function as Lewis base
 (c) function as Lewis acid (d) form the cation

49. NH_4Cl , NaNH_2 and H_2O behaves in liq. NH_3 as-

- (a) base, acid, acid (b) acid, base, acid
 (c) acid, base, base (d) base, acid, base

50. In the equilibrium $\text{HClO}_4 + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ + \text{ClO}_4^-$

- (a) HClO_4 is conjugate acid of H_2O
 (b) H_3O^+ is the conjugate base of H_2O
 (c) H_2O is the conjugate acid of H_3O^+
 (d) ClO_4^- is the conjugate base of HClO_4

51. The mass x of a solute adsorbed per gram of a solid adsorbent is given by the Freundlich adsorption isotherm $x = kc^n$, where k and n are 0.160 and 0.431 respectively. The amount of acetic acid ($M = 60.05 \text{ g mol}^{-1}$) that 1 kg of charcoal would adsorb from 0.837M vinegar solution?

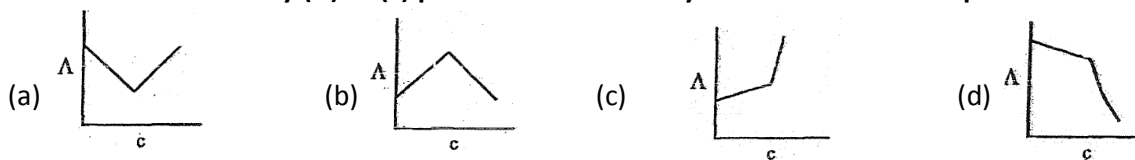
- (A) 2.47 mol
 (B) 1.275 mol
 (C) 4.89 mol
 (D) 0.837 mol

52. Graph between $\log(x/m)$ vs. $\log P$ is a straight line at an angle 45° with intercept on y-axis, 0.3010. the amount (in gm) of gas adsorbed per gram of the adsorbent when pressure is 0.2 atm, is (assuming Freundlich adsorption)

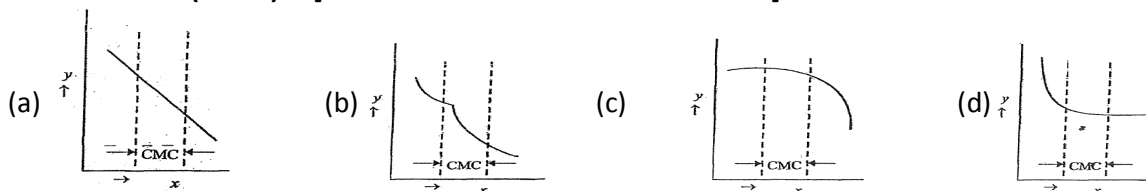
- (A) 0.4 (B) 0.6 (C) 0.8 (D) 0.2

58. The adsorption of a gas is described by Langmuir adsorption isotherm. Calculate the pressure at which the fractional coverage is 0.5 ($K=0.9\text{kPa}^{-1}$ at 27°C)
(E) (A)1.11 kPa (B)2.22kPa (C)3.33kPa (D)4.44kPa
59. In a solution of 100 mL 0.5 M acetic acid, 1 g of active charcoal is added, which adsorbs acetic acid. It is found that the concentration of acetic acid becomes 0.49M. If surface area of charcoal is $3.01\times 10^2\text{ m}^2$, then the area occupied by single acetic acid molecule on the surface of charcoal will be
(A) $5\times 10^{-10}\text{ m}^2$ (B) $2.5\times 10^{-10}\text{ m}^2$
(C) $7.5\times 10^{-10}\text{ m}^2$ (D) $10\times 10^{-10}\text{ m}^2$
60. "Colloids are thermodynamically unstable with reference to bulk but kinetically stable". Identify the correct pair statements.
- | Statements | Reasons |
|---|---|
| (A) Thermodynamically unstable | (C) interfacial surface tension |
| (B) kinetically stable | (D) electrical double layer |
| (a) (A) \leftrightarrow (D) and (B) \leftrightarrow (C) | (b) (A) \leftrightarrow (C) and (B) \leftrightarrow (D) |
| (c) (A) \leftrightarrow (C) and (B) \leftrightarrow (C) | (d) (A) \leftrightarrow (D) and (B) \leftrightarrow (D) |
61. The surface tension of a liquid does not change when
(a) a solute is added (b) the temperature is changed
(c) surface area is changed (d) vapor pressure is changed
62. Generally, hydrophobic colloids are flocculated efficiently by ions of opposite type and high charge number. This is consistent with the
(a) peptization principle
(b) kraft theory
(c) Hardy-Schulze rule
(d) Langmuir adsorption mechanism
63. The stability of lyophobic colloid is the consequence of
(a) van der waals attraction among the solute solvent adducts
(b) Brownian motion of the colloidal particles
(c) Insolubility of colloidal particles in solvent
(d) Electrostatic repulsion among double-layered colloidal particles
64. Stability of lyophobic dispersions is determined by
(a) inter-particle electric double layer repulsion and intra-particle van der waals attraction
(b) inter-particle electric double layer attraction and intra-particle van der waals repulsion
(c) inter-particle excluded volume repulsion and intra-particle van der waals attraction
(d) inter-particle excluded volume repulsion and intra-particle van der waals attraction
65. When river water containing colloidal clay flows into the sea, the major cause of silting is
(a) accumulation of sand at the bottom
(b) flocculation and coagulation
(c) decreased salinity of sea water
(d) micellization
66. Consider aqueous solutions of two compounds A and B of identical concentrations. The surface tension of the solution of A is smaller than that of pure water while for B it is greater than that of pure water under identical conditions. From this one infers that
(a) surface concentration of A is smaller than its bulk concentration
(b) surface concentration of B is larger than its bulk concentration
(c) surface concentration of A is larger than that of B
(d) surface concentration of A is smaller than that of B

67. The molar conductivity (Λ) vs (c) plot of sodium dodecylsulfate in water is expected to look like



68. The correct representation of the variation of molar conductivity (y-axis) with surfactant concentration (x-axis) is [CMC = critical micelle concentration].



69. Which of the following statement is correct for lyophilic sols?

- (A) The coagulation of the sol is irreversible
- (B) They are formed by inorganic substances
- (C) They are self stabilized
- (D) They are readily coagulated by addition of electrolytes

70. 3 gm of activated charcoal was added to 50 ml of 0.06N acetic acid solution in a flask. After one hour it was filtered and the strength of filtrate was found to be 0.042N. The amount of acetic acid adsorbed (per gram of charcoal) is

- (A) 18 mg
- (B) 36 mg
- (C) 42 mg
- (D) 54 mg

End of the Test Paper

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