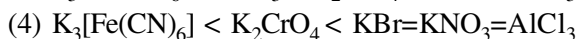
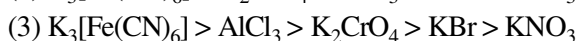
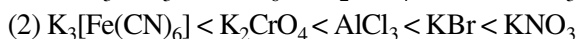
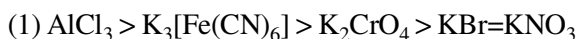


SURFACE CHEMISTRY

1. The flocculation value of HCl for arsenic sulphide sol. is 30 m mole L⁻¹. If H₂SO₄ is used for the flocculation of arsenic sulphide, the amount, in grams, of H₂SO₄ in 250 ml required for the above purpose is _____.

(molecular mass of H₂SO₄ = 98 g/mol)

2. As per Hardy-Schulze formulation, the flocculation values of the following for ferric hydroxide sol are in the order :



3. For the following Assertion and Reason, the correct option is

Assertion : For hydrogenation reactions, the catalytic activity increases from Group 5 to Group 11 metals with maximum activity shown by Group 7-9 elements.

Reason : The reactants are most strongly adsorbed on group 7-9 elements.

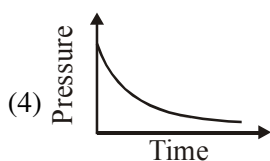
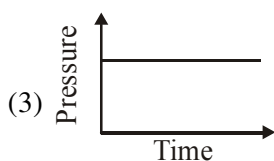
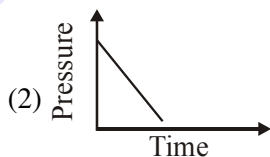
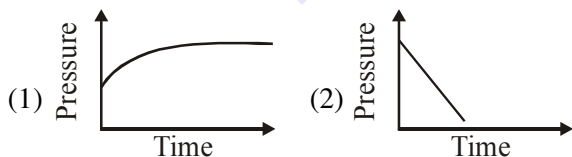
(1) Both assertion and reason are true but the reason is not the correct explanation for the assertion.

(2) Both assertion and reason are false.

(3) Both assertion and reason are true and the reason is the correct explanation for the assertion.

(4) The assertion is true, but the reason is false.

4. A mixture of gases O₂, H₂ and CO are taken in a closed vessel containing charcoal. The graph that represents the correct behaviour of pressure with time is :



5. Match the following :

- | | |
|---------------|----------------|
| (i) Foam | (a) smoke |
| (ii) Gel | (b) cell fluid |
| (iii) Aerosol | (c) jellies |
| (iv) Emulsion | (d) rubber |
| | (e) froth |
| | (f) milk |

(1) (i)-(b), (ii)-(c), (iii)-(e), (iv)-(d)

(2) (i)-(d), (ii)-(b), (iii)-(e), (iv)-(f)

(3) (i)-(e), (ii)-(c), (iii)-(a), (iv)-(f)

(4) (i)-(d), (ii)-(b), (iii)-(a), (iv)-(e)

6. Tyndall effect of observed when :

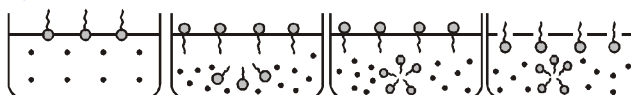
(1) The diameter of dispersed particles is much smaller than the wavelength of light used

(2) The diameter of dispersed particles is much larger than the wavelength of light used

(3) The diameter of dispersed particles is similar to the wavelength of light used

(4) The refractive index of dispersed phase is greater than that of the dispersion medium

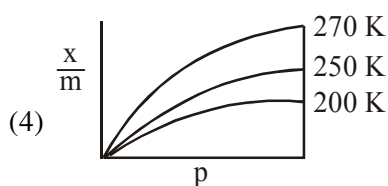
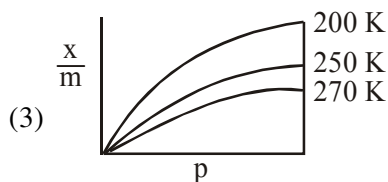
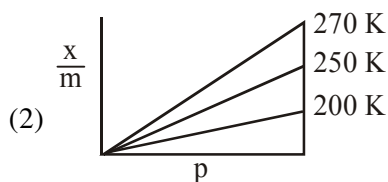
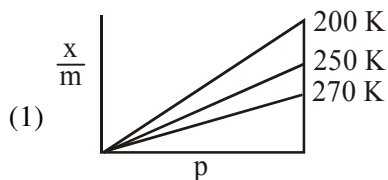
7. Identify the correct molecular picture showing that happens at the critical micellar concentration (CMC) of an aqueous solution of a surfactant (○ polar head; ~ non-polar tail; • water).



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

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

8. Adsorption of a gas follows Freundlich adsorption isotherm. If x is the mass of the gas adsorbed on mass m of the adsorbent, the correct plot of $\frac{x}{m}$ versus p is :



9. The mass of gas adsorbed, x , per unit mass of adsorbate, m , was measured at various pressures, p . A graph between $\log \frac{x}{m}$ and $\log p$ gives a straight line with slope equal to 2 and the intercept equal to 0.4771. The value of $\frac{x}{m}$ at a pressure of 4 atm is : (Given $\log 3 = 0.4771$)
10. Amongst the following statements regarding adsorption, those that are valid are :
- ΔH becomes less negative as adsorption proceeds.
 - On a given adsorbent, ammonia is adsorbed more than nitrogen gas.
 - On adsorption, the residual force acting along the surface of the adsorbent increases.
 - With increase in temperature, the equilibrium concentration of adsorbate increases.
- (1) (b) and (c) (2) (a) and (b)
 (3) (d) and (a) (4) (c) and (d)
11. For Freundlich adsorption isotherm, a plot of $\log (x/m)$ (y-axis) and $\log p$ (x-axis) gives a straight line. The intercept and slope for the line is 0.4771 and 2, respectively. The mass of gas, adsorbed per gram of adsorbent if the initial pressure is 0.04 atm, is _____ $\times 10^{-4}$ g. ($\log 3 = 0.4771$)

