



# CHEMISTRY

## BOOKS - IIT-JEE PREVIOUS YEAR (CHEMISTRY)

### SURFACE CHEMISTRY

**Jee Main And Advanced**

1. Storing Tyndall effect is observed only when
  - (i) the refractive indices of the dispersed

phase and the dispersion medium differ greatly in magnitude

(ii) the diameter of the dispersed particles is biggest than the wavelength of the light used

(iii) the refractive indices of the dispersed phase and the dispersion medium are similar

(iv) the diameter of the dispersed particles is not much smaller than the wavelength of the light used.

A. 1 and 4

B. 2 and 4

C. 1 and 3

D. 2 and 3

**Answer: B**



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2. For a linear plot of  $\log (x / m)$  versus  $\log [$   
in a Freundlich adsorption isotherm, which of  
the following statements is correct ? (k and n  
are consists)

A.  $1 / n$  appears as the intercept

B. Only  $1/n$  appears as the slope

C.  $\log\left(\frac{1}{n}\right)$  appears as the intercept

D. Both  $k$  and  $1/n$  appear in the slope term

**Answer: B**



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3. Methylene blue, from its aqueous solution, is adsorbed on activated charcoal at  $25^{\circ}C$ .

For process, the correct statement is

- A. the adsorption requires activation at  $25^{\circ}$
- B. the adsorption is accompanied by a decrease in enthalpy
- C. the adsorption increases with increase of temperature
- D. the adsorption is irreversible

**Answer: B**



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4. The coagulating power of electrolytes having ions  $Na^{\oplus}$ ,  $Al^{3+}$  and  $Ba^{2+}$  for arsenic sulphide sol increases in the order

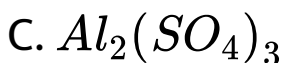
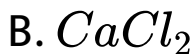
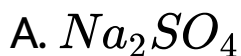


**Answer: B**



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5. Among the electrolytes  $Na_2SO_4$ ,  $CaCl_2$ ,  $Al_2(SO_4)_3$  and  $NH_4Cl$ , the most effective coagulating agent for  $Sb_2S_3$  sol is

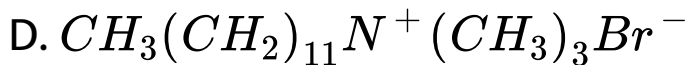
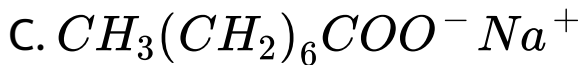
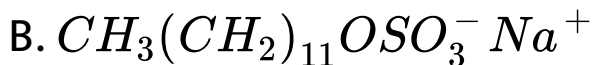
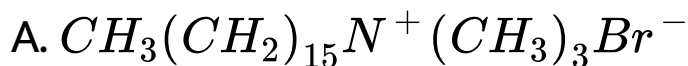


**Answer: C**



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6. Among the following, which surfactant will form micelles in aqueous solution at the lowest molar concentration at ambient conditions?





**Answer: A**



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7. Lyophilic sols are

- A. irreversible sols
- B. prepared from inorganic compounds
- C. coagulated by adding electrolytes
- D. self-stabilising

**Answer: D**



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8. Spontaneous adsorption of a gas on solid surface is an exothermic process because

A.  $\Delta H$  increases for system

B.  $\Delta S$  increases for gas

C.  $\Delta S$  decreases for gas

D.  $\Delta G$  increases for gas

**Answer: C**



9. The rate of physisorption increases with

A. decrease in temperature

B. increase in temperature

C. decrease in pressure

D. decrease in surface area

**Answer: A**



**10.** When the temperature is increased, surface tension of water:

A. increases

B. decreases

C. remains constant

D. shows irregular behaviour

**Answer: B**



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11. The correct statement (s) about surface properties is (are)

A. the critical temperatures of ethane and nitrogen are 563 K and 126 K, respectively. The adsorption of ethane will be more than that of nitrogen of same amount of activated charcoal at a given temperature

B. cloud is an emulsion type of colloid in which liquid is dispersed phase and gas

is dispersion medium

C. Adsorption is accompanied by decrease

in enthalpy and decrease in entropy of

the system

D. Brownian motion of colloidal particles

does not depend on the size of the

particles but depends on viscosity of the

solution

**Answer: B::C**



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12. When  $O_2$  is adsorbed on a metallic surface, electron transfer occurs from the metal to  $O_2$ . The TRUE statement (s) regarding this adsorption is (are)

- A.  $O_2$  is physisorbed
- B. heat is released
- C. occupancy of  $\pi_{2p}^*$  of  $O_2$  is increased
- D. both length of  $O_2$  is increased

**Answer: B::C::D**

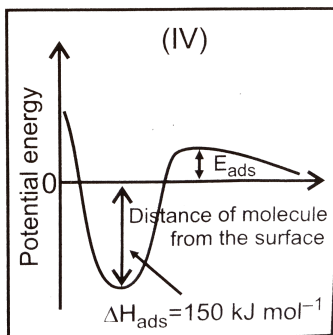
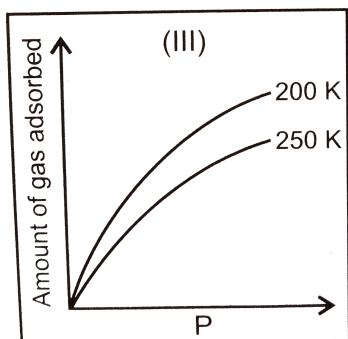
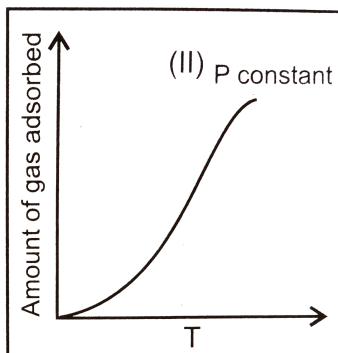
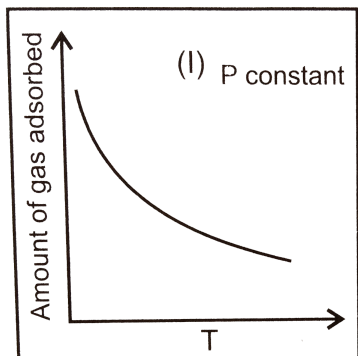


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**13.** The given graphs//data *I*, *II*, *III* and *IV* represent general trends observed of different physisorption and chemisorption processes under mild conditions of temperature and pressure, which of the following choice (s)



about *I*, *II*, *III* and *IV* is (are) correcty ?



A. *I* is physisorption and *II* is chemisorption

B. *I* is physisorption and *III* is chemisorption

C. *IV* is chemisorption and *II* is chemisorption

D. *IV* is chemisorption and *III* is chemisorption

**Answer: A::C**



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**14.** Choose the correct reason(s) for the stability of the lyophobic colloidal particles.

A. Preferential adsorption of ions on their surface from the solution

B. Preferential adsorption of solvent on their surface from the solution

C. Attraction between different particles having opposite charges on their surface

D. Potential difference between the fixed layer and the diffused layer of opposite charges around the colloidal particles

**Answer: A::D**



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15. The correct statement(s) pertaining to the adsorption of a gas on a solid surface is (are)

A. Adsorption is always exothermic

B. Physisorption may transform into chemisorption at high temperature

C. Physisorption increases with increasing temperature but chemisorption decreases with increasing temperature

D. Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation

**Answer: A::B::D**



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**16. Statement :** The plot of atomic number ( y - axis ) versus number of neutrons ( x -axis ) for stable nuclei shows a curvature towards x-axis from the line of  $45^\circ$  slope as the atomic

number is increased .

Explanation : proton -proton electrostatic repulsions begin to overcome attractive forces involving protons and neutrons in heavier nuclides.

A. Statement I is true , Statement II is true ,  
Statement II is a correct explanation of  
Statement I

B. Statement I is true , Statement II is true ,  
Statement II is not the correct  
explanation of Statement I

C. Statement I is true , Statement II is false

D. Statement I is false , Statement II is true

**Answer: A**



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**17. Assertion (A):** Micelles are formed by surfactant molecules above the critical micellization concentration ( $CMC$ ) .

**Reason(R):** The conductivity of a solution

having surfactant molecules decreases sharply at the *CMC* .

A. Statement I is true , Statement II is true ,  
Statement II is a correct explanation of  
Statement I

B. Statement I is true , Statement II is true ,  
Statement II is not the correct  
explanation of Statement I

C. Statement I is true , Statement II is false

D. Statement I is false , Statement II is true



**Answer: B**



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