Surface Chemistry

SET Self Evaluation Test -14

1. In which of the following commercial processes a catalyst is not used **[CPMT 1989]**

(a) Haber's process

(b) Deacon's process

(c) Solvay process

(d) Lead chamber process

2. A catalyst **[IIT 1984; AFMC 1995; CBSE PMT 1995]**

(a) Increases the average kinetic energy of reacting molecules

(b) Increases the activation energy

(c) Alters the reaction mechanism

(d) Increases the frequency of collisions of reacting species

3. The coagulation of 100 *ml* of a colloidal sol of gold is completely prevented by addition of 0.25 *g* of a substance `*X*' to it before adding 10 *ml* of 1% $NaCl$ solution. The gold number of `*X*' is

(a) 0.25 (b) 25

(c) 250 (d) 2.5

4. Which one of the following is not a property of hydrophilic sols

(a) High concentrations of dispersed phase can be easily attained

(b) Coagulation is reversible

(c) Viscosity and surface tension are about the same as for water

(d) The charge of the particle depends on the pH values of the medium; it may be positive, negative or even zero

5. Peptising agent is

(a) Always an electrolyte

(b) Always a non-electrolyte

(c) Electrolyte or non-electrolyte

(d) A lyophilic colloid

6. The catalyst used in the manufacture of methanol from water gas is **[MP PET 2002]**

(a) V_2O_5 (b) $Ni + Mo$

(c) $ZnO + Cr_2O_3$ (d) $Pt + W$

7. Organic catalysts differ from inorganic catalysts **[AFMC 1989]**

(a) By acting at very high temperature

(b) By acting at low temperature

(c) Being used up

(d) Being proteinous in nature

8. Commercial detergents mainly contain **[CPMT 1993]**

(a) $RCOONa$

(b) $RONa$

(c) $RSNa$

(d) $ROSO_2Na$

9. In which of the following processes shape-selective catalysis is occurring

(a) Conversion of alcohol to gasoline

(b) Synthesis of methanol from CO and H_2

(c) Polymerisation of ethylene

(d) Synthesis of ammonia

10. Which one of the following is used for reviving the exhausted permutite **[EAMCET 2003]**

(a) HCl solution

(b) 10% $CaCl_2$ solution

(c) 10% $MgCl_2$ solution **[AIIMS 1983, 84]**

(d) 10% $NaCl$ solution

11. The ability of a catalyst to accelerate the chemical reaction is known as **[CPMT 2000; KCET 2000]**

(a) Selectivelty

(b) Activity

(c) Negative catalyst

(d) None of these

12. $AlCl_3$, in reactions, acts as

(a) Oxidizing agent

(b) Reducing agent

(c) Acid catalyst

(d) None of these

13. On addition of one *ml* of 10% *NaCl* solution to 10 *ml* gold sol in the presence of 0.25 *gm* of starch. The coagulation is just prevented, starch has gold number **[MP PET 2004]**

(a) 0.025 (b) 0.25

(c) 2.5 (d) None

14. Milk is an example of **[MP PET 2001; JIPMER 2002; MP PMT 2002,04]**

(a) Pure solution

(b) Gel

(c) Emulsion

(d) Suspension

Answers and Solutions

(SET -14)

1. (c) In Haber's process we use iron as a catalyst, In Deacon's process we use Cu_2Cl_2 as a catalyst and in lead chamber process we use N_2O_5 as a catalyst but in solvay process no catalyst is used.

2. (d) A catalyst can increase the rate or reaction and hence increases the frequency of collision of reacting species.

3. (b) 250 *mg* of X is present in 100 *ml* of colloidal sol of gold. By definition, gold no. of X is that amount of it in *mg* which is present in 10 *ml* of colloidal gold solution. Hence in 10 *ml*, the amount of X present is 25 *mg* which is the gold number of X.

4. (c) Viscosity and surface tension are not same for water in hydrophillic sols.

5. (a) Process of converting precipitate into colloidal particles by adding suitable electrolyte called peptisation and stabilizing agent (electrolytes) as peptizing agent.

6. (c) $[CO + H_2] + H_2 \xrightarrow{ZnO+Cr_2O_3} CH_3OH$

7. (d) Organic catalyst are proteinous in nature and obtain from living cell.

8. (a) Commercial detergents mainly contain salts of higher fatty acids.

9. (a,c) Shape selective catalyst are zeolites and zeolites are alminosilicates of general formula $M_{x/n}[(AlO_2)_x.(SiO_2)_y].mH_2O$. Zeolites are used in conversion of alcohol to gasoline and in polymerisation of ethylene.

10. (d) 10% $NaCl$ solution is used for reviving the exhaust permutite.

11. (b) The ability of a catalyst to accelerate the chemical reaction is known as its activity. Degree of acceleration can be as high as 10^{10} times in certain reactions.

12. (c) $AlCl_3$ may be written as $Al^{+3}Cl^-$ and all the tri-positive ions are Lewis acid hence it can be acts as acid catalyst.

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13. (d) $0.25 \times 1000 = 250$

14. (c) Milk is the example of emulsion of fat globules in water.