

RAMAKRISHNA MISSION VIDYAMANDIRA

Belur Math, Howrah – 711 202

ADMISSION TEST – 2015

INDUSTRIAL CHEMISTRY (Honours)

Date : 18-06-2015

Full Marks : 50

Time: 03:00 p.m – 04:00 p.m

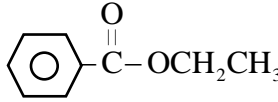
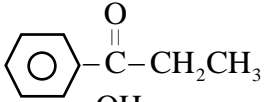

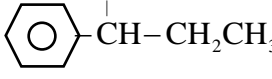
Instructions for the candidate

Answer all the questions given below. Each question carries 2 marks. Tick (✓) the correct option. The tick must be very clear — if it is smudgy or not clear, no marks will be awarded.

Name of the student : _____

Application No. : _____

- A solution is made by dissolving 49g of H_2SO_4 in 250ml of water. The molarity of the solution prepared is
a) 2M b) 1M c) 4M d) 5M
- The number of oxygen atoms present in 1 mole of oxalic acid dihydrate is
a) 6×10^{23} b) 6.022×10^{34} c) 7.22×10^{23} d) 36.13×10^{23}
- The configuration of the valence orbital of an element with atomic number 22 is
a) $3d^5 4s^1$ b) $3d^2 4s^2$ c) $4s^1 4p^1$ d) $3d^2 4s^1 4p^1$
- The elements in which the electrons are progressively filled in 5f-orbitals are called
a) lanthanoids b) actinoids c) transition elements d) halogens
- Which of the following molecules contains covalent and coordinate bonds?
a) CCl_4 b) H_2SO_4 c) NaCl d) $\text{Mg}(\text{OH})_2$
- Which of the following is non-polar?
a) SO_2 b) CO_2 c) H_2O d) NH_3
- Arrange the following in increasing order of covalent character – NaCl , MgCl_2 , AlCl_3
a) $\text{NaCl} < \text{MgCl}_2 < \text{AlCl}_3$ b) $\text{MgCl}_2 < \text{NaCl} < \text{AlCl}_3$
c) $\text{AlCl}_3 < \text{MgCl}_2 < \text{NaCl}$ d) $\text{NaCl} < \text{AlCl}_3 < \text{MgCl}_2$
- What volume in litres will be occupied by 4.4g of CO_2 at STP ?
a) 22.4 L b) 44.8 L c) 12.2 L d) 2.24 L
- For an ideal gas, number of moles per litre in terms of its pressure, temperature and gas constant is
a) PT/R b) P/RT c) PRT d) RT/P
- For a reaction to be spontaneous at any temperature, the conditions are
a) $\Delta H = +ve$, $\Delta S = +ve$ b) $\Delta H = -ve$, $\Delta S = -ve$ c) $\Delta H = +ve$, $\Delta S = -ve$ d) $\Delta H = -ve$, $\Delta S = +ve$
- According to Lewis concept, an acid is a/an
a) proton donor b) electron pair donor c) proton acceptor d) electron pair acceptor
- Which of the following is conjugate acid of SO_4^{2-} ?
a) HSO_4^- b) H^+ c) H_2SO_4 d) SO_4^{2-}
- The solubility product of AgCl is 1.5625×10^{-10} at 25°C . Its solubility in grams per litre will be
a) 143.5 b) 108 c) 1.57×10^{-8} d) 1.79×10^{-3}
- BeO is insoluble but BaO is soluble. Give reason.
a) Lattice energy of BeO is higher than BaO due to small size of Be^{2+} ion and its covalent nature
b) Hydration energy of BeO is lower than BaO due to small size Be^{2+} ion
c) BeO is amphoteric in nature while BaO is basic
d) BeO forms hydrated salts while BaO forms anhydrous salts

15. When plaster of Paris comes in contact with water it sets into a hard mass. The composition of the hard mass is
 a) $\text{CaSO}_4 \cdot \text{H}_2\text{O}$ b) $\text{CaSO}_4 \cdot \text{Ca}(\text{OH})_2$ c) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ d) $\text{CaSO}_4 \cdot 2\text{Ca}(\text{OH})_2$
16. Buckminsterfullerene is
 a) graphite b) diamond c) C-60 d) quartz
17. What is the order of reactivity of hydrogen atoms attached to carbon atom in an alkene?
 a) $3^\circ > 1^\circ > 2^\circ$ b) $2^\circ > 1^\circ > 3^\circ$ c) $3^\circ > 2^\circ > 1^\circ$ d) $1^\circ > 2^\circ > 3^\circ$
18. Which of the following pollutants is not harmful for lungs?
 a) CO b) CO_2 c) SO_2 d) NO_2
19. An electric current is passed through silver nitrate solution using silver electrodes. 15.28 g of silver was found to be deposited on cathode. What will be the weight of copper deposited on cathode if same amount of electricity is passed through copper sulphate solution using copper electrodes?
 a) 4.49 g b) 6.4 g c) 12.8 g d) 3.2 g
20. Phosphorous acid on heating gives the following products : $4\text{H}_3\text{PO}_3 \xrightarrow{\Delta} 3\text{H}_3\text{PO}_4 + \text{PH}_3$
 The above reaction is an example of
 a) oxidation b) thermal decomposition c) disproportionation d) reduction
21. The increasing order of crystal field splitting strength of the given ligands is
 a) $\text{NH}_3 < \text{Cl}^- < \text{CN}^- < \text{F}^- < \text{CO} < \text{H}_2\text{O}$ b) $\text{F}^- < \text{Cl}^- < \text{NH}_3 < \text{CN}^- < \text{H}_2\text{O} < \text{CO}$
 c) $\text{Cl}^- < \text{F}^- < \text{H}_2\text{O} < \text{NH}_3 < \text{CN}^- < \text{CO}$ d) $\text{CO} < \text{CN}^- < \text{NH}_3 < \text{H}_2\text{O} < \text{F}^- < \text{Cl}^-$
22. An unknown alcohol is treated with the "Lucas reagent" to determine whether the alcohol is primary, secondary or tertiary. Which reacts fastest and by what mechanism?
 a) Tertiary alcohol by $\text{S}_{\text{N}}2$ b) Secondary alcohol $\text{S}_{\text{N}}1$
 c) Tertiary alcohol $\text{S}_{\text{N}}1$ d) Secondary alcohol $\text{S}_{\text{N}}2$
23. What is the final product (C) obtained in the reaction sequence :
 $\text{CH}_3\text{CH}_2\text{COOH} \xrightarrow{\text{PCl}_3} \text{(A)} \xrightarrow[\text{AlCl}_3]{\text{C}_6\text{H}_6} \text{(B)} \xrightarrow[\text{base, heat}]{\text{NH}_2\text{NH}_2} \text{(C)}$
- a)  b) 
- c)  d) 
24. Low density polythene (LDP) is used in the insulation of electricity carrying wires and manufacture of flexible pipes and squeeze bottles because—
 a) It is tough, hard and rigid.
 b) It is chemically inert, tough, flexible and poor conductor of electricity.
 c) It is very tough, good conductor of electricity and flexible.
 d) It is chemically inert, very soft, water absorbent and poor conductor of heat.
25. Fill up the blanks with suitable reagents to show synthesis of poly vinyl chloride
 $\text{CH} \equiv \text{CH} \xrightarrow{\text{X}} \text{CH}_2 = \text{CHCl} \xrightarrow{\text{Y}} \text{-(CH}_2 - \text{CHCl} - \overset{\text{Cl}}{\underset{|}{\text{CH}}}\text{)-}_n$
 a) X = HCl, HgCl_2 ; Y = Polymerisation, peroxide b) X = Cl_2 , FeCl_3 ; Y = Polymerisation, heat
 c) X = HCl, CuCl ; Y = H_2O , H^+ d) X = HCl, HgCl_2 ; Y = Pt, high pressure

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