

Total No. of Questions – [5]

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Paper Code - U128-105BCBE-FS

**May 2019 / ENDSEM**

**F. Y. B. TECH. (COMMON) (SEMESTER II)**

**COURSE NAME: Engineering Chemistry COURSE CODE: ES10175B**

**(2017 PATTERN)**

Time: [2 Hours]

[Max. Marks: 50]

**(\*) Instructions to candidates:**

- 1) Answer Q.1 OR Q.2, Q.3 OR Q.4 and Q.5
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed
- 4) Use suitable data where ever required

- Q.1) a) Explain any three methods of chemical conversion coating for protection of metal from corrosion. [6]
- b) Define Pilling Bedworth ratio with an example. Explain all four types of metal oxide films formed on the metal surface with reaction & example. [6]
- c) Explain mechanism of dry corrosion due to oxygen along with reactions, diagram and example. [4]

**OR**

- Q.2) a) Explain galvanizing & tinning methods of metallic coatings with the help of process & diagram. [6]
- b) Explain electroplating and electro-less plating methods of corrosion prevention with reaction, diagram & advantages. [6]
- c) Explain any four factors affecting rate of corrosion of metal. [4]
- Q.3) a) Describe the principle, construction, diagram and working of a dry cell with any 2 applications. [6]
- b) Differentiate between primary batteries and secondary batteries. [4]
- c) Explain following terms [4]
- i) Energy efficiency
  - ii) Power density
  - iii) Energy density
  - iv) Cycle Life



OR

- Q.4) a) Describe Lithium –Manganese dioxide cell with construction, diagram & reaction. Explain two advantages, two disadvantages & two applications of Lithium –Manganese dioxide cell. [6]
- b) Explain construction, diagram and discharging reactions of Lead acid battery. [4]
- c) Define fuel cell. Give 2 advantages, 2 disadvantages and 2 applications of fuel cells. [4]

Q.5) Attempt following multiple choice questions: [1x20=20]

- 1) 1 M  $\text{Na}_2\text{EDTA} \equiv$  \_\_\_\_\_  $\text{CaCO}_3$ .  
a) 10 g                      b) 100 g                      c) 1000 g                      d) None of these
- 2)  $\text{Mg}(\text{HCO}_3)_2$  on boiling forms \_\_\_\_  
(a)  $\text{MgCO}_3 + \text{CO}_2 + \text{H}_2\text{O}$                       (b)  $\text{MgCO}_3 + \text{CO}_2$   
(c)  $\text{Mg}(\text{OH})_2 + 2\text{CO}_2$                       (d)  $\text{Mg}(\text{OH})_2 + \text{MgCO}_3$
- 3) The concentration of dissolved impurities is expressed in terms of  
(a) Equivalents of EDTA                      (b) Equivalents of  $\text{CaCO}_3$   
(c) Equivalents of  $\text{ZnSO}_4$                       (d) None of these
- 4) Dissolved oxygen can be removed by adding calculated quantity of  
(a) Sodium carbonate                      (b) Sodium sulphite  
(c) Sodium sulphate                      (d) Sodium hydroxide
- 5) Zeolite exchanger has ability to replace calcium ions in water by  
(a) Sodium ions                      (b) Potassium ions  
(c) Hydrogen ions                      (d) Hydroxyl ions
- 6) In glass electrode, the potential produced across the membrane is used to measure  
(a) pH of the solution                      (b) Pressure of the solution  
(c) Concentration of the solution                      (d) Temperature of the solution
- 7) Calomel electrode can be represented as.....  
(a)  $\text{Hg}, \text{Hg}_2\text{Cl}_2 | \text{Cl}^-$                       (b)  $\text{Pt}, \text{AgCl} | \text{Cl}^-$   
(c)  $\text{Hg}, \text{HgCl}_2 | \text{Cl}^-$                       (d)  $\text{Pt} | 1\text{M HCl}$



- 8) The indicator electrode used in potentiometric titration of  $\text{Fe}^{+2}$  versus  $\text{Ce}^{+4}$  is  
 (a) Silver electrode (b) Platinum electrode  
 (c) Zinc electrode (d) Calomel electrode
- 9) The reference electrodes are those whose potential is  
 (a) Constant (b) Reproducible  
 (c) Stable (d) Stable and reproducible
- 10) Ratio of specific conductance to that of measured conductance is called  
 (a) Specific resistance (b) Molar conductance  
 (c) Equivalent conductance (d) Cell constant
- 11) Monomer is a molecule  
 (a) of high molecular weight (b) having reactive site  
 (c) is used for synthesis of petrol (d) having at least two reactive sites
- 12) Number average MW is expressed as  
 (a)  $\frac{\sum M_i}{\sum n_i}$  (b)  $\frac{\sum n_i M_i^2}{\sum n_i M_i}$   
 (c)  $\frac{\sum n_i M_i}{\sum M_i}$  (d)  $\frac{\sum n_i M_i}{\sum n_i}$
- 13) The polymers which do not become soft on heating and hard on cooling are  
 (a) Thermoplastic polymers (b) Thermosoftening polymers  
 (c) Thermosetting polymers (d) None of these
- 14) On polymer backbone, N-doping creates  
 (a) Positive charge (b) Negative charge  
 (c) Neutral charge (d) None of these
- 15) Crystallinity of LDPE is  
 (a) 90% (b) 40%  
 (c) 50% (d) 99%
- 16) Which of the following statement is not true for GCV?  
 (a) It is higher calorific value (b) It is theoretical calorific value  
 (c) It is lower calorific value (d) It is gross calorific value
- 17) Acid correction should be subtracted while calculating GCV by a Bomb calorimeter as it involves  
 (a) Exothermic reaction (b) Displacement reaction  
 (c) Neutralisation reaction (d) Endothermic reaction

- 18) Cetane number of----is arbitrarily 100.  
(a) n-Heptane (b) Isooctane  
(c) Hexadecane (d) 2-methyl naphthalene
- 19) Choose the option that is a renewable fuel  
(a) Charcoal (b) Coal  
(c) Petrol (d) Biodiesel
- 20) Biodiesel is obtained from vegetable oil or animal oil by a chemical reaction called ----  
(a) Fractional distillation (b) Emulsification  
(c) Trans esterification (d) Biological fermentation

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