

Total No. of Questions – [ 5 ]

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Paper Code - U127-105B (RE-F4FS)

JUNE 2018/ RE-EXAM

**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)** Write reaction of following metals with oxygen and identify types of oxide films formed. **[6 marks]**  
(i) Mg (ii) Cr (iii) Mo (iv) Ag (v) Na (vi) Cu
- b)** Distinguish the following **[6 marks]**  
a) anodic protection and cathodic protection. (3 points)  
b) galvanizing and tinning. (3 points)
- c)** Explain any four factors affecting rate of corrosion on the basis of **nature of environment**. **[4 marks]**

**OR**

- Q.2) a)** Define corrosion. State conditions under which wet corrosion occurs. Explain oxygen absorption mechanism of wet corrosion with reactions and figure. **[6 marks]**
- b)** Explain any two methods of surface preparation before application of coatings. Explain metal cladding and cementation methods of applying metallic coatings. **[6 marks]**
- c)** Explain any four factors affecting rate of corrosion on the basis of **nature of metal**. **[4 marks]**
- Q.3) a)** Write discharging electrode reactions of following **[6 marks]**  
a) Nickel Metal- Hydride Battery  
b) Lithium-Manganese Dioxide [Li/MnO<sub>2</sub>] Cell  
c) Ni-Cd cell
- b)** Give any four merits and four demerits of fuel cell. **[4 marks]**
- c)** Differentiate between primary batteries and secondary batteries. (4 points) **[4 marks]**

**OR**



- Q4) a)** Define fuel cell. Explain working with reaction, figure, two advantages and two disadvantages of Polymer Electrolyte Membrane fuel cell. **[6 marks]**
- b)** Mention any four outstanding features of lithium batteries in comparison with conventional batteries. **[4 marks]**
- c)** Write discharging electrode reactions of dry cell (Zn – MnO<sub>2</sub> cell). Give two advantages and two disadvantages of it. **[4 marks]**

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

- 1)** The colour of Metal-EDTA complex is **[1 mark]**  
(a) Blue (b) Wine red  
(c) Pink (d) Colourless
- 2)** Corrosion of boiler occurs due to water containing the impurity **[1 mark]**  
(a) Dissolved oxygen (b) Dissolved carbon dioxide  
(c) Dissolved magnesium sulphate (d) All of these
- 3)** The process used to decrease concentration of salts in water by applying direct electric current is **[1 mark]**  
(a) Ion exchange (b) Reverse osmosis  
(c) Electrodialysis (d) Osmosis
- 4)** Water softened by ion exchanger is free from **[1 mark]**  
(a) All types of cations only (b) All types of anions only  
(c) Both (a) and (b) (d) None of these
- 5)** Scales are formed in the boilers due to **[1 mark]**  
(a) Decomposition of bicarbonates  
(b) Decrease in solubility of calcium sulphate  
(c) Hydrolysis of magnesium salts  
(d) All of these
- 6)** Aniline in acidic medium shows\_\_\_\_\_, due to\_\_\_\_\_ **[1 mark]**  
(a) Blue shift, loss of conjugation  
(b) Red shift, loss of conjugation  
(c) Red shift, presence of conjugation  
(d) Hyperchromic shift, presence of conjugation
- 7)** Which of the following is an auxochrome? **[1 mark]**  
(a) C-C (b) H-H  
(c) -OH (d) C=C
- 8)** pH range over which a glass electrode can be used is **[1 mark]**  
(a) 1 to 10 (b) 2 to 10 (c) 1 to 12 (d) 1 to 14
- 9)** The cell emf at equivalence point in the titration of Fe<sup>+2</sup> versus Ce<sup>+4</sup> is **[1 mark]**  
(a) 0.11 V (b) 0.75 V (c) 1.45 V (d) 1.1 V
- 10)** The conducting power of all ions produced by one mole of an electrolyte in 1 dm<sup>3</sup> of water is known as\_\_\_\_\_. **[1 mark]**  
(a) Conductance (b) Equivalent conductance  
(c) Molar conductance (d) Specific conductance

- 11) Power alcohol is \_\_\_\_\_ blended with petrol. [1 mark]  
 (a) Ethanol (b) Methanol  
 (c) Propanol (d) Kerosene
- 12) Knocking tendency of \_\_\_\_\_ is observed to be higher in diesel engine. [1 mark]  
 (a) Aromatics (b) Cycloparaffins  
 (c) Olefins (d) Straight chain alkanes
- 13) Acid correction should be subtracted while calculating GCV by a Bomb calorimeter as it involves [1 mark]  
 (a) Exothermic reaction (b) Displacement reaction  
 (c) Neutralisation reaction (d) Endothermic reaction
- 14) The unit of calorific value is \_\_\_\_\_. [1 mark]  
 (a) kcal/m (b) joules  
 (c) cal/C (d) cal/gm
- 15) A good fuel has \_\_\_\_\_ calorific value and \_\_\_\_\_ ignition temperature. [1 mark]  
 (a) High, moderate (b) Low, moderate  
 (c) High, high (d) Moderate, low
- 16) High density polyethylene has crystallinity [1 mark]  
 a) 40% b) 90%  
 c) 30% d) 100%
- 17) \_\_\_\_\_ is a thermoplastic material. [1 mark]  
 a) Phenol formaldehyde resin b) Epoxy resin  
 c) Polyethylene d) Silicons
- 18) For suspension polymerization, initiator should be [1 mark]  
 \_\_\_\_\_  
 a) water soluble  
 b) monomer soluble  
 c) soluble in both water and monomer  
 d) homogeneously mixed with solution of water and monomer
- 19) Kevlar is \_\_\_\_\_ type of liquid crystal. [1 mark]  
 a) thermotropic b) lyotropic  
 c) smectic d) cholesteric
- 20) Degree of polymerization is [1 mark]  
 a) number of monomers in polymer chain  
 b) number of reaction sites in monomer  
 c) number of ways polymerization is carried out  
 d) none of these