Total No. of Questions – [5 ] Total No. of Printed Pages:3

| G.R. No. | |
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# DECEMBER 2017 / ENDSEM

## F. Y. B. TECH. (COMMON) (SEMESTER - I)

**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) | Define Corrosion. Give any 2 factors affecting rate of dry corrosion. Write reaction of following metals with oxygen and identify types of oxide films formed. (i) Na (ii) Al (iii) Ag (iv) Mo | **[6 marks]** |
| | b) | Give principle involved in cathodic protection. Explain cathodic protection of metal by sacrificial anodic protection and impressed current cathodic protection | **[6 marks]** |
| | c) | Explain any four factors affecting rate of corrosion on the basis of **nature of metal.** | **[4 marks]** |

**OR**

| | | | |
|---|---|---|---|
| Q.2) | a) | Explain wet corrosion with hydrogen evolution mechanism and oxygen absorption mechanism. | **[6 marks]** |
| | b) | Define electroplating. Explain electroplating with figure, process, reactions, 2 advantages and 2 applications. | **[6 marks]** |
| | c) | Explain any four factors affecting rate of corrosion on the basis of **nature of environment.** | **[4 marks]** |
| Q.3) | a) | Define fuel cell. Explain working with reactions, figure, two advantages and two disadvantages of Polymer Electrolyte Membrane fuel cell (PEMFC) . | **[6 marks]** |
| | b) | Write electrode reactions of dry cell ($Zn - MnO_2$ cell). Give two advantages and two disadvantages of it. | **[4 marks]** |

c) Mention any four outstanding features of lithium batteries in comparison with conventional batteries. **[4 marks]**

**OR**

**Q4)** a) Discuss the charging and discharging electrode reaction of lead acid battery. Give two advantages and two disadvantages of it. **[6 marks]**

b) Give any four merits and four demerits of fuel cell. **[4 marks]**

c) Write electrode reactions of Ni-Cd cell. Give any four applications of it. **[4 marks]**

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

1) 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

2) Cation exchange resin has a functional group **[1 mark]**
(a) $-S0_3H$ (b) $-NMe_30H$
(c) $-CH_4$ (d) $-S0_4$

3) Sodium zeolite or permutit can be represented as **[1 mark]**
(a) $AI_20_3Mg_20.xSi0_2.yH_20$ (b) $Na_20.AI_20_3.xSi0_2.yH_20$
(c) $Ca_20.Si_20_3.xNa_20.yH_20$ (d) $AI_20_3Si_20.xNa_20.yH_20$

4) Foaming can be prevented in low pressure boilers, by adding antifoaming agents like **[1 mark]**
(a) Mineral oil (b) Castor oil
(c) Refined oil (d) Crude oil

5) Bicarbonate alkalinity of water is determined by using the indicator **[1 mark]**
(a) Methyl orange (b) Phenolphthalein
(c) Phenol red (d) Cresol red

6) On dilution equivalent conductance of a solution will **[1 mark]**
(a) Decrease (b) Increase
(c) Remains unaltered (d) None of these

7) Glass electrode is an example of **[1 mark]**
(a) Indicator electrode (b) Primary electrode
(c) Redox electrode (d) None of these

8) The cell emf at equivalence point in the titration of $Fe^{+2}$ versus $Ce^{+4}$ is **[1 mark]**
(a) 0.11 V (b) 0.75 V (c) 1.45 V (d) 1.1 V

9) $\pi \rightarrow \pi^*$ transitions will not be possible in …….. **[1 mark]**
(a) Benzene (b) Ethane
(c) Ethylene (d) H-CHO

10) When absorption intensity of a compound is increased in UV – Visible spectroscopy, the effect is known as_____. **[1 mark]**
(a) Hypsochromic shift (b) Hypochromic shift
(c) Bathochromic shift (d) Hyperchromic shift

11) Biodiesel is obtained from vegetable oil or animal oil by a chemical reaction called _____. **[1 mark]**
(a) Fractional distillation (b) Emulsification
(c) Trans esterification (d) Biological fermentation

12) In power alcohol, ethanol is blended_____ with petrol and used as a fuel In IC engine. **[1 mark]**
(a) 80 - 90% (b) 40 - 50%
(c) 20 - 25% (d) Less than 10 %

13) Octane number of _____ is arbitrarily zero. **[1 mark]**
(a) Isooctane (b) Hexadecane
(c) n-heptane (d) 2-methyl naphthalene

14) To get more accurate results the corrections considered while calculating the calorific value of a fuel by bomb calorimeter are **[1 mark]**
(a) Cooling Correction (b) Fuse Wire Correction
(c) Acid Correction (d) All of these

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) Which of the following is a trifunctional monomer? **[1 mark]**
a) Formaldehyde b) Phenol
c) Vinyl chloride d) Ethylene glycol

17) Which of the following statement is true? **[1 mark]**
a) Bulky group increases $T_g$
b) Higher the flexibility, higher is $T_g$
c) Higher molecular weight polymer show low $T_g$
d) Addition of plasticizer increase $T_g$

18) Bulk polymerization techniques uses **[1 mark]**
a) monomer dispersed in water
b) monomer dispersed in water with emulsifier
c)only monomer and initiator
d) monomer and initiator along with solvent

19) Urea formaldehyde resin is an example of _____ resin **[1 mark]**
a) thermoplastic b) thermosetting
c) thermoelastic d) thermotropic

20) Polyacetylene is an example of _____ **[1 mark]**
a) biodegradable polymer b) conducting polymer
c) electroluminescent polymer d) liquid crystal polymer