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

G.R. No.	

Paper Code – U127-105B (ESE)

MAY 2018/END SEMESTER EXAM

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

COURSE NAME: Engineering Chemistry COURSE CODE: ES 10175B

(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) What is Pilling –Bedworth ratio? Explain relation of Pilling Bedworth ratio and nature of oxide films. Discuss four types of oxide films formed on the surface of metal with suitable examples. **[6 marks]**

b) Discuss 6 factors affecting rate of corrosion, 3 from nature of metal and 3 from nature of environment. **[6 marks]**

c) Compare galvanizing and tinning.(Give 4 points) **[4 marks]**

OR

Q.2) a) Define corrosion. State conditions under which wet corrosion occurs. Explain hydrogen evolution mechanism of wet corrosion. **[6 marks]**

b) Give principle involved in cathodic protection. Explain cathodic protection of metal by sacrificial anodic protection and impressed current cathodic protection with figure and explanation. **[6 marks]**

c) Explain electroplating with figure, process, reactions and 2 advantages **[4 marks]**

Q.3) a) Describe the construction and working of Nickel-Cadmium storage battery with reactions. Give any four applications **[6 marks]**

b) Explain in detail 4 advantages of lithium cells **[4 marks]**

c) Give 4 merits and 4 demerits of fuel cell **[4 marks]**

OR

Q.4) a) Give construction with figure, chemical reactions(during discharging) of a lead acid storage battery with 4 applications **[6 marks]**

b) Explain working with reactions , 2 advantages and 2 disadvantages of polymer electrolyte membrane fuel cell **[4 marks]**

c) Give reactions, 2 advantages and 2 applications of Nickel- Metal Hydride Battery **[4 marks]**

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

1) The colour of Metal-EDTA complex is **[1 mark]**
(a) Blue (b) Wine red (c) Pink (d) Colourless

2) 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

3) $MgCl_2$ impurity present in boiler water is deposited as **[1 mark]**
(a) $MgCO_3$ (b) MgZ
(c) $Mg(HCO_3)_2$ (d) $Mg(OH)_2$

4) Zeolite is regenerated by washing the bed with solution of **[1 mark]**
(a) NaCl (b) HCl
(c) NaOH (d) Na_2CO_3

5) In water purification for domestic use, chemical action of bleaching powder with water produces _____ which is a powerful germicide. **[1 mark]**
(a) Hydrochloric acid (b) Hypochlorous acid
(c) Hydroclorous acid (d) Hypochloric acid

6) In potentiometry, calomel electrode is used as_____ **[1 mark]**
(a) Indicator electrode (b) Primary electrode
(c) Related electrode (d) Reference electrode

7) In a glass electrode the glass bulb is filled with **[1 mark]**
(a) 0.01 M HCl (b) 0.1 M HCl
(c) 1 M HCl (d) None of these

8) Ratio of specific conductance to that of measured conductance is called **[1 mark]**
(a) Specific resistance (b) Molar conductance
(c) Equivalent conductance (d) Cell constant

9) When absorption maxima shifts towards lower wavelength due to removal of conjugation, it is called **[1 mark]**
(a) Red shift (b) Orange shift
(c) Blue shift (d) Black shift

10) Instead of glass, quartz cuvettes and quartz windows are used In UV-visible spectroscopy because **[1 mark]**
(a) Glass absorbs radiation of wavelength less than 350 nm
(b) Glass is breakable
(c) Quartz looks elegant
(d) Quartz is cheaper than glass

11) The crucible used in bomb calorimeter for calorific value determination is **[1 mark]**
(a) Ni or stainless steel crucible (b) Silica crucible
(c) Porcelain crucible (d) Nichrome crucible

12) In refining of petroleum, during fractional distillation process, gasoline is obtained in the boiling range_____having composition in terms of number of carbon atoms _____. **[1 mark]**
(a) Below 30°, C1to C4 (b) 30-70°C, C5, to C7
(c) 40-120°, C5 to C9 (d) 120-180°, C9 to C1O

13) Knocking tendency of _____ is observed to be higher in diesel engine. **[1 mark]**
(a) Aromatics (b) Cycloparaffins
(c) Olefins (d) Straight chain alkanes

14) 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

15) Volume of oxygen for combustion of 8 m^3 hydrogen will be, **[1 mark]**

(a) 2 m^3 (b) 3 m^3
(c) 4 m^3 (d) 5 m^3

16) High density polyethylene has crystallinity **[1 mark]**

(a) 40% (b) 90%
(c) 30% (d) 100%

17) 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

18) _____ affects biodegradation process. **[1 mark]**

(a) Nature of polymer (b) Temperature and moisture
(c) Type of microorganism (d) All of these

19) N – doping in conducting polymer is done by_____ **[1 mark]**

(a) I_2 (b) $FeCl_3$
(c) Na (d) Br_2

20) The polymers that can be moulded and remoulded to get different shapes are **[1 mark]**

(a) thermoplastic polymers (b) thermosoftening polymers
(c) cross linked polymers (d) none of these