

Total No. of Questions – [5]

Total No. of Printed Pages 3

G.R. No.

Paper Code :- UT17-105B(RE-FS8F)

DECEMBER 2017 / ~~ENDSEM~~ RE-EXAM

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) Explain wet corrosion with hydrogen evolution mechanism and oxygen absorption mechanism (6 marks)

b) Explain any six factors affecting rate of corrosion (6 marks)

c) Compare galvanizing and tinning(Give 4 points) (4 marks)

OR

Q.2) a) Explain mechanism of dry corrosion due to oxygen. Discuss oxidation corrosion in case of Mg, Cr, Mo with reactions and type of oxide film formed (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) Give reason: (4 marks)

i) Impure metal corrodes faster than pure metal under identical environmental conditions

ii) Rusting of iron is faster in saline water than ordinary water

Q.3) a) Give a brief description of a polymer electrolyte membrane fuel [PEMFC] with figure, construction , working with reactions, 2 advantages and 2 disadvantages (6 marks)

b) Differentiate between primary batteries and secondary batteries (Give 4 points) (4 marks)

- c) Explain the construction with figure, 2 applications and 2 advantages of the Ni-Cd cell (4 marks)

OR

- Q.4) a) What are Lithium batteries? Explain Lithium ion batteries with construction, working of lithium ion batteries during discharge with figure and reactions (6 marks)
- b) Explain construction with figure and chemical reactions of Zn – MnO₂ dry cell (4 marks)
- c) Give any 4 advantages of lithium cells over conventional cells (4 marks)

Q.5) Attempt following multiple choice questions: (1 x 20 = 20 marks)

- 1) Salts responsible for permanent hardness are (1 mark)
- (a) CaSO₄ and Ca(HCO₃)₂ (b) Na₂SO₄ and Ca(HCO₃)₂
(c) Na₂SO₄ and MgCl₂ (d) CaSO₄ and MgCl₂
- 2) If $P < 1/2 M$, then alkalinity of water is due to ions (1 mark)
- (a) OH⁻ (b) HCO₃⁻
(c) CO₃⁻² and HCO₃⁻ (d) OH and CO₃⁻²
- 3) 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
- 4) Exhausted zeolite is regenerated by using (1 mark)
- (a) Solution of sodium aluminate (b) Solution of sodium phosphate
(c) Solution of sodium chloride (d) Solution of sodium silicate
- 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) Hydrochlorous acid (d) Hypochloric acid
- 6) In a glass electrode the glass bulb is filled with (1 mark)
- (a) 0.01 M HCl (b) 0.1 M HCl
(c) 10 M HCl (d) None of these
- 7) 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
- 8) In conductometric titration of strong acid-strong base, the conductance of the solution (1 mark)
- (a) Decreases upto end point and then increases
(b) Increases upto end point and then decreases
(c) Increases upto end point and then remains constant
(d) Decreases upto end point and then remains constant

- 9) 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
- 10) Absorbance is related to transmittance as..... (1 mark)
 (a) $A = -\ln T$ (b) $A = -\log T$
 (c) $A = +\log T$ (d) $A = +\ln T$
- 11) The theoretical amount of O_2 required for combustion of fuel is 0.61m^3 . Calculate the volume of air to be supplied. (1 mark)
 (a) 2.9 m^3 (b) 3.1 m^3
 (c) 3.5 m^3 (d) 4.0 m^3
- 12) Sodium alanate has theoretical storage capacity of hydrogen as (1 mark)
 a) 2.2% wt
 b) 1.8% wt
 c) 5.5% wt
 d) 3.7% wt
- 13) 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
- 14) Octane number of _____ is arbitrarily zero. (1 mark)
 (a) Isooctane (b) Hexadecane
 (c) n-heptane (d) 2-methyl naphthalene
- 15) In refining process of petroleum, the de-emulsification of oil is done by (1 mark)
 (a) Cottrell's process (b) Control process
 (c) Condensation process (d) None of these
- 16) Crystallinity of LDPE is (1 mark)
 (a) 90% (b) 40%
 (c) 50% (d) 99%
- 17) T_g of a polymer increases on (1 mark)
 (a) Decreased cross linking and coiling
 (b) Increased branching in polymer
 (c) Plasticizer addition to polymer
 (d) None of these
- 18) Very high molecular weight of polymer can be achieved by _____. (1 mark)
 a) emulsion polymerization b) suspension polymerization
 c) solution polymerization d) bulk polymerization
- 19) N – doping in conducting polymer is done by _____. (1 mark)
 a) I_2 b) $FeCl_3$
 c) Na d) Br_2
- 20) Urea formaldehyde resin is an example of _____ resin (1 mark)
 a) thermoplastic b) thermosetting
 c) thermoelastic d) thermotropic