

G.R. No.

Paper Code - 0119-105B (BE-ES)

DECEMBER 2019 / BACKLOG EXAM
F. Y. B.TECH. (COMMON) (SEMESTER – I/II)
COURSE NAME: Engineering Chemistry
COURSE CODE: ES10175B
(PATTERN 2017)

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 wherever required.

- Q.1) a) Distinguish the following [6 marks]
 a) anodic protection and cathodic protection. (3 points)
 b) galvanizing and tinning. (3 points)
- b) 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
- c) Explain any four factors affecting rate of corrosion on the basis of nature of environment. [4 marks]

OR

- Q.2) a) What is electroplating? Explain electroplating with process, reaction and figure. Give 2 advantages and 2 applications of electroplating. [6 marks]
- b) What is principle of cathodic protection? Give the various types of cathodic protection with figure and explanation. [6 marks]
- c) Define galvanization. Explain the process with the help of diagram. [4 marks]
- Q.3) a) Define fuel cell. Explain working with reaction, figure, two advantages and two disadvantages of Solid Oxide 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 – MnO₂ cell). Give two advantages and two disadvantages of it. [4 marks]

OR

- Q.4) a) Write discharging electrode reactions of following cells [6 marks]

- a) Nickel Metal Hydride Battery
 - b) Lithium-Manganese Dioxide [Li/MnO₂] 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]

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

- 1 In a glass electrode the glass bulb is filled with
 - (a) 0.01 M HCl (b) 0.1 M HCl
 - (c) 1 M HCl (d) None of these
- 2 The reciprocal of resistance is called -----
 - a) Conductance b) Potential c) Current d) Cell constant
- 3 The conducting power of all ions produced by one mole of an electrolyte in 1 dm³ of water is known as _____.
 - (a) Conductance (b) Equivalent conductance
 - (c) Molar conductance (d) Specific conductance
- 4 In potentiometric redox titration between Fe⁺² and Ce⁺⁴, at equivalence point-----
 - a) [Fe⁺³] and [Fe⁺²] ions are present
 - b) [Ce⁺³] and [Fe⁺²] ions are present
 - c) [Ce⁺³] and [Ce⁺⁴] ions are present
 - d) [Fe⁺³] and [Ce⁺³] ions are present
- 5 Maximum energy is required for transition of ----
 - a) $\sigma \rightarrow \sigma^*$ b) $\pi \rightarrow \pi^*$ c) $n \rightarrow \pi^*$ d) $n \rightarrow \sigma^*$
- 6 Number average molecular weight is measured by
 - a) osmotic pressure (b) light scattering
 - c) ultra-centrifugation (d) viscosity measurement
- 7 Degree of polymerization is
 - 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
- 8 Thermosetting polymers are those, _____
 - a) which become soft on heating but do not become hard on cooling
 - b) which become soft on heating and hard on cooling
 - c) which do not become soft on heating
 - d) which are not affected by heat
- 9 Which of the following is liquid crystal polymer?
 - a) polyacetylene (b) Kevlar

