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

G.R. No.	

U118-1058 (BE-FF)

DEC. **2018 / Backlog 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) Explain any six factors affecting rate of corrosion. [6 marks]

b) Define electroplating. Explain electroplating with figure, process, reactions, two advantages and two applications. [6 marks]

c) Give the different types of oxide films formed on surface of metal with suitable example. [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) Give principle of cathodic protection. Explain sacrificial anodic protection with figure, process, two advantages, two disadvantages and two applications. [6 marks]

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

Q.3) a) Explain Lead-acid battery with figure, charging discharging reactions and any two applications. [6 marks]

b) What are lithium batteries? How they are classified? Mention any two outstanding features of lithium batteries in comparison with conventional batteries. [4 marks]

c) Give the construction with figure, working with reactions of SOFC. [4 marks]

OR

Q4) a) Write discharging electrode reactions of following cells [6 marks]

a) Nickel Metal Hydride Battery

b) Lithium-Manganese Dioxide [Li/MnO_2] 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) 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

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

3) Water softened by ion exchanger is free from [1 mark]
(a) All types of cations (b) All types of anions
(c) Both (a) and (b) (d) None of these

4) 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

5) 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

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

7) 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

8) Energy of electron is lowest when it is in_____molecular orbital. [1 mark]
(a) π (b) σ
(c) π^* (d) π

9) In potentiometric redox titration between Fe^{+2} and Ce^{+4}, at equivalence point [1 mark]
(a) $[Fe^{+3}]$ and $[Fe^{+2}]$ ions are present
(b) $[Ce^{+3}]$ and $[Fe^{+3}]$ ions are present
(c) $[Ce^{+3}]$ and $[Ce^{+4}]$ ions are present
(d) $[Fe^{+3}]$ and $[Ce^{+4}]$ ions are present

10) Which electronic transitions are called forbidden transitions? [1 mark]
(1) $\sigma \rightarrow \sigma^*$ (2) $\pi \rightarrow \pi^*$ (3) $n \rightarrow \sigma^*$ (4) $n \rightarrow \pi^*$ (5) $\pi \rightarrow \sigma^*$ (6) $\sigma \rightarrow \pi^*$
(a) 1 and 4 (b) 2 and 6 (c) 3 and 5 (d) 5 and 6

11) $C(s) + O_2 g) \rightarrow CO_2$ (g) [1 mark]
In above reaction 12g C reacts with how many grams of O_2?
a) 32 b) 16 c) 8 d) 64

12) Cetane number of _____ is 100 [1 mark]
a) n – Heptane b) Iso octane
c) Hexadecane d) 2 – methyl naphthalene

13) Knocking in diesel engine is because of _____ [1 mark]

a) Ignition delay b) No ignition
c) Pre – ignition d) None of above

14) Cooling Correction during calculating GCV for Bomb Calorimeter should be _____ . [1 mark]
a) Added b) Multiplied c) Not considered d)Subtracted

15) The relation between the two terms Gross Calorific Value and Net Calorific Value can be explained as [1 mark]
a) GCV=NCV b) GCV>NCV c) GCV<NCV d) GCV ≥ NCV

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

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

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) 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

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