Code No. 2509 / CBCS

FACULTY OF ENGINEERING

B.E. II – Semester (CBCS) (Backlog) Examination, December 2019

Subject: Engineering Chemistry – II

Time: 3 Hours **Max.Marks: 70**

Note: Answer all questions from Part-A and answer any five questions from Part-B

PART – A (10x2 = 20 Marks)

1 The resistance of a conductivity cell filled with 0.098N solution of KCl is 214 ohms at 25°C. Calculate the equivalent conductance of KCl solution, if the cell constant is 0.078cm $^{-1}$.

2 Write the Nernst equation for the electrode, potential of metal-metal ion electrode.

3 Differentiate primary and secondary batteries.

4 Write the Hydrogen–Oxygen fuel cell reactions for oxidation and reduction processes.

5 Explain galvanic corrosion.

6 Write four factors affecting rate of corrosion.

7 Write the Dulong's formula for the calculation of calorific value.

8 What is trans-esterification.

9. Define composite material.

10 Classify liquid crystals and explain them.

PART – B (10x5 = 50 Marks)

11 a) The equivalent conductivities at infinite dilution (Λ_∞) for CH_3COONa, HCl and NaCl are 91.0, 426.16 and 126.45 ohm^{-1} cm^2 eq^{-1} respectively. Calculate the degree of dissociation constant, if the Λ_V of CH_3COOH is 130.0 ohm^{-1} cm^2 eq^{-1}. 5

b). Explain the effect of dilution on various types of conductivities. 5

12 a) Describe lead–acid battery with discharging and charging reactions. 6

b) Describe Methanol-Oxygen fuel cell. Write its reactions for oxidation and reduction processes. 4

13 a) Write a note on electrochemical corrosion. 6

b) What is hot- dipping? Explain i) Galvanising ii) Tinning. 4

14 a) Explain the proximate analysis of coal and give its importance. 5

b) What is knocking? Explain i) octane number ii) cetane number 5

15 a) What are the constituents of composites? Write the advantages and applications of composites. 5

b) Write principles of green chemistry and give two examples of clean green technology. 5

16 a) Explain the determination of pH of a solution using quinhydrone electrode. 6

b) Describe standard hydrogen electrode. Give its representation and write the reactions for oxidation and reduction processes. 4

17 a) What are the constituents of paint? Explain their functions. 6

b) A sample of coal was found to contain the following composition. C= 81%, H= 5%, O = 8%, N = 1%. S =1% and ash = 4%. Calculate minimum amount of air required for complete combustion of 1kg coal sample. 4

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