FE1905

Total No. of Printed Pages:3

F.E. Sem-I (Revised Course 2019-2020)
EXAMINATION NOV/DEC 2019
Chemistry

[Duration : Three Hours] **[Total Marks :100]**

Instructions:
1. Answer any two questions each from Part-A and Part-B; Answer any one question from Part-C.
2. Draw diagrams wherever necessary.
3. Assume additional data if required.

PART-A

Answer any two questions

Q.1

a) For the cell $Ni/Ni^{2+}_{(0.01M)}//Ag^{+}_{(0.1M)}/Ag$ write the cell reaction and calculate the EMF of the cell at 298K if the standard electrode potentials of Ni and Ag electrodes are -0.23 V and 0.8 V respectively. **(6 mk)**

b) Describe the mechanism of corrosion of a metal placed in a humid environment of acidic pH. **(6 mk)**

c) Explain briefly 'Anodization' as a tool for corrosion protection. **(4 mk)**

d) State and explain any four characteristics of batteries. **(4 mk)**

Q.2

a) For the cell $X/X^{2+}_{(0.01M)}//KCl_{(saturated)}/Hg_2Cl_2$, Hg, Pt. Write the cell reaction and calculate the E^{o}_{X} at 298K, where 'X' is an unknown element. The Ecell value was found to be 0.06. Data: $E_{calomel} = 0.2422V$. **(6 mk)**

b) Describe the mechanism of corrosion of a metal placed in a humid environment of neutral pH. **(6 mk)**

c) Draw a neat labeled diagram for Zn-Air Battery and write the relevant reaction involved in its functioning. **(4 mk)**

d) Explain briefly cathodic corrosion control measure through sacrificial anodic protection. **(4 mk)**

Q.3

a) Explain the method for determination of pH of a given solution using Glass Electrode. Write the cell representation of the resultant cell and derive the relationship between pH and EMF of the cell. **(6 mk)**

b) Explain any three factors each i.e. due to metal and nature of environment which affect the rate of corrosion. **(6 mk)**

CB73D8065034A0BF9B3C0C645232E45B

c) Draw a neat labeled diagram for Li-Ion battery and write the relevant reaction involved in its functioning. **(4 mk)**

d) Explain with help of neat labeled diagram construction of Ion selective electrode. **(4 mk)**

PART-B

Answer any two questions

Q.4

a) Discuss the following structure-property relationship in polymers:
i) Chemical properties ii) Optical Properties **(6 mk)**

b) Outline the mechanism of Beckmann rearrangement and give one application for the same. **(6 mk)**

c) State the basic principle involved in working of UV-Vis and IR spectroscopy. **(4 mk)**

d) Discuss the purification of Crude Oil. **(4 mk)**

Q.5

a) Explain the Bulk and suspension methods of polymerization. **(6 mk)**

b) Outline the mechanism of Reimer-Tiemann and give one application for the same. **(6 mk)**

c) With the help of a block diagram explain the working of Gas Chromatography. **(4 mk)**

d) Explain the grading of Gasoline and Diesel. **(4 mk)**

Q.6

a) Discuss briefly Projection Formulae's and Geometrical Isomerism in chemical structures. **(6 mk)**

b) Discuss the degradation in polymers due to oxidation and ESC. **(6 mk)**

c) With the help of a block diagram explain the working of UV-Vis spectroscopy. **(4 mk)**

d) Define the term 'Fuel'. Outline its classification with suitable examples. **(4 mk)**

PART-C

Answer any One question

Q.7

a) An article upon cleaning after a period of over a year was found to have developed tiny pores of discoloration on its surface. Explain the types of corrosion the article has undergone with suitable examples and relevant reactions. **(5 mk)**

b) Define the term 'Electrode Potential'. Determine the electrode Potential of the following system; $Cu^{2+}{}_{(0.01M)}/Cu$ at 25°C, E° of Cu^{2+} = 0.34V. **(5 mk)**

CB73D8065034A0BF9B3C0C645232E45B

c) Discuss briefly the terms Chirality and Enantiomers **(5 mk)**

d) Explain crystallinity in polymers with regard to Tg and Tm **(5 mk)**

Q.8 a) Explain the process of electroplating a surface with Chromium. Draw relevant diagram. **(5 mk)**

b) Outline the classification of polymers based on structure and type of polymerization. **(5 mk)**

c) Explain the thermal and environmental stress cracking degradation in polymers. **(5 mk)**

d) Draw a neat labeled diagram of Calomel electrode; write its representation and reaction involved. **(5 mk)**

CB73D8065034A0BF9B3C0C645232E45B