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## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, B.E. - Semester End Examination; Sep. / Oct. - 2023

### Applied Chemistry

(Computer Science and Engineering Stream)

Time: 3 hrs

Max. Marks: 100

#### Course Outcomes

The Students will be able to:

CO1: Identify the terms and processes involved in scientific and engineering applications.

CO2: Explain the phenomena of chemistry to describe the methods of engineering processes.

CO3: Solve for the problems in chemistry that are pertinent in engineering applications

CO4: Apply the basic concepts of chemistry to explain the chemical properties and processes

CO5: Analyze properties and processes associated with chemical substances in multidisciplinary situations.

**Note: I) PART - A** is compulsory. **Two** marks for each question.

**II) PART - B:** Answer any **Two** sub questions (from a, b, c) for a Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
<b>I : PART - A</b>		<b>10</b>			
1 a.	Give any two differences between electroplating and electro-less plating.	2	L1	CO1	PO1
b.	Write the cell reaction involved in Ni-MH battery.	2	L1	CO2	PO2
c.	What is ion selective electrode? Give an example.	2	L1	CO1	PO1
d.	Define Weight average molecular weight and Number average molecular weight.	2	L2	CO4	PO1
e.	Mention any two characteristics of e-waste management.	2	L1	CO1	PO1
<b>II : PART - B</b>		<b>90</b>			
<b>UNIT - I</b>		<b>18</b>			
2 a.	Explain the production of electronic grade silicon by Czochralski process and float zone method with the help of a neat labeled diagram.	9	L2	CO2	PO2
b.	Illustrate the working principle, properties and applications of QLED.	9	L2	CO3	PO3
c.	Explain the electroplating of nickel. Give the applications of electroplating of nickel.	9	L2	CO2	PO2
<b>UNIT - II</b>		<b>18</b>			
3 a.	What are sensors? Explain the working principle of conductometric sensors and give applications.	9	L2	CO2	PO2
b.	Discuss the detection of SO <sub>x</sub> , NO <sub>x</sub> by electrochemical gas sensors.	9	L2	CO2	PO2
c.	Define battery. Explain the construction, working and applications of Li-ion battery.	9	L2	CO2	PO2

Contd....2

**UNIT - III****18**

- 4 a. Define corrosion. Describe the electro chemical theory of corrosion with suitable example. 9 L3 CO3 PO2
- b. What are reference electrodes? Explain the construction, working and applications of calomel electrode. 9 L3 CO3 PO2
- c. Calculate the emf of the cell and  $\Delta G$  when Mg electrode is in contact with 0.5M  $MgCl_2$  solution and Au electrode is in contact with 0.25M  $AuCl_3$  solution at 30°C. Write the suitable cell representation and cell reactions. 9 L3 CO3 PO2
- $E^\circ_{Mg} = -2.37$  V and  $E^\circ_{Au} = 1.50$  V  
( $R = 8.314$  kJ/mol and  $F = 96500$  C/mol)

**UNIT - IV****18**

- 5 a. What are conducting polymers? Explain the synthesis and applications of Kevlar and Epoxy resin. 9 L3 CO1 PO1
- b. Explain the preparation, properties and commercial applications of graphene oxide. 9 L2 CO2 PO2
- c. What is PV cell? Summarize the construction and working of solar PV cell. 9 L2 CO1 PO1

**UNIT - V****18**

- 6 a. Explain the sources, causes, composition and ill effects of the toxic materials used in manufacturing electronic and electrical products. 9 L3 CO2 PO2
- b. Define e-waste. Describe the process of extraction of gold from e-waste. 9 L2 CO2 PO2
- c. Write a brief note on role of following stake holders:
- i) Producer
  - ii) Consumer 9 L2 CO2 PO2
  - iii) Recycler
  - iv) Statutory bodies

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