Code No. 1703

OSMANIA UNIVERSITY
FACULTY OF ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING (AUTONOMOUS)
B.E. **(ECE, CSE, AI&ML) I-Semester** (Main) Examinations April 2022

ENGINEERING CHEMISTRY

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

Note : *i) Each question carries **14** Marks.*
*ii) **First Question** is compulsory and answer all **sub** questions. Answer any **four** questions from remaining **six** questions **(Q.2 - Q.7).***
iii) Answers to each question must be written at one place only and in the same order as they occur in the Question Paper.
*iv) **Missing data, if any, may suitably be assumed.***

			Marks	BT	CO
1.	a)	How do you sterilize water using Chlorine?	2	1	1
	b)	Solve the cell reaction of the following cell notation: Ag/Ag^+ // H^+/H_2/ Pt.	2	3	2
	c)	Draw the t_2g set of orbitals.	2	2	3
	d)	Define functionality. Explain with an example.	2	2	4
	e)	Differentiate between primary and secondary batteries.	2	2	5
	f)	Outline the sacrificial anodic protection of corrosion controlling method.	2	2	1
	g)	Calculate the bond order of N_2 molecule.	2	3	3
2.	a)	How do you determine the hardness of water by EDTA method? 0.30gm of $CaCO_3$ was dissolved in HCl and solution made up to 1000ml with distilled water. 100ml of this solution required 30ml of EDTA solution for titration. 100ml of hard water sample required 35ml EDTA solution. 100ml of this boiled water required 12ml of EDTA solution. Calculate the total, permanent and temporary hardness of water.	8	5	1
	b)	Define Electrochemical corrosion. Discuss the mechanism of electrochemical corrosion.	6	6	1
3.	a)	Define cyclic process. Explain the determination of maximum efficiency of heat engine using Carnot's cycle. Calculate the efficiency of an engine working between the temperature of 273K and 373 K.	8	5	2

	b)	Describe the construction of Calomel electrode in detail with a neat diagram.	6	5	2
4.	a)	Explain the crystal field splitting of d-orbitals in Octahedral complexes.	7	5	3
	b)	Discuss the different types of electronic transitions and applications of UV-Visible Spectroscopy.	7	6	3
5.	a)	Write the preparation, properties and applications of the following polymers i) Bakelite ii) Buna-S	8	5	4
	b)	Define liquid crystals. Explain the important applications of liquid crystals.	6	5	4
6.	a)	Explain the working of Lead-Acid battery as voltaic and as electrolytic cell with the relevant reactions.	7	5	5
	b)	What is Bottom-up approach? Discuss the synthesis of Sol-Gel process for the synthesis of nanomaterials.	7	5	5
7.	a)	Define conducting polymers. Explain the mechanism of Polyacetylene.	6	5	4
	b)	Write a note on the following i) Galvanizing ii) Potentiometric titration of Acid-Base	8	4	1 & 2

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