

U.S.N

--	--	--	--	--	--	--	--	--	--

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

Engineering Chemistry

(Common to All Branches)

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Recollect the fundamental Definitions or Laws of Chemistry relevant to Engineering field.

CO2: Discuss the various Properties and Applications by understanding the course topics pertaining to Engineering field.

CO3: Explain various Concepts and Principles used in the topics to understand the theory related to Engineering field.

CO4: Describe the Synthesis and applications of materials in the engineering field.

CO5: Solve the numerical problems by applying proper solutions to verify the theoretical concepts related to engineering.

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
I : PART - A		10			
1 a.	Write any two advantages of power alcohol.	2	L1	CO1	PO1
b.	What is Galvanization and Tinning?	2	L1	CO1	PO1
c.	Mention the Composition of cement.	2	L1	CO1	PO1
d.	Name any two applications of carbon nanotubes.	2	L1	CO1	PO1
e.	Define COD and BOD.	2	L1	CO1	PO1
II : PART - B		90			
UNIT - I		18			
2 a.	What is Knocking? Explain mechanism of Knocking and its ill effects.	9	L1	CO2	PO2
b.	Explain the construction, working and applications of Calomel electrode.	9	L2	CO2	PO1
c.	What are fuel cells? Outline the construction, working and applications of methanol-oxygen fuel cell.	9	L1	CO2	PO1
UNIT - II		18			
3 a.	Illustrate the Electrochemical theory of corrosion with suitable example.	9	L2	CO4	PO1
b.	What is cathodic protection? Summarize the sacrificial and impressed current technique for the prevention of corrosion.	9	L1	CO1	PO1
c.	Define electroplating. Explain the principle and applications of electroplating of Chromium.	9	L1	CO5	PO2

Contd....2

UNIT - III**18**

- 4 a. Explain the following properties of cement:
- i) Quality
 - ii) Shrinkage
 - iii) Setting time
 - iv) Soundness
- b. Summarize the synthesis, properties and applications of the following polymers:
- i) Polycarbonates
 - ii) Polyurethane
 - iii) Kevlar
- c. What are conducting polymers? Summarize the synthesis, mechanism and applications of poly-acetylene (p-type).

UNIT - IV**18**

- 5 a. Explain the basic principles of green chemistry.
- b. i) Summarize the synthesis of ethylene oxide and methyl methacrylate and give any two industrial applications of green chemistry.
- ii) Calculate the atom economy for the formation of nitrobenzene ($C_6H_5NO_2$)
- c. What is Nano chemistry? Explain the synthesis of nanomaterials by sol-gel method.

UNIT - V**18**

- 6 a. Discuss the softening of hard water by Ion-exchange process.
- b. Outline the theory, procedure and calculation involved in the estimation of Potentiometry.
- c. What are liquid crystals? Distinguish between Thermo-tropic and Lyo-tropic liquid crystals with examples.

* * * *