

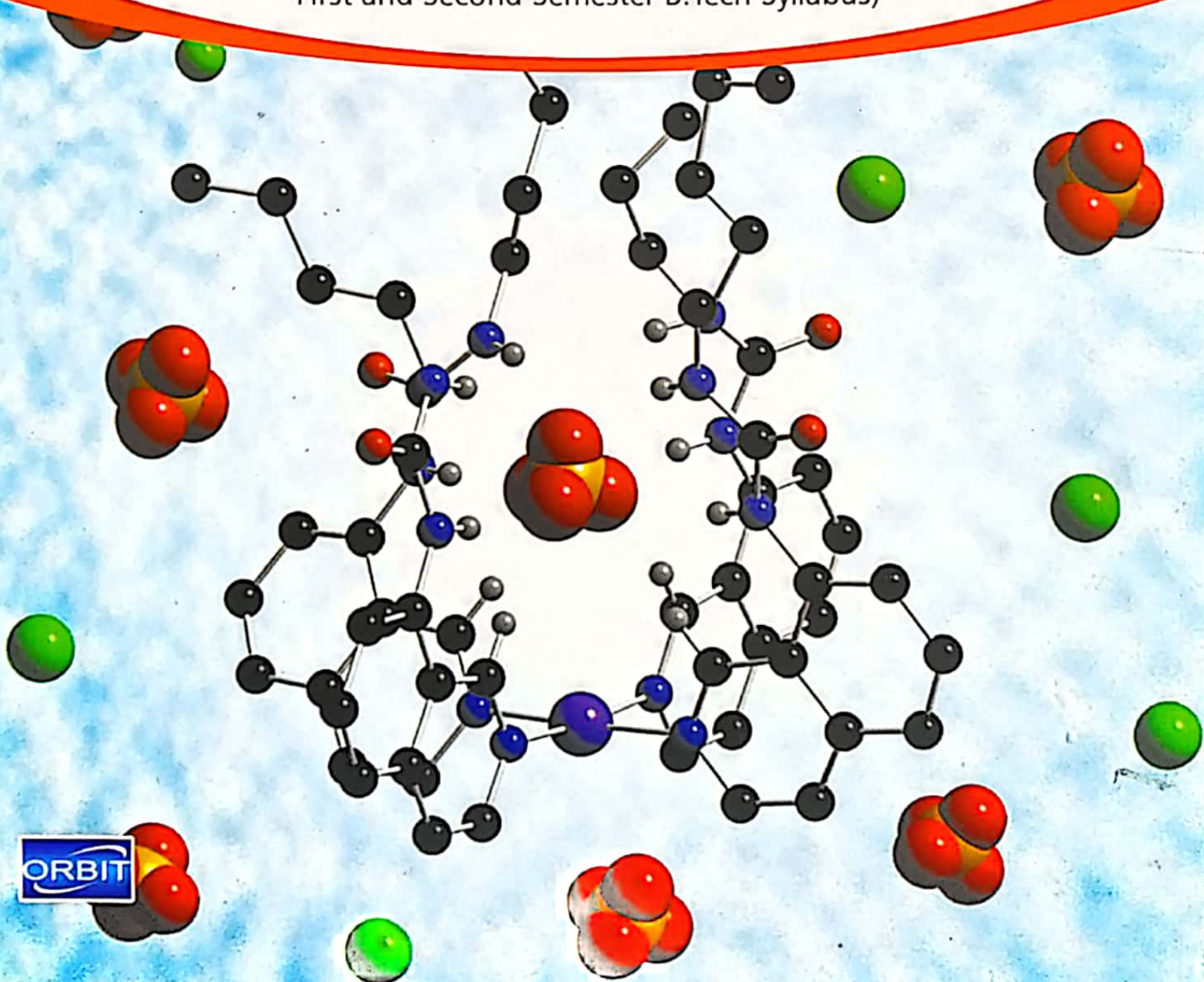
DR. TOM GHERIAN, M.Sc., Ph.D.
DR. MITY THAMBI, M.Sc., M. Phil., Ph.D.
DR. V. D. JOHN, M.Sc., Ph.D.
MR. SHUITH THOMAS, M.Sc., M.Phil.

Revised Edition

As per
KTU
Syllabus

A TEXT BOOK OF ENGINEERING CHEMISTRY

(Dr. A P J Abdul Kalam Technological University, Kerala
First and Second Semester B.Tech Syllabus)



ORBIT

CONTENTS

CHAPTER 1 – SPECTROSCOPY	01-42
1.1 INTRODUCTION	01
1.2 TYPES OF SPECTRA	01
1.3 ELECTROMAGNETIC SPECTRUM AND ABSORPTION OF RADIATION	02
1.4 ENERGY LEVELS IN MOLECULES	04
1.5 ABSORPTION LAWS	05
1.6 SOLVED EXERCISES	08
1.7 UV-VISIBLE SPECTROSCOPY	11
1.8 INFRARED SPECTROSCOPY	18
1.9 NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY	28
1.10 SHORT ANSWER QUESTIONS	41
CHAPTER 2 – ELECTROCHEMISTRY	43-68
2.1 INTRODUCTION	43
2.2 ELECTRODE POTENTIAL	43
2.3 NERNST'S EQUATION FOR SINGLE ELECTRODE POTENTIAL	44
2.4 SOLVED EXERCISES	49
2.5 ELECTROCHEMICAL SERIES	51
2.6 TYPES OF ELECTRODES	53
2.7 REFERENCE ELECTRODES	53
2.8 BATTERIES	60
2.9 FUEL CELLS	62
2.10 POTENTIOMETRIC TITRATIONS	64
2.11 SHORT ANSWER QUESTIONS	67
CHAPTER 3 – INSTRUMENTAL METHODS	69-96
3.1 INTRODUCTION	69
3.2 THERMOGRAVIMETRIC ANALYSIS	69
3.3 DIFFERENTIAL THERMAL ANALYSIS	72
3.4 CHROMATOGRAPHY	75
3.5 COLUMN CHROMATOGRAPHY	78
3.6 THIN LAYER CHROMATOGRAPHY	80
3.7 GAS CHROMATOGRAPHY	81
3.8 HIGH PERFORMANCE LIQUID CHROMATOGRAPHY	84
3.9 CONDUCTANCE OF ELECTROLYTIC SOLUTIONS – IMPORTANT TERMS	87
3.10 CONDUCTOMETRIC MEASUREMENTS	89
3.11 SHORT ANSWER QUESTIONS	95
CHAPTER 4 – CHEMISTRY OF ENGINEERING MATERIALS	97-139
4.1 INTRODUCTION	97
4.2 MATERIAL SCIENCE AND ENGINEERING	97
4.3 CLASSIFICATION OF MATERIALS	98

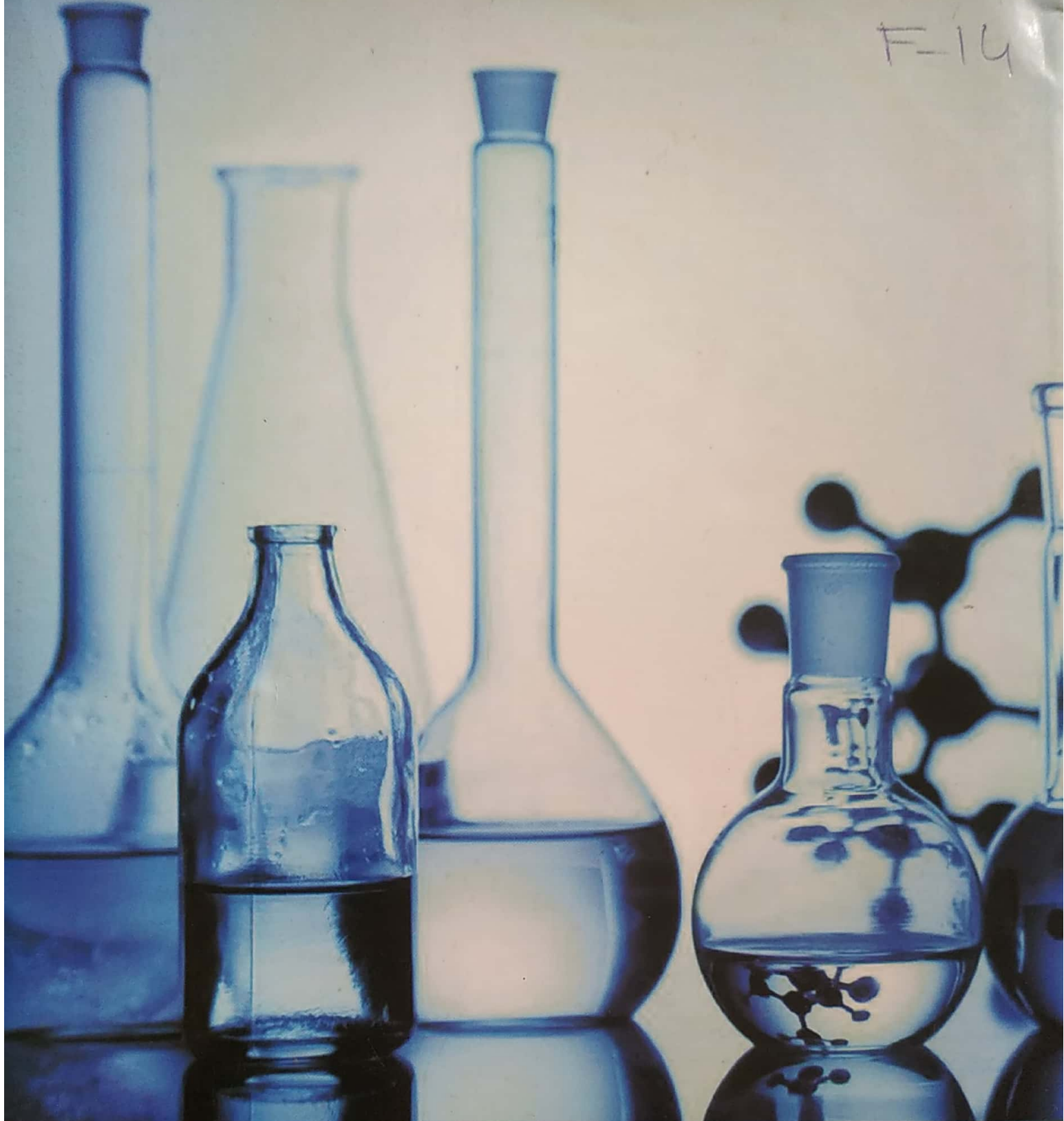
ENGINEERING CHEMISTRY

4.4	POLYMERS	99
4.5	CONDUCTING POLYMERS	106
4.6	ADVANCED POLYMERS	113
4.7	ORGANIC LIGHT EMITTING DIODE (OLED)	118
4.8	INTRODUCTION TO NANOTECHNOLOGY	120
4.9	FULLERENES	131
4.10	SHORT ANSWER QUESTIONS	138
CHAPTER 5A – FUEL		140-162
5A.1	INTRODUCTION	141
5A.2	CLASSIFICATION OF FUEL	141
5A.3	CHARACTERISTICS OF A GOOD FUEL	142
5A.4	CALORIFIC VALUE	142
5A.5	THEORETICAL CALCULATION OF CALORIFIC VALUE OF A FUEL	143
5A.6	SOLVED EXERCISES USING DULONG'S FORMULA	144
5A.7	DETERMINATION OF CALORIFIC VALUE	146
5A.8	LIQUID FUELS	149
5A.9	CRACKING	152
5A.10	SYNTHETIC PETROL	154
5A.11	KNOCKING	155
5A.12	DIESEL ENGINE FUEL AND CETANE NUMBER	156
5A.13	GASEOUS FUELS	157
5A.14	BIODIESEL	159
5A.15	SHORT ANSWER QUESTIONS	161
CHAPTER 5B - LUBRICANTS		163-173
5B.1	INTRODUCTION	163
5B.2	CLASSIFICATION OF LUBRICANTS	163
5B.3	SYNTHETIC LUBRICANTS	169
5B.4	PROPERTIES OF LUBRICATING OILS	169
5B.5	SHORT ANSWER QUESTIONS	173
CHAPTER 6 – WATER TECHNOLOGY		174-211
6.1	INTRODUCTION	174
6.2	HARDNESS OF WATER	174
6.3	TYPES OF HARDNESS	175
6.4	UNITS OF HARDNESS	176
6.5	DEGREE OF HARDNESS	176
6.6	ESTIMATION OF WATER HARDNESS BY EDTA METHOD	181
6.7	WATER SOFTENING	185
6.8	DESALINATION OF BRACKISH WATER	190
6.9	DISINFECTION	192
6.10	DISSOLVED OXYGEN	198
6.11	BIOLOGICAL OXYGEN DEMAND (BOD)	200

CONTENTS

6.12	CHEMICAL OXYGEN DEMAND (COD)	203
6.13	SEWAGE	205
6.14	SEWAGE TREATMENT	205
6.15	UPFLOW ANAEROBIC SLUDGE BLANKET (UASB) PROCESS	208
6.16	SHORT ANSWER QUESTIONS	210
	SYLLABUS	212
	LAST YEAR QUESTION PAPER (1 st AND 2 nd SEMESTER)	

F-14



Price ₹ 225



ORBIT PUBLISHERS & DISTRIBUTORS
Ernakulam-682018 Tel.: 9447407285
E-mail: orbitpdekm@gmail.com