



ESTD : 2007

Sri Indu Institute of Engineering and Technology (Autonomous)

(Formerly RVR Institute of Engineering & Technology)

An Autonomous Institution Under UGC

NAAC Accredited. Recognized Under 2(f) of UGC Act 1956

EAMCET CODE: INDI

Approved by AICTE, New Delhi, & Affiliated to JNTUH, Hyderabad.

JNTUH CODE: X3



COURSE FILE

ON

ENGINEERING CHEMISTRY

Course Code - CH103BS

**I B. Tech Semester-I
A.Y. 2022-2023**

Prepared by
O.SUBHASHINI
Asst. Professor


Head of the Department
Department of H&S
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(VIII) Ibrahimpatnam (M) R.R. Dist-501 510


PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



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INSTITUTE VISION & MISSION

Vision:

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

Mission:

- **IM1:** To offer outcome-based education and enhancement of technical and practical skills.
- **IM2:** To Continuous assess of teaching-learning process through institute-industry collaboration.
- **IM3:** To be a centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students' fraternity.
- **IM4:** To Create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders.


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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

PROGRAM OUTCOMES

PO1: ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: THE ENGINEER AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.

PO11: PROJECT MANAGEMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change


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SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY
B.Tech. in COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
COURSE STRUCTURE, I YEAR SYLLABUS (BR22 Regulations)
Applicable from Academic Year: 2022-23 Batch

I Year I Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA101BS	Matrices and Calculus	3	1	0	4
2.	CH103BS	Engineering Chemistry	3	1	0	4
3.	CS103ES	Programming for Problem Solving	3	0	0	3
4.	EE101ES	Basic Electrical engineering	2	0	0	2
5.	ME101ES	Computer Aided Engineering Graphics	1	0	4	3
6.	CS106ES	Elements of Computer Science &Engineering	0	0	2	1
7.	CH106BS	Engineering Chemistry Laboratory	0	0	2	1
8.	CS107ES	Programming for Problem Solving Laboratory	0	0	2	1
9.	EE102ES	Basic Electrical engineering Laboratory	0	0	2	1
		Induction Program				
		Total	12	2	12	20

I Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	AP202BS	Applied Physics	3	1	0	4
3.	ME202ES	Engineering Workshop	0	1	3	2.5
4.	EN204HS	English for Skill Enhancement	2	0	0	2
5.	EC201ES	Electronic Devices and Circuits	2	0	0	2
6.	AP205BS	Applied Physics Laboratory	0	0	3	1.5
7.	CS201ES	Python Programming Laboratory	0	1	2	2
8.	EN207HS	English Language and Communication Skills Laboratory	0	0	2	1
9.	CS203ES	IT Workshop	0	0	2	1
10.	*MC201ES	Environmental Science	3	0	0	0
		Total	13	4	12	20

ENGINEERING CHEMISTRY

(Course Code: CH103BS)

B.Tech. I Year I Sem.

L T P C
3 1 0 4

Course Objectives:

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT - I: Water and its treatment: [8]

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F-ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

UNIT – II Battery Chemistry & Corrosion [8]

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods

UNIT - III: Polymeric materials: [8]

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene
Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP).
Rubbers: Natural rubber and its vulcanization.
Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol

rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their Applications.

UNIT - IV: Energy Sources: [8]

Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.

UNIT - V: Engineering Materials: [8]

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermoresponsive materials- Polyacryl amides, Poly vinyl amides

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)



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Course: Engineering Chemistry(C112)

Class: I-B. TECH DATA SCIENCE

Course Outcomes

After completing this course the student will be able to:

C112.1: Students can explain the basic properties of water& usage in domestic, industrial purpose, preventive measures to water related problems and water purification methods (**understanding**)L2

C112.2: Students can acquire the knowledge of construction of electrochemical cells used in various batteries, fuel cells and their applications (**Knowledge**)L1

C112.3: Students can able to understand the mechanism, control measures of the types of corrosion and their applications (**Applying**)L3

C112.4: Students can learn the fundamentals & general properties of types of polymers, preparation & applications in various fields (**Applying**)L3

C112.5: Students can learn the basic knowledge on analysis of fuels and composition of the gaseous fuels (**Analysing**)L4

C112.6: Students can acquire the knowledge on engineering materials like cement, smart materials lubricants and their applications in constructions & health benefits (**Understanding**)L2

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CO's Mapping with PO/PSO

Mapping of course outcomes with program outcomes:

High -3 Medium -2 Low-1

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C112.1	2	2	-	-	-	1	1	-	-	-	-	2	-	-
C112.2	2	2	-	-	1	1	1	-	-	-	-	1	-	-
C112.3	2	2	-	-	-	-	1	-	-	-	-	-	-	-
C112.4	2	-	-	-	-	1	1	-	-	-	-	1	-	-
C112.5	2	2	-	-	-	-	1	-	-	-	-	-	-	-
C112.6	2	1	-	-	1	1	1	-	-	-	-	1	-	-
C112	2.00	1.8	-	-	1.0	1.0	1.0	-	-	-	-	1.0	-	-



CO-PO mapping Justification

PO1. ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO5. MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. THE ENGINEER AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO12. LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

C112.1: Students can explain the basic properties of water & usage in domestic, industrial purpose, preventive measures to water related problems and water purification methods (understanding)L2

Justification	
PO1	student get the knowledge on the water treatment methods (level 2)
PO2	Classify the types of hardness of water (level 2)
PO6	Student can able to know the importance of purification methods(level1)
PO7	Student can understand the impact of water treatment methods in industrial and domestic usage (level1)
PO12	Student can attain the knowledge in life –long practice (level 2)

C112.2: Students can acquire the knowledge of construction of electrochemical cells used in various batteries, fuel cells and their applications (Knowledge)L1

Justification	
PO1	Students can get the knowledge on construction of electrochemical cell(level2)
PO2	Students can able to understand the usage of batteries (level 2)
PO5	Students can able to understand the types of battery cells & fuel cells(level1)
PO6	Students can able to get the knowledge on applications of fuel cells(level1)
PO7	Students can understand the usage of eco-friendly fuels (level1)
PO12	Student can attain the knowledge in life –long practice (level 1)

C112.3: Students can able to understand the mechanism, control measures of the types of corrosion and their applications (Applying)L3

Justification	
PO1	Students get the knowledge of corrosion (level 2)
PO2	Student can understand the different types of corrosion(level2)
PO7	Student can understand the corrosion control methods (level 1)

C112.4: Students can learn the fundamentals & general properties of types of polymers, preparation& applications in various fields (Applying)L3

Justification	
PO1	Student can understand the fundamentals of the polymers(level2)
PO6	Student can able to know the wide range of applications of the polymers(level1)
PO7	Student can utilize the concept of bio-degradable polymers(level1)
PO12	Student can attain the knowledge in life –long practice (level 1)

C112.5: Students can learn the basic knowledge on analysis of fuels and composition of the gaseous fuels (Analysing)L4

Justification	
PO1	Student can classify the different types of fuels(level2)
PO2	Student can understand the extraction of the fuels (level2)
PO7	Student can able to get knowledge about composition of eco-friendly fuels(level1)

C112.6: Students can acquire the knowledge on engineering materials like cement, smart materials, lubricants and their applications in constructions & health benefits (Understanding)L2

	Justification
PO1	Student can get the knowledge on the composition of engineering materials(level2)
PO2	Student can able to get the composition and applications of engineering materials(level1)
PO5	Student can understand the usage in the medical applications(level1)
PO6	Student can contribute the application for further applications(level1)
PO7	Student can understand the promotion for the sustainable environment (level1)
PO12	Student can attain the knowledge in life –long practice (level 1)



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<https://sriet.ac.in/>

Lr. No. SIJET/BR22/Academic Calendar/2022/02

Date: 15.12.2022

REVISED ACADEMIC CALENDAR I.B.TECH FOR THE ACADEMIC YEAR 2022-23 (BR22-REGULATIONS)

Dr. I. Satyanarayana,
Principal.

X3

To,
All the HOD's
Sir,

Sub: SIJET (Autonomous)-Academic & Evaluation-Revised Academic Calendar for I B.Tech - I & II Semesters for the academic year 2022-2023-Reg.

The approved Academic Calendar for I B.Tech - I & II Semesters for the academic year 2022-23 is given below.

I-SEMESTER

S. NO	Description	Period		Duration
		From	To	
1.	Commencement of I Semester class work (including Induction programme)	03.11.2022		
2.	1 st Spell of Instructions	03.11.2022	28.12.2022	8 Weeks
3.	I Mid Examinations	29.12.2022	04.01.2023	1 Week
4.	Submission of First Mid Term Exam Marks to the Autonomous Section on or before	10.01.2023		
5.	2 nd Spell of Instructions	05.01.2023	02.03.2023	8 Weeks
6.	Second Mid Term Examinations	03.03.2023	09.03.2023	1 Week
7.	Preparation & Practical Examinations	10.03.2023	16.03.2023	1 Week
8.	Submission of Second Mid Term Exam Marks to the Autonomous Section on or before	16.03.2023		
9.	I Semester End Examinations	17.03.2023	01.04.2023	2 Weeks

II-SEMESTER

S. NO	Description	Period		Duration
		From	To	
1.	Commencement of II Semester class work	03.04.2023		
2.	1 st Spell of Instructions (including Summer Vacation)	03.04.2023	10.06.2023	10 Weeks
	Summer Vacation	15.05.2023	27.05.2023	2 Weeks
3.	I Mid Examinations	12.06.2023	17.06.2023	1 Week
4.	Submission of First Mid Term Exam Marks to the Autonomous Section on or before	23.06.2023		
5.	2 nd Spell of Instructions	19.06.2023	12.08.2023	8 Weeks
6.	II Mid Term Examinations	14.08.2023	19.08.2023	1 Week
7.	Preparation & Practical Examinations	21.08.2023	26.08.2023	1 Week
8.	Submission of Second Mid Term Exam Marks to the Autonomous Section on or before	26.08.2023		
9.	II Semester End Examinations	28.08.2023	09.09.2023	2 Weeks

Commencement of Class Work for II B.Tech I Semester - 11.09.2023

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<https://siiet.ac.in/>

Class: DATA SCIENCE

Semester: I W.E.F: 14-11-2022

LH: D-208

	I 9:40- 10:30	II 10:30 - 11:20	III 11:20- 12:10	12:10- 12.45	IV 12.45- 1.35	V 1.35- 2.25	VI 2.25- 3.15	VII 3.15-4.00
MON	BEE	M&C	PPS	L U N C H	BEE/EC LAB			LIB
TUE	PPS LAB				M&C	M&C	ECSE	EG(T)
WED	PPS	EC	BEE		EG PRACTICE			BEE(T)/M&C(T)
THU	EC	PPS	BEE		BEE/EC LAB			EC(T)/PPS(T)
FRI	EG PRACTICE				M&C	EC	BEE	PPS(T) style="border: 2px solid red;">EC(T)
SAT	BEE	PPS	ECSE		PPS	M&C	EC	M&C(T)/BEE(T)

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
MA101BS	Matrices and Calculus	CH.SARITHA	ME101ES	ComputerAided Engineering Graphics	A.MALLESH
CH103BS	Engineering Chemistry	O.SUBHASHINI	CH106BS	Engineering Chemistry Lab	O.SUBHASHINI
CS103ES	Programming for Problem Solving	U.NARESH	CS107ES	Programming for Problem Solving Lab	U.NARESH/G.KALYANI
EE101ES	Basic Electrical Engineering	S.NISCHALA	EE102ES	Basic Electrical Engineering Lab	G.BHARGAVI /M.NAGA RAJU
CS106ES	Elements of Computer Science & Engineering	P.SRILATHA			

O. Subhashini
Class In-Charge

Ch. Saritha
Time Table Coordinator



[Signature]
Head of The Department

Dr. R. YADAGIRI RAO
M.Sc., B.Ed., M.Tech(CSE), Ph.D.
Head of the Department
Department of H&S
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Engineering Chemistry : Lesson Plan

L/H	TOPIC TO BE COVERED	TEACHING AIDS	BOOKS
UNIT-1: WATER & ITS TREATMENT			
1	Introduction to hardness of water, types of hardness.	Black Board	T1,R1
2	Units of hardness, Estimation of hardness of water by complexometric method.	Black Board	T1,R1
3	Related numerical problems.	Black Board	T1,R1
4	Potable water and its specifications - Steps involved in the treatment of potable water	Black Board, PPT	T1,R1
5	Disinfection of potable water by chlorination and break - Point chlorination.	Black Board	T1,R1
6	Defluoridation- Determination of F- ion by ion- selective electrode method .Boiler troubles: Sludges, Scales	Black Board	T1,R1,W1
7	Caustic embrittlement. Internal treatment of Boiler feed water -Calgon conditioning - Phosphate conditioning - Colloidal conditioning.	Black Board, PPT	T1,R1
8	External treatment methods -Softening of water by ion- exchange process.	Black Board, PPT	T1,R1, V1
9	Desalination of water – Reverse osmosis.	Black Board	T1,R1
UNIT-II: BATTERY CHEMISTRY AND CORROSION			
10	Introduction - Classification of batteries- primary, secondary and reserve batteries with examples.	Black Board	T1,R1
11	Basic requirements for commercial batteries. Construction, working and applications of: Zn-air battery.	Black Board	T1,R1

12	Lithium-ion battery, Applications of Li-ion battery to electrical vehicles.	Black Board	T1,R1
13	Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell.	Black Board	T1,R1,W2
14	Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.	Black Board	T1,R1
15	Corrosion: Causes and effects of corrosion.	Black Board, PPT	T1,R1
16	Theories of chemical Corrosion and mechanism of chemical corrosion.	Black Board, PPT	T1,R1 V2
17	Electrochemical corrosion –mechanism of electrochemical corrosion.	Black Board PPT	T1,R1,
18	Types of corrosion: Galvanic, water-line and pitting corrosion	Black Board	T1,R1
19	Factors affecting rate of corrosion	Black Board	T1,R1
20	Corrosion control methods.	Black Board	T1,R1
21	Cathodic protection-sacrificial and impressed current methods	Black Board	T1,R1
UNIT–III POLYMERIC MATERIALS			
22	Definition – Classification of polymers with examples.	Black Board	T1,R1
23	Types of polymerization –addition (free radical addition) .	Black Board	T1,R1
24	Condensation polymerization with examples – Nylon 6:6, Terylene	Black Board	T1,R1
25	Definition and characteristics thermoplastic and thermosetting plastics.	Black Board	T1,R1
26	Bakelite, Teflon, Fiber reinforced plastics (FRP).	Black Board	T1,R1
27	Natural rubber and its vulcanization.	Black Board	T1,R1
28	Elastomers, Characteristics –preparation – properties and applications of Buna-S rubber.	Black Board	T1,R1

29	Butyl rubber, and Thiokol rubber.	Black Board	T1,R1
30	Characteristics and Classification of conducting polymers with examples.	Black Board	T1,R1 W3,V3
31	Mechanism of conduction intrans-poly acetylene and applications of conducting polymers.	Black Board	T1, R1
32	Biodegradable polymers, Concept and advantages – Polylacticacid and poly vinyl alcohol and their applications.	Black Board	T1, R1
UNIT-IV ENERGY SOURCES			
33	Introduction, calorific value of fuel- HCV,LCV.Units of calorific value	Black Board	T1, R1
34	Dulong's formula. Classification- solid fuels.	Black Board	T1,R1
35	Coal –analysis of coal – proximate analysis and their significance.	Black Board	T1,R1,W4
36	Ultimate analysis of coal and their significance.	Black Board, PPT	T1,R1
37	Liquid fuels – petroleum and its refining.	Black Board, PPT	T1,R1
38	Cracking types – moving bed catalytic cracking.	Black Board ,PPT	T1,R,V4
39	Knocking – octane and cetane rating.	Black Board	T1,R1
40	Synthetic petrol - Fischer-Tropsch's process.	Black Board	T1,R1
41	Gaseous fuels – composition and uses of natural gas, LPG.	Black Board	T1, R1
42	CNG, Biodiesel – Transesterification, advantages.	Black Board	T1, R1
UNIT –V: ENGINEERING MATERIALS			
43	Introduction of Portland cement &its composition,	Black Board	T1,R1
44	Setting and hardening of Portland cement.	Black Board	T1, R1
45	Smart materials and their engineering applications.	Black Board	T1, R1

46	Shape memory materials- Poly L- Lactic acid.	Black Board	T1, R1, W4, V5
47	Thermoresponse materials- Polyacryl amides, Polyvinyl amides	Black Board	T1, R1
48	Introduction of lubricants. Classification of lubricants with examples.	Black Board	T1, R1
49	Characteristics of a good lubricants, mechanism of lubrication -thick film, thin film and extreme pressure	Black Board	T1, R1
50	Properties of lubricants: viscosity, cloud point, pour point, flash point and fire point	Black Board	T1, R1

Text books:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016.
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

Reference books:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015).
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011).



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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana-501510

GAP WITHIN THE SYLLABUS – MAPPING TO CO, PO

Galvanic cell construction and functioning and preparation of cement

Course outcome;

After completing this topic, the student will be able to:

1. The required principles and concepts of electrochemistry, to know the different types of batteries and applications (Analysis)L3
2. The basic principle involved in the preparation of cement by the clinkers process. (Knowledge)L1

Mapping of course outcomes with program outcomes:

High -3 Medium -2 Low-1

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	-	-	1	-	-	-	-	-	-	1	-	-
2	2	-	-	-	1	-	-	-	-	-	-	1	-	-



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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana-501510

GAP BEYOND THE SYLLABUS-MAPPING TO PO/PSO

Chemical analysis of water, corrosion control methods and utilization of smart materials in medical field.

Course outcome:

After completing this topic, the student will be able to:

1. The basic principle involved in the concept of chemical analysis of brackish water.
2. The process involved in the application of the corrosion control methods involving electrochemical process.
3. The mechanism involved in the application of smart materials in the medical field

Mapping to PO/PSO:

High -3 Medium -2 Low-1

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	-	-	-	-	-	-	-	-	-	1	-	-
2	2	2	-	-	-	-	-	-	-	-	-	1	-	-
3	2	2	-	-	-	-	-	-	-	-	-	1	-	-



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WEB REFERENCES :

W-1 <https://www.thermodyneboilers.com/boiler-problems/>

W-2

[https://chem.libretexts.org/Bookshelves/General_Chemistry/Chemistry_1e_\(OpenSTAX\)/17%3A_Electrochemistry/17.5%3A_Batteries_and_Fuel_Cells](https://chem.libretexts.org/Bookshelves/General_Chemistry/Chemistry_1e_(OpenSTAX)/17%3A_Electrochemistry/17.5%3A_Batteries_and_Fuel_Cells)

W-3 <https://www.sciencedoze.com/2022/03/conducting-polymers-definition-examples.html>

W-4 <https://www.scribd.com/presentation/497847401/Analysis-of-Coal>

W-5 <https://www.atriainnovation.com/en/what-are-shape-memory-materials/>

VIDEO REFERENCES :

1. <https://youtu.be/ctfHNf1s6RM?si=EnrLSa3uXqzPZtDR> –Ion exchange process
2. <https://www.youtube.com/live/rPv35HuWLW0?si=8pIqwhWd8IWvHOZZ> –
Corrosion
3. <https://youtu.be/1dG0PmKFsOA?si=u83MUinL3KOs4mKd> –Conducting polymers
4. <https://youtu.be/SavZyTMROxk?si=CCB22VarlU6SIygw> –moving bed catalytic
cracking
5. <https://youtu.be/I7doX1zWGDw?si=NhhkbRfuJ24j0OvM> –shape memory materials



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POWERPOINT PRESENTATION

Unit-1

https://docs.google.com/presentation/d/1Hcj1ip8ap6k_h1568J-W3r0h2Aax1hOP/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true

Unit-2

https://docs.google.com/presentation/d/1Zihc9ppImK9VfChsvuvuadcse4UT_J1K/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true

Unit-4

<https://docs.google.com/presentation/d/1wiZafPiRaH4xGjQffBYrtEZcWACgbaa/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true>



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Lecture notes

Unit 1 link:

https://drive.google.com/file/d/1aOrg6Z_XXPGsKHuH_JuK7axChExklgOt/view?usp=sharing

Unit 2 link:

<https://drive.google.com/file/d/15o4pDGY93Ltv8AMrRxxgWfDItkfRIKnO/view?usp=sharing>

Unit 3 link:

<https://drive.google.com/file/d/1OtOUV-imszqWSetKXo-Ym4-n-GDtOBuw/view?usp=sharing>

Unit 4 link:

<https://drive.google.com/file/d/1qFliGL1PBVX17zxeqygc2BbHa7cO3RFD/view?usp=sharing>

Unit 5 link:

<https://drive.google.com/file/d/1rup7vbaItLmbGa1UX66L36T4DECWIOle/view?usp=sharing>

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

UGC Autonomous Institution and Affiliated to JNTUH, Hyderabad
B .Tech I Year I Semester Regular Examinations, March-2023

ENGINEERING CHEMISTRY
(Common to CSE, CSE (CS), CSE (DS))

Time: 3 Hours

Max. Marks: 60

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. All Questions Carry Equal Marks in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

10x1=10 Marks

1. What is break point of chlorination?
2. Explain caustic embrittlement.?
3. Name the factors effecting rate of corrosion?
4. Distinguish between primary and secondary battery
5. What is fiber reinforced plastics?
6. Distinguish between Natural and synthetic Rubber
7. What is Dulong's formula?
8. Define cetane rating
9. What are shape memory materials?
10. List the ratio of components present in Portland cement.

PART-B

5x10=50 Marks

11. What is potable water ? What are its specifications? [10]
(or)
12. Distinguish between soft water , Hard water and compare the types of Hardness along with equations. [10]
13. What is electrochemical corrosion ? Describe in detail. [10]
(or)
14. What is galvanic and waterline corrosion ? Write their preventive measures. [10]
15. Write the preparation, properties and applications of PVC? [10]
(or)
16. Distinguish between addition and condensation polymerization. [10]
17. Write the synthesis of petrol by Fischer-Tropsch's process [10]
(or)
18. What is cracking ? write a note on moving bed catalytic cracking ? [10]
19. Discuss the various steps involved in setting and hardening of cement with chemical equations. [10]
(or)
20. What are smart materials? Describe thermoresponsive materials with examples [10]

Code No: 181AJ**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech I Year I Semester Examinations, March/April - 2023****ENGINEERING CHEMISTRY****(Common to EEE, CSE, IT, CSIT, CE(SE), CSE(CS), CSE(DS), CSD)****Time: 3 Hours****Max. Marks: 60****Note:** This question paper contains two parts A and B.i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.

- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A**(10 Marks)**

- What are the methods used for disinfection of water. [1]
- b) What is importance of ion exchange method of water treatment? [1]
- c) Define cathodic protection. [1]
- d) What are the applications of fuel cells? [1]
- e) Give applications of terelene. [1]
- f) Give examples for thermosetting polymers. [1]
- g) What is the composition of LPG? [1]
- h) Define HCV. [1]
- i) Give applications of shape memory materials. [1]
- j) Define lubricant. [1]

PART-B**(50 Marks)**

- 2.a) Define portable water, give its specifications.
- b) Explain determination of F^- ion by ion- selective electrode method. [5+5]
- OR**
- 3.a) Differentiate internal and external treatment of water.
- b) Explain reverse osmosis method and its importance. [5+5]
4. What are the basic requirements for commercial batteries, explain construction, working principle and applications of Zn-air batteries. [10]
- OR**
- 5.a) What are the causes and effects of corrosion?
- b) Explain Galvanic and pitting corrosion. [5+5]
- 6.a) Explain steps involved in free radical polymerization mechanism with suitable example.
- b) Give brief note on Bakelite. [5+5]

OR

7. a) Give brief note on Fibre reinforced plastics and its applications.

b) Explain properties and applications of synthetic rubbers.

[5+5]

8. Compare proximate and ultimate analysis of fuel and give its significance.

[10]

OR

9. a) Describe Fischer-Tropsch's process.

b) Give brief note on Trans esterification.

[5+5]

10. Explain various smart materials and their importance.

[10]

OR

11. a) Explain mechanism of lubrication.

b) Explain any three important properties of lubricants.

[5+5]

--ooOoo--

Code No: 131AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, December - 2016

ENGINEERING CHEMISTRY

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) What are the various units of hardness? Give the relation between them. [2]
- b) List out the various steps involved in the sewage treatment. [3]
- c) What is standard electrode potential? Give its units. [2]
- d) Explain the functioning of the dry cell with chemical reactions. [3]
- e) Define fibers and give two examples. [2]
- f) Give the mechanism of free radical polymerization of Vinyl chloride. [3]
- g) Give the classification of fuels with examples. [2]
- h) Define HCV and LCV of a fuel and give their inter-relationship. [3]
- i) What is meant by refractory? Give an example each for acidic and basic refractory. [2]
- j) Define viscosity, Flash point and Pour point of a lubricant. [3]

PART-B**(50 Marks)**

- 2.a) Define scales and sludges. What are the causes, effects and preventive method of these? [5+5]
- b) Estimate the amount of hardness of water by complexometric method. [5+5]

OR

- 3.a) Write a short note each on Calgon conditioning and Phosphate conditioning of boiler feed water.
- b) In the determination of hardness of water by complexometry, 20 ml of standard hard water containing 0.1 g of CaCO_3 per 100 ml consumed 15 ml of EDTA solution. 100 ml of hard water sample consumed 12 ml of EDTA solution. After boiling and filtering, the same water sample consumed 6 ml of EDTA solution. Calculate the temporary and permanent hardness of water. [5+5]

- 4.a) What is an electrochemical series? What are its applications?
- b) What is meant by reference electrode? Give the construction and working of Calomel electrode. [5+5]

OR

- 5.a) Give the classification of batteries and describe the construction and working of Ni-Cd battery.
- b) Define fuel cell. Write a short note on methanol-oxygen fuel cell. [5+5]

- 6.a) Differentiate thermo plastics from thermo set plastics with suitable examples.
b) Give the preparation, properties and applications of PVC. [5+5]

OR

- 7.a) Define elastomers. How Buna-S and butyl rubber are prepared? Give their applications.
b) What are bio degradable polymers? Write the advantages and applications of biodegradable polymers with suitable examples. [5+5]
- 8.a) What is cracking? How is gasoline obtained by moving bed catalytic cracking?
b) Write a short note each on Natural gas and LPG. [5+5]

OR

- 9.a) Calculate the LCV of fuel having 4% of hydrogen, whose gross calorific value is 8,828 K cal/kg.
b) How is coal analyzed by proximate analysis? Give its significance. [5+5]

- 10.a) What is Portland cement? Write the composition of white cement and water proof cement. What are their advantages?
b) Give the classification of lubricants with examples. Explain the significance of cloud point and pour point. [5+5]

OR

- 11.a) What are composites? Give the classification and advantages of composite materials.
b) Explain about Refractoriness under load, Porosity and Chemical inertness of a refractory. [5+5]

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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501 510

I B. TECH I SEM I-MID Examinations, Dec-2022/Jan-2023

BR22

Set-II

Branch: CSE, CSE(CS), CSE(DS)
Subject: Engineering chemistry

Marks:20

Date:30-12-2022(FN)
Time:2 Hours

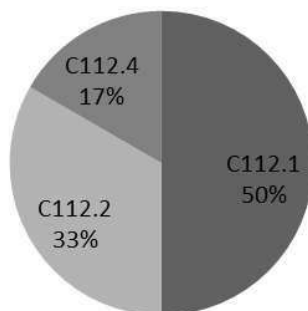
PART-B

Answer any FOUR Questions. All question carry Equal marks

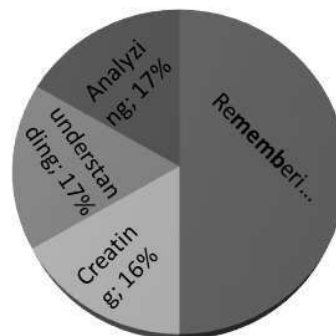
4*5=20 Marks

1. What is boiler feed water? Describe any two methods used for Internal treatment of boiler feed water? (Remembering L1) (C112.1)
2. What is caustic embrittlement? How to prevent it? (Remembering L1) (C112.1)
3. Discuss units of hardness of water? (Creating L6) (C112.1)
4. Explain Solar cell functioning and uses? (Understanding L2) (C112.2)
5. Distinguish between battery and fuel cell? (Analyzing L4) (C112.2)
6. Define polymer? Describe the types of polymerization? (Remembering L1) (C112.4)

QUESTION PAPER MAPPING WITH CO'S



QUESTION PAER MAPPING WITH BT



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I B.TECH I SEM I-MID Examinations, Dec-2022/Jan-2023

BR22

Branch: CSE, CSE(CS), CSE(DS)

Date: 30-12-2022(FN)

Subject: Engineering chemistry

Marks: 10

Student name:

H.T.NO: _____

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PART-A

Objective/Quiz paper

The objective / quiz paper is set with multiple choice, fill in the blanks and match the following type of question for a total of 10 marks.

Multiple choice:

- EDTA has the ability to form complex with metal ions. []
A) Stable complex B) Unstable complex
C) Salts D) Acids
- The residual hardness of water softened by ion exchange process is about []
A) 10 ppm B) 5ppm C) 20 ppm D) 2 ppm
- During wet corrosion which part under goes corrosion []
A) Anode B) Cathode C) Both D) None
- Bakelite is made by the action of []
A) Phenol and formaldehyde B) Melamine and formaldehyde
C) Urea and formaldehyde D) Ethylene and formaldehyde

Fill in the blanks:

- Hardness of water can be expressed in terms of equivalents of _____
- In a solar cell the region where electrons and holes diffused across the junction is called _____
- At lower P^H corrosion rate _____
- Co polymers are made of _____

Match of the following:

- I. Fuel cell [] A. Elastomer
- II. Hard water [] B. Phosphate conditioning
- III. Buna –s [] C. Pollution free
- IV. Internal treatment [] D. Calcium and magnesium salts



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I B.TECH I SEM I-MID Examinations,Dec-2022/Jan-2023

BR22

Answer key

Descriptive paper key link

<https://drive.google.com/file/d/1Dfhk3qH5lrsP9UisrxYShGT7YkHuUDQe/view?usp=sharin>

g

Objective/Quiz Key Paper

Multiple choices:

1. A
2. D
3. A
4. A

Fill in the blanks:

5. CaCO_3
6. p,n-junction diode
7. increases
8. Different monomers

Match the following:

9. I-C
- II-D
- III-B
- IV-A



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I B.TECH I SEM II-MID Examinations, March-2023

BR22

Set-I

Branch: CSE, CSE(CS), CSE(DS)
Subject: Engineering chemistry

Marks: 20

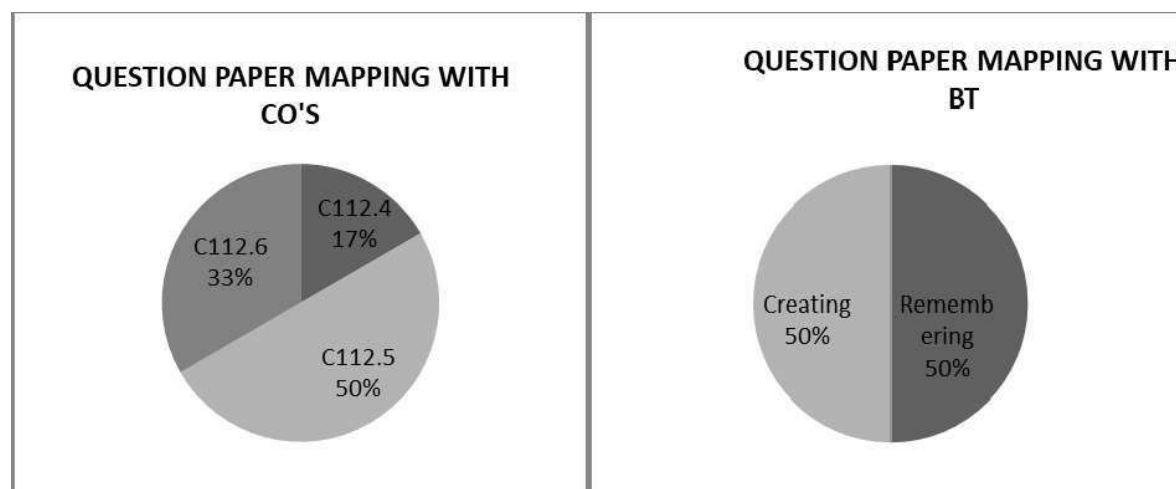
Date: 04-03-2023 (FN)
Time: 2 Hours

PART-B

Answer any **FOUR** Questions. All Questions carry Equal Marks

4*5=20 Marks

- | | |
|--|---------------------------|
| 1. How vulcanization of rubber occurs? | (Remembering L1) (C112.4) |
| 2. What is calorific value of fuel? Discuss HCV, LCV? | (Remembering L1) (C112.5) |
| 3. Discuss proximate analysis? | (Creating L6) (C112.5) |
| 4. Discuss fractional distillation? | (Creating L6)(C112.5) |
| 5. Discuss classification of lubricants? | (Creating L6) (C112.6) |
| 6. What is the mechanism of thin film and thick film lubricants? | (Remembering L1)(C112.6) |





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I B.TECH I SEM II-MID Examinations, March-2023

BR22

Answer key

Descriptive paper key link

<https://drive.google.com/file/d/19Lwjvu3qLaeHtR9pxH1I98k4Mka5bnLJ/view?usp=sharing>

Objective/Quiz Key Paper

Multiple choices:

1. C
2. A
3. C
4. D

Fill in the blanks:

5. Biopolymers
6. $100 - (\% \text{ of C} + \% \text{ of H} + \% \text{ of N} + \% \text{ of P})$
7. Pour point
8. Graphite

Match the following:

9. I-C
- II-D
- III-B
- IV-A

MID-1 & MID-11 STUDENT ANSWER SCRIPTS:

https://drive.google.com/file/d/1pRt3n16b_c4FVGYO5mZg2ATPxNJAe3jd/view?usp=sharing

<https://drive.google.com/file/d/1f6n-EsUBIBqt4BBJbkkcNC87Syhk2S4c/view?usp=sharing>



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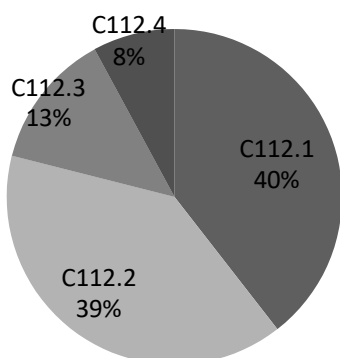
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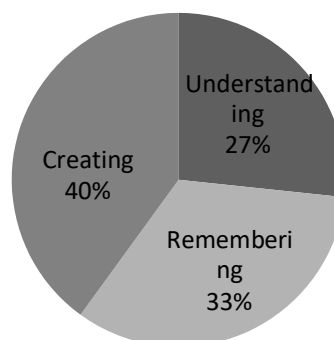
I-MID ENGINEERING CHEMISTRY ASSIGNMENT

1. Explain demineralisation of hard water using ion exchange process with a neat diagram?
(Understanding L2) (C112.1)
2. What is reverse osmosis describe with a neat diagram? (Remembering L1) (C112.1)
3. Discuss municipal water treatment process? (Creating L6) (C112.1)
4. What is a caustic embrittlement? (Remembering L1) (C112.1)
5. Discuss different chlorination method? (Creating L6) (C112.1)
6. Estimate the hardness of water by complexometric method? (Creating L6) (C112.1)
7. Explain the structure and functioning of lithium-ion battery? (Understanding L2) (C112.2)
8. What is galvanic corrosion and water corrosion? (Remembering L1) (C112.3)
9. Discuss solid oxide fuel cell? (Creating L6) (C112.2)
10. Define polymer and discuss type of polymers? (Remembering L1) (C112.2)
11. E Discuss about methanol-oxygen fuel cell? (Creating L6) (C112.2)
12. Explain preparation, properties and applications of Bakelite? (Understanding L2) (C112.4)
13. What is primary battery? Explain Zn –air battery as an example? (Remembering L1) (C112.2)
14. Discuss cathodic protection method? (Creating L6) (C112.3)
15. Explain solar cell functioning and uses? (Understanding L2) (C112.2)

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QUESTION PAPER MAPPING WITH
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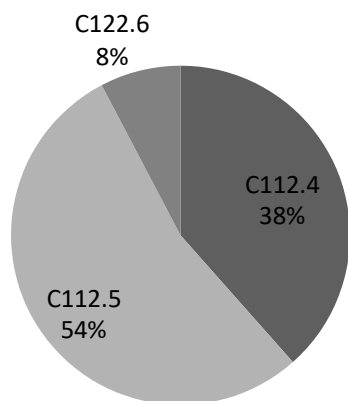
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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

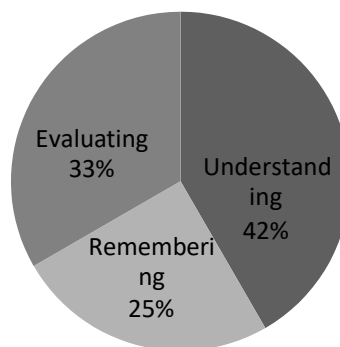
II-MID ENGINEERING CHEMISTRY ASSIGNMENT

1. Explain the preparation, properties and engineering applications of PVC, Teflon, Fiber reinforced plastics? **(Understanding L2) (C122.4)**
2. Explain the preparation, properties and applications of Buna-S, Butyl rubber, Thiokol rubber? **(Understanding L2) (C122.4)**
3. Explain about the characteristics and classification of conducting polymers with examples? **(Understanding L2) (C122.4)**
4. Explain about the conduction mechanism in Trans poly acetylene and applications of conducting polymers? **(Understanding L2) (C122.4)**
5. What is mean by Bio-degradable polymers concept and advantages and poly vinyl and poly lactic Acids. **(Remembering L1) (C122.4)**
6. Define calorific value of fuel –HCV, LCV& Dulong's formula?**(Remembering L1) (C122.5)**
7. Explain the proximate analysis and ultimate analysis of coal and their significance? **(Evaluating L5) (C122.5)**
8. Explain about the liquid fuels- Petroleum &its refining? **(Evaluating L5) (C122.5)**
9. Define cracking and explain moving –bed catalytic cracking? **(Evaluating L5) (C122.5)**
10. Define knocking, octane and cetane rating?**(Remembering L1) (C122.5)**
11. Explain about the Natural gas-LPG, CNG, biodiesel trans-esterification and advantages? **(Understanding L2) (C122.5)**
12. Explain about Portland cement, its composition and setting &hardening?**(Evaluating L5) (C122.6)**

QUESTION PAPER MAPPING WITH CO



QUESTION PAPER MAPPING WITH BT



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I-MID & II-MID ENGINEERING CHEMISTRY ASSIGNMENT PROOFS

https://drive.google.com/file/d/1ddOtlw3_fvhg1xxjKDC2edNSoLGAmSbe/view?usp=sharing -mid-1

https://drive.google.com/file/d/1_syLUfT-YrrCTZP4kEKLGir5pswVsd/view?usp=sharing -mid-2



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BR22

SCHEME OF EVALUATION WITH CO and BTL MAPPING

SCHEME OF EVALUATION-ENGINEERING CHEMISTRY(MID-I)(Set-II)		
<i>Instructions:</i>		
a) Any answer by alternate method should be valued and suitably awarded.		
b) All answers (including extra, stuck off and repeated) should be valued. Answers with maximum marks must be considered.		
Qn No	Description of Answer	Marks
1.	Definition of boiler feed water(C112.1)(Remembering)	1
	Name of any two internal treatment methods of boiler feed water(C112.1)(Remembering)	1
	Explanation of two internal treatment methods of boiler feed water(C112.1)(Remembering)	3
2.	Definition of caustic embrittlement(C112.1)(Understanding)	1
	Explanation of caustic embrittlement(C112.1)(Understanding)	1
	Equations of caustic embrittlement(C112.1)(Understanding)	2
	Prevention of caustic embrittlement(C112.1)(Understanding)	1
3.	Mention the names of units of hardness(C112.1)(Remembering)	1
	Definitions of units of hardness(C112.1)(Remembering)	2
	Formulas of units of hardness(C112.1)(Remembering)	2
4	Definition of solar cell(C112.2)(Remembering)	1
	Functioning of solar cell(C112.2)(Remembering)	2
	Diagram of solar cell(C112.2)(Remembering)	1
	Uses of solar cell(C112.2)(Remembering)	1
5	Difference between battery & fuel cell has 10 points are compulsory(C112.2)(Analyzing)	5
6	Definition of polymer & mention the names of types of polymerization(C112.4)(Understanding)	2
	Explanation of types of polymerization with examples & equations(C112.4)(Understanding)	3
20		TOTAL



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BR22

SCHEME OF EVALUATION WITH CO and BTL MAPPING

SCHEME OF EVALUATION-ENGINEERING CHEMISTRY (MID-II)(Set-I)		
<i>Instructions:</i>		
a) Any answer by alternate method should be valued and suitably awarded.		
b) All answers (including extra, stuck off and repeated) should be valued. Answers with maximum marks must be considered.		
Qn No	Description of Answer	Marks
1	Definition of vulcanization of rubber (C112.4) (Understanding)	1
	Preparation and process of vulcanization rubber with equations (C112.4) (Understanding)	4
2	Definition of calorific value & Definitions of HCV, LCV (C112.5) (Remembering)	3
	Explanation and formulas of HCV, LCV (C112.5) (Remembering)	2
3	What are steps involved in proximate analysis (C112.5) (Remembering)	1
	Explanation of each step in proximate analysis (C112.5) (Remembering)	2
	Formulas of each step in proximate analysis (C112.5) (Remembering)	2
4	Definition of fractional distillation (C112.5) (Understanding)	1
	Process of fractional distillation & Diagram of fractional distillation (C112.5) (Understanding)	4
5	Definition of lubricants & Classification of lubricants with tree diagram (C112.6) (Remembering)	2
	Explanation of different types of lubricants with examples (C112.6) (Remembering)	3
6	Mechanism of thin film definition and diagram and where it is used (C112.6) (Remembering)	3
	Mechanism of thick film definition and diagram and where it is used (C112.6) (Remembering)	2
TOTAL		20

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TUTORIAL CLASS

S.NO	TOPIC	Teaching method/Teaching Aid	Session plan	Reference books
1	Hard water, hardness, types of hardness, units of hardness, potable water & its treatment, break point chlorination.	Black Board	1	T1, R1
2	Defluoridation, boiler troubles-sludges, scales, caustic embrittlement, internal treatment method.	Black Board, PPT	1	T1, R1, W1
3	External treatment method ,reverse osmosis	Black Board	1	T1, R1 V1
4	Batteries, types of batteries, construction, working & applications of Zn-air battery.	Black Board	1	T1, R1, W2
5	Lithium –ion battery, fuel cell, methanol –oxygen fuel cell.	Black Board ,PPT	1	T1, R1, W2
6	Solid-oxide fuel cell, solar cell, introduction of corrosion.	Black Board	1	T1, R1
7	Theories of corrosion, types of corrosion.	Black Board ,PPT	1	T1, R1 W1, V2
8	Corrosion control methods	Black Board	1	T1, R1
9	Polymers, types of polymerization, free radical mechanism.	Black Board	1	T1, R1
10	Preparations of polymers like- Nylon-6,6, Terylene, natural rubber, vulcanization rubber.	Black Board	1	T1, R1
11	Preparations of polymers like- Buna-s, butyl & Thiokol rubber, PVC.	Black Board	1	T1, R1 W2

12	Classification of conducting polymers, biodegradable polymers.	Black Board	1	T1, R1 W3,V3
13	Calorific value, HCV, LCV, Dulong's formula.	Black Board	1	T1, R1
14	Analysis of coal-proximate & ultimate analysis of coal.	Black Board ,PPT	1	T1, R1,W4
15	Petroleum refining –fractional distillation, synthetic petrol-Fischer Tropsch's process	Black Board ,PPT	1	T1, R1
16	Cracking-moving bed catalytic cracking, knocking-octane rating & cetane rating.	Black Board, PPT	1	T1, R1 V4
17	Bio diesel- transesterification, CNG, LPG.	Black Board	1	T1, R1
18	Cement-Composition, setting and hardening.	Black Board	1	T1, R1
19	Smart materials – shape memory materials, thermoresponsive materials	Black Board	1	T1, R1 W5, V5
20	Classification of lubricants with examples	Black Board	1	T1, R1
21	Properties of lubricants, mechanism of lubricants	Black Board	1	T1, R1



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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist.,Telangana-501510

Result Analysis:

DATA SCIENCE

Course Title	ENGINEERING CHEMISTRY
Course Code	CH103BS
Programme	B.Tech
Year & Semester	I year I- semester
Regulation	BR22
Course Faculty	O.Subhashini, Assistant Professor , H&S

Weak Students:

S No	Roll no	Intermediate Marks	Internal-I Status (35)	Internal-II Status (40)
1	22X31A6702	69.2%	20	25
2	22X31A6712	60%	23	32
3	22X31A6713	60%	23	27
4	22X31A6723	74%	20	25
5	22X31A6729	78%	20	30
6	22X31A6739	77.8%	20	34
7	22X31A6740	72.8%	20	20
8	22X31A6749	68.4%	22	37
9	22X31A6756	61%	20	34
10	22X31A6757	61%	23	32

Advanced learners:

S No	Roll No	Intermediate Marks	Gate Material
1	22X31A6703	90.7%	Water &its treatment, batteries, fuels&combustion.
2	21X31A6704	91.3%	
3	21X31A6718	96.8%	
4	21X31A6745	98%	
5	21X31A6747	97.5%	
6	21X31A6751	97.5%	
7	21X31A6754	97.2%	



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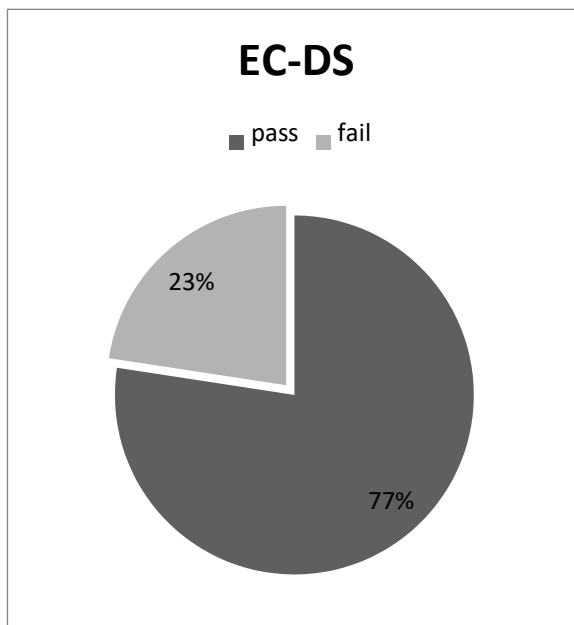
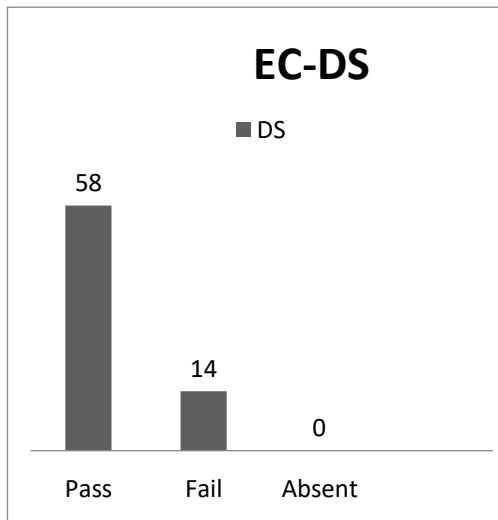
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BR22

RESULT ANALYSIS AT END OF SEMESTER

Branch : DATA SCIENCE

Subject: ENGINEERING CHEMISTRY





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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

DEPARTMENT OF HUMANITIES AND SCIENCE REMEDIAL CLASSES TIME TABLE

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
CSE-A	M&C	PPS	BEE	EG	EC	M&C
CSE-B	BEE	M&C	EG	PPS	EC	BEE
CSE-C	EC	EG	BEE	M&C	PPS	EC

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
DS	M&C	EC	BEE	PPS	EG	EC
CYBER	PPS	M&C	EC	EG	BEE	M&C

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
AIML-A	AP	PPS	M&C	ENG	AP	M&C
AIML-B	M&C	EG	PPS	AP	M&C	EG

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
AI&DS	M&C	ENG	AP	PPS	AP	PPS
IOT	PPS	AP	M&C	EG	M&C	EG

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
ECE	AP	ENG	M&C	PPS	AP	PPS
CIVIL	EG	AP	M&C	PPS	M&C	EG


Head of the Department
Department of H&S
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V) Ibrahimpatnam (M) R.R. Dist-501 510


PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences

Course Outcome Attainment (Internal Examination-1)

Name of the faculty	O.SUBHASHINI	Academic Year:	2022-2023
Branch & Section:	DATASCIENCE	Examination:	I Internal
Course Name:	ENGINEERING CHEMISTRY	Year:	I Semester: 1

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Q5a	Q5b	Q5c	Q6a	Q6b	Q6c	Obj1	A1
Max. Marks ==>		5			5			5			5			5			5			10	5
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3	22X31A6703	5			3						4			4						10	5
4	22X31A6704				4			1			4			4						10	5
5	22X31A6705	4			3						3			3						9	5
6	22X31A6706	2			2															10	5
7	22X31A6707	3			4									2						9	5
8	22X31A6708	2			4									2						8	5
9	22X31A6709	4									4			1						8	5
10	22X31A6710	4			4									3						8	5
11	22X31A6711	4									2			1						9	5
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36	22X31A6738	2						1			3			4						6	5
37	22X31A6739	3												2						10	5
38	22X31A6740	2									3									10	5
39	22X31A6741	3												2						10	5
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61	22X31A6763	1									3			4						9	5
62	22X31A6764				2						2			4						10	5

Target set by the faculty / HoD	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	6.00	3.00
Number of students performed above	30	0	0	19	0	0	3	0	0	29	0	0	40	0	0	3	0	0	62	62
Number of students attempted	48	0	0	28	0	0	16	0	0	45	0	0	58	0	0	8	0	0	62	62
Percentage of students scored more than target	63%			68%			19%			64%			69%			38%			100%	100%

CO Mapping with Exam Questions:

CO - 1	Y			Y			Y												Y	Y
CO - 2									Y			Y							Y	Y
CO - 3																			Y	Y
CO - 4														Y					Y	Y
CO - 5																				
CO - 6																				

>Target %	63%			68%			19%			64%			69%			38%			100%	100%
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CO Attainment based on Exam Questions:

CO - 1	63%			68%			68%												100%	100%
CO - 2									19%			19%							100%	100%
CO - 3																			100%	100%
CO - 4														19%					100%	100%
CO - 5																				
CO - 6																				

CO	Subj	obj	Asgn	Overall	Level	Attainment Level	
CO-1	66%	79%	100%	82%	3.00	1	40%
CO-2	19%	46%	100%	55%	3.00	2	50%
CO-3		100%	100%	100%	3.00	3	60%
CO-4	19%	59%	100%	59%	3.00		
CO-5							
CO-6							

Attainment (Internal 1 Examination) = **3.00**

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences



Course Outcome Attainment (Internal Examination-2)

Name of the faculty:	O.SUBHASHINI	Academic Year:	2022-2023
Branch & Section:	DATASCIENCE	Examination:	II Internal
Course Name:	ENGINEERING CHEMISTRY	Year: I	Semester: I

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Q5a	Q5b	Q5c	Q6a	Q6b	Q6c	Obj	A2	viva/ ppt
	Max. Marks ==>	5			5			5			5			5			5			10	5	5
1	22X31A6701				4						4			5						10	5	5
2	22X31A6702	3						1						3						8	5	5
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6	22X31A6706							4						3						10	5	5
7	22X31A6707				1									3			3			10	5	5
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10	22X31A6710																				5	5
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22	22X31A6722	4						5			3									10	5	5
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29	22X31A6729				3			1			2			4						10	5	5
30	22X31A6730	3												5						10	5	5
31	22X31A6731	5			5									2			5			9	5	5
32	22X31A6733	5			5			5									5			10	5	5
33	22X31A6734				5			5						5			5			10	5	5
34	22X31A6736							5			5			5			5			10	5	5
35	22X31A6737	4			5			4									5			10	5	5
36	22X31A6738	4						5						5			5			10	5	5
37	22X31A6739	4			2									5			3			10	5	5
38	22X31A6740	2			2			1												10	5	5
39	22X31A6741				3			4						2			4			10	5	5
40	22X31A6742				4			4						5			3			10	5	5
41	22X31A6743	5			1									2			5			10	5	5
42	22X31A6744	4			3									4			4			10	5	5
43	22X31A6745				5			5						5			5			10	5	5
44	22X31A6746	5			4			5									4			10	5	5
45	22X31A6747	5			5			5			5									10	5	5
46	22X31A6748				5			5			4			5						10	5	5
47	22X31A6749				4			5			4			4						10	5	5
48	22X31A6750	5									5			5			5			10	5	5
49	22X31A6751	5			5			5			5									10	5	5
50	22X31A6752	3			4									4			2			10	5	5
51	22X31A6753							4			3			3			2			10	5	5
52	22X31A6754	5			5			5			5									10	5	5
53	22X31A6755	3			4									4			5			10	5	5
54	22X31A6756				3						2			5			4			10	5	5
55	22X31A6757	4												4			4			10	5	5
56	22X31A6758	3			4									4			4			10	5	5
57	22X31A6759				5			5						5			5			10	5	5
58	22X31A6760				5			5						5			5			10	5	5
59	22X31A6761	3			4			4						4						10	5	5
60	22X31A6762	4			5						5			4						10	5	5
61	22X31A6763	4			5			5						5						10	5	5
62	22X31A6764	5			5			5			5									10	5	5

Target set by the faculty / HoD	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	6.00	3.00	3.00
Number of students performed above the target	33	0	0	42	0	0	37	0	0	22	0	0	40	0	0	33	0	0	61	62	61
Number of students attempted	36	0	0	49	0	0	40	0	0	25	0	0	44	0	0	35	0	0	61	62	61
Percentage of students scored more than target	92%			86%			93%			88%			91%			94%			100%	100%	100%

CO Mapping with Exam Questions:

CO - 1																					
CO - 2																					
CO - 3																					
CO - 4	Y																		Y	Y	Y
CO - 5				Y			Y			Y									Y	Y	Y
CO - 6													Y			Y			Y	Y	Y

% Students Scored >Target %	92%			86%			93%			88%			91%			94%			100%	100%	100%
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CO Attainment based on Exam Questions:

CO - 1																					
CO - 2																					
CO - 3																					
CO - 4	92%																		100%	100%	100%
CO - 5				92%			92%			92%									100%	100%	100%
CO - 6													92%			92%			100%	100%	100%

CO	Subj	obj	aasgn	ppt	Overall	Level
CO-1						
CO-2						
CO-3						
CO-4	92%	100%	100%	100%	98%	3.00
CO-5	92%	100%	100%	100%	98%	3.00
CO-6	92%	100%	100%	100%	98%	3.00

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal Examination-2) = **3.00**

**SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

Department of Humanities & Sciences

Course Outcome Attainment (University Examinations)

Name of the faculty :		O.SUBHASHINI	Academic Year:		2022-2023
Branch & Section:		DATASCIENCE	Year / Semester:		I/I
Course Name:		ENGINEERING CHEMISTRY			
S.No	Roll Number	Marks Secured	S.No	Roll Number	Marks Secured
1	22X31A6701	11	36	22X31A6738	22
2	22X31A6702	7	37	22X31A6739	24
3	22X31A6703	29	38	22X31A6740	14
4	22X31A6704	38	39	22X31A6741	22
5	22X31A6705	39	40	22X31A6742	32
6	22X31A6706		41	22X31A6743	33
7	22X31A6707	29	42	22X31A6744	46
8	22X31A6708	24	43	22X31A6745	57
9	22X31A6709	15	44	22X31A6746	52
10	22X31A6710	26	45	22X31A6747	53
11	22X31A6711	26	46	22X31A6748	38
12	22X31A6712	21	47	22X31A6749	29
13	22X31A6713	9	48	22X31A6750	40
14	22X31A6714	25	49	22X31A6751	44
15	22X31A6715	33	50	22X31A6752	9
16	22X31A6716	27	51	22X31A6753	5
17	22X31A6717	11	52	22X31A6754	49
18	22X31A6718	50	53	22X31A6755	26
19	22X31A6719	40	54	22X31A6756	12
20	22X31A6720	43	55	22X31A6757	16
21	22X31A6721	35	56	22X31A6758	21
22	22X31A6722	28	57	22X31A6759	34
23	22X31A6723	7	58	22X31A6760	48
24	22X31A6724	34	59	22X31A6761	23
25	22X31A6725	32	60	22X31A6762	30
26	22X31A6726	30	61	22X31A6763	31
27	22X31A6727	23	62	22X31A6764	39
28	22X31A6728	27			
29	22X31A6729	6			
30	22X31A6730	16			
31	22X31A6731	29			
32	22X31A6733	37			
33	22X31A6734	33			
34	22X31A6736	35			
35	22X31A6737	24			
Max Marks		60			
Class Average mark		29	Attainment Level		% students
Number of students performed above the target		32	1		40%
Number of successful students		61	2		50%
Percentage of students scored more than target		52%	3		60%
Attainment level		3			



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

(UGC AUTONOMOUS INSTITUTION)

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(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

ATTENDANCE REGISTER

https://drive.google.com/file/d/1f09RE9ThV_KKI3B2ZDKuotIYW_mmeLyz/view?usp=sharing