



VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN

(An Autonomous Institution)

[Sponsored by Lavu Educational Society, Affiliated to JNTUH & Approved by AICTE, New Delhi]
Kondapur (V), Ghatkesar (M), Medchal - Malkajgiri (D) - 501 301. Phone: 96529 10002/3



Department of Chemistry

2nd BoS Meeting on 19th August 2025

AGENDA

Item No.	Agenda Item
1.0	Review and Confirmation of Items
1.1	Review and conformation of the Minutes of Meeting of the 1 st BOS Meeting held on 19 th December 2024.
1.2	Review of the VR 25 regulations.
1.3	Review and conformation of I B.Tech I & II Semester Course Structure.
2.0	Approval Items
2.1	Approval of Syllabus for I B.Tech I & II Semester.
3.0	Any other items with permission of Chair

Chairman - BOS
(Ch. Bhavana Rushi)



VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN

(An Autonomous Institution)

[Sponsored by Lavu Educational Society, Affiliated to JNTUH & Approved by AICTE, New Delhi]
Kondapur (V), Ghatkesar (M), Medchal - Malkajgiri (D) - 501 301. Phone: 96529 10002/3



Department of Chemistry

2nd BoS Meeting on 19th August 2025

Members Present:

S. No	Name of the Member	Designation	Organization	Role	Sign
1	Mr. Ch. Bhavana Rushi	Assistant Professor	VMTW, Hyderabad.	BOS Chairman	
2	Dr. T. Sabithakala	Assistant Professor	UCESTH, JNTUH Hyderabad	Member (JNTUH Nominee)	
3	Dr. Y. Prashanthi Reddy	Assistant Professor (Sr. Grade)	MGU, Nalgonda.	Member (Academician)	
4	Dr. K. Ramesh	Assistant Professor (Sr. Grade) & Head	CBIT, Hyderabad	Member (Academician)	
5	Dr T. Nageswara Rao	Vice President	ACL Harmoni Analytical, HYD	Member (Industry)	
6	Dr. N. Sambashivudu	Assistant Professor	VMTW, Hyderabad.	Member	
7	Mr. T. Dileep	Assistant Professor	VMTW, Hyderabad.	Member	
8	Mr. V. Rama Krishna	Assistant Professor	VMTW, Hyderabad.	Member	
9	Mr. P. Ramesh	Assistant Professor	VMTW, Hyderabad.	Member	
10	Dr. R. Sridhar	Associate Professor & HOD-BSH	VMTW, Hyderabad.	Special Invitee	

MINUTES BOOK

Vignan's Institute of Management & Technology for Women (An Autonomous Institutions & Accredited by NBA & NAAC)

Minutes of the 2nd Board of Studies (BoS) meeting held on 19th August 2025, 10.30AM at
HOD'S Chamber, VMTW

The Quorum (minimum 40%) was satisfied.

The following members were present:

1. Mr. Ch. Bhavana Rushi
2. Dr. T. Sabithakala
3. Dr. Y. Prashanthi Reddy
4. Dr. K. Ramesh
5. Dr. T. Nageswara Rao
6. Dr. N. Sambashivudu
7. Mr. T. Dileep
8. Mr. V. Rama Krishna
9. Mr. P. Ramesh
10. Dr. R. Sridhar

The Chairman welcomed all the members to the meeting of the Board of Studies.

Proceedings of the meeting of the Board of Studies

1.0 Review and Confirmation of Items.

1.1 Review and confirmation of the Minutes of Meeting of the 1st BOS Meeting held on 19th December 2024.

The Chairman-BOS present the Minutes of Meeting of the 1st BOS Meeting held on 19th December 2024.

The Board reviewed and confirmed the Minutes of the Meeting of the 1st BOS Meeting held on 19th December 2024.

1.2 Review of the VR 25 regulations.

The Chairman-BOS present the VR 25 regulations.

The Board reviewed and noted.

1.3 Review and conformation of I B.Tech I & II Semester Course Structure.

The Chairman-BOS present the proposed Course Structure (Annexure -1) to the members.

The Board has reviewed and confirmed the Course Structure.

Minutes of the Board of Studies (BOS) meeting held on Thursday, 19th August 2025

2.0 Approval Items

2.1 Approval of Syllabus for I B.Tech I & II Semester.

The Chairman-BOS presented the Syllabus (Annexure – II, III, IV & V) to the members.

Theory Subject - **Engineering Chemistry** – I. B.Tech – I Semester –
CSE

Laboratory - **English Chemistry Lab** – I. B.Tech – I Semester –
CSE

Theory Subject - **Engineering Chemistry** – I. B.Tech – II Semester –
Common to ECE, CSE (AIML), CSE (DS), IT

Laboratory - **Engineering Chemistry Lab** – I. B.Tech – I Semester –
Common to ECE, CSE (AIML), CSE (DS), IT

The Board has approved the above syllabi (Annexure – II, III, IV & V).

3.0 Any other item with the permission of the Chair

- Dr. Sabithakala (University Nominee, Assistant Professor, Dept of Chemistry, JNTUH)
Suggested to determine the alkalinity of water in Virtual Lab Experiments
- Dr. Y Prashanthi Reddy (Subject Expert, Sr.Grade Assistant Professor, Dept of Chemistry, MGU) Accepted without changes.
- Dr P Ramesh (Subject Expert, Sr.Grade Assistant Professor, Dept of Chemistry, CBIT)
Suggested to include the determine the alkalinity of water in Virtual Lab Experiments
- Dr T Nageshwara Rao, (Industry Expert, Manager) Industrial Expert suggested pesticide & corrosion relevant topics

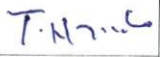
The Board suggested the Chairperson, maintain the Academic Quality, Update the syllabus to maintain the Standards of Institution.



Chairman - BOS
(Mr. Ch. Bhavana Rushi)

Department of Chemistry

Minutes of the 2nd Board of Studies (BoS) meeting held on 19th August 2025, 10.30AM at
HOD'S Chamber, VMTW

S.N o.	Name	Designation	Organization	Position in BoS	Signature
1	Mr. Ch. Bhavana Rushi	Assistant Professor	VMTW, Hyderabad.	BOS Chairman	
2	Dr. T. Sabithakala	Assistant Professor	UCESTH, JNTUH Hyderabad	Member (JNTUH Nominee)	
3	Dr. Y. Prashanthi Reddy	Assistant Professor (Sr. Grade)	MGU, Nalgonda.	Member (Academician)	
4	Dr. K. Ramesh	Assistant Professor (Sr. Grade) & Head	CBIT, Hyderabad	Member (Academician)	
5	Dr T. Nageswara Rao	Vice President	ACL Harmoni Analytical, HYD	Member (Industry)	
6	Dr. N. Sambashivudu	Assistant Professor	VMTW, Hyderabad.	Member	
7	Mr. T. Dileep	Assistant Professor	VMTW, Hyderabad.	Member	
8	Mr. V. Rama Krishna	Assistant Professor	VMTW, Hyderabad.	Member	
9	Mr. P. Ramesh	Assistant Professor	VMTW, Hyderabad.	Member	
10	Dr. R. Sridhar	Associate Professor & HOD-BSH	VMTW, Hyderabad.	Special Invitee	

B Tech

L T P C

I Year - I Semester

3 0 0 3

**ENGINEERING CHEMISTRY
(CSE)**

Course Objectives:

- To develop adaptability to new advances in Engineering Chemistry and acquire the essential skills to become a competent engineering professional.
- To understand the industrial significance of water treatment, fundamental principles of battery chemistry, and the impact of corrosion along with its control methods for structural protection.
- To impart foundational knowledge of various energy sources and their practical applications in engineering.
- To equip students with an understanding of smart materials, bio-sensors and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

- Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.
- Students will gain basic knowledge of electro chemical processes and their relevance to corrosion and its control methods.
- Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
- Students will learn the basic concepts and properties of polymers and other engineering materials.
- Students will be able to apply the principles of UV-Visible, IR-spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.

UNIT-I: Water and its treatment:

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation - Nalgonda technique.

Boiler troubles: Scales, Sludges 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 brackish water - Reverse osmosis.

UNIT-II: Electrochemistry and Corrosion:

Introduction- Electrode potential, standard electrode potential, Nernst equation (no derivation), electrochemical cell - Galvanic cell, cell representation, EMF of cell - Numerical problems. Types of electrodes, reference electrodes - Primary reference electrode - Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode. Construction, working and determination of pH of unknown solution using SHE and Calomel electrode.

Corrosion: Introduction- Definition, causes and effects of corrosion - Theories of corrosion, chemical and electrochemical theories of corrosion, Types of corrosion: galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion - Nature of the metal, Nature of the corroding environment. Corrosion control methods - Cathodic protection Methods - Sacrificial anode and impressed current methods.

1) *for* 2) *edu* 3) *edu* 4) *for* 5) *T.M...*
6) *N. Rambashindur* 7) *for* 8) *for* 9) *P. Ramon* 10) *for*

UNIT-III: Energy sources:

Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion batteries. Fuel Cells – Differences between a battery and a fuel cell, Construction and applications of Direct Methanol Fuel Cell (DMFC).

Fuels: Introduction and characteristics of a good fuel, Calorific value – Units - HCV, LCV- Dulong's formula - Numerical problems.

Fossil fuels: Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking - Moving bed catalytic cracking. LPG and CNG composition and uses.

Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen.

UNIT - IV: Polymers:

Definition - Classification of polymers: Based on origin and tacticity with examples – Types of polymerization - Addition (free radical addition mechanism) and condensation polymerization. Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6). Differences between thermoplastics and thermo setting plastics, Fiber reinforced plastics (FRP). Conducting polymers: Definition and Classification with examples - Mechanism of conduction in trans polyacetylene and applications of conducting polymers.

Biodegradable polymers: Polylactic acid and its applications.

UNIT-V- Advanced Functional Materials:

Smart materials: Introduction, Classification with examples - Shape Memory Alloys – Nitinol, Piezoelectric materials – quartz and their engineering applications.

Biosensor - Definition, Amperometric Glucose monitor sensor.

Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Under Control- CO sensor (Passive Infrared detection), Raman spectroscopy (application) - Tumour detection in medical applications.

TEXT BOOKS:

1. Engineering Chemistry by P.C.Jain and M.Jain, Dhanpatrai Publishing Company, 2010.
2. Engineering Chemistry by Rama Devi, Dr.P.Aparna and Rath, Cengage learning, 2025.

REFERENCE BOOKS:

1. Engineering Chemistry: by Thirumala Chary Laxminarayana & Shashikala, Pearson Publications (2020)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.
3. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi 2015.
4. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.
5. Challenges and Opportunities in Green Hydrogen by Editors: Paramvir Singh, Avinash Kumar Agarwal, Anupma Thakur, R.K. Sinha.
6. Raman Spectroscopy in Human Health and Bio- medicine,
<https://www.worldscientific.com/doi/epdf/10.1142/13094>
7. E-Content-<https://doi.org/10.1142/13094>|October2023
8. E-books:
<https://archive.org/details/EngineeringChemistryByShashiChawla/page/n11/mode/2u>

- 1) 2) 3) 4) 5) T. Narul
- 6) N. Sambashimulu 7) 8) 9) P. Ramesh 10)

B Tech

L T P C

I Year - II Semester

0 0 2 1

ENGINEERING CHEMISTRY LABORATORY

(Common for CSE(AIML), CSE(DS), IT & ECE)

Course Objectives: The course consists of experiments related to the principles of Chemistry required for engineering student. The student will learn:

- Students will understand and perform experiments based on core chemical principles relevant to engineering applications.
- Students will learn to estimate the hardness of water to assess its suitability for drinking purposes.
- Students will acquire the ability to perform acid-base titrations using instrumental methods such as conductometry, potentiometry, and pH metry.
- Students will gain hands-on experience in synthesizing polymers like Bakelite and Nylon – 6, in the laboratory.
- Students will learn to determine the unknown concentration of potassium permanganate (KMnO_4) using a calibration curve.

Course Outcomes: The experiments will make the student gain skills on:

- Students will develop practical skills through hands-on chemistry experiments relevant to engineering.
- Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.
- Students will be able to apply techniques like conductometry, potentiometry and pH metry to determine concentrations or equivalence points in acid-base reactions.
- Students will gain experience in synthesizing polymers such as Bakelite, Nylon-6,6.
- Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).

List of Experiments:

I. Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method.

II. Conductometry:

1. Estimation of the concentration of strong acid by conductometry.
2. Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry.

III. Potentiometry:

1. Estimation of concentration of Fe^{+2} ion by Potentiometry using KMnO_4 .
2. Estimation of concentration of strong acid with strong base by Potentiometry using quinhydrone

IV. pH -Metry: Determination of an acid concentration using pH-meter.

V. Colorimetry: Verification of Lambert-Beer's law using KMnO_4 .

VI. Preparations:

1. Preparation of Bakelite.
2. Preparation Nylon-6, 6.

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

1) *[Signature]*2) *[Signature]*3) *[Signature]*4) *[Signature]*5) *[Signature]*6) *N. Rambarhinde*7) *[Signature]*8) *[Signature]*9) *P. Ramappa*10) *[Signature]*

VIII. Virtual lab experiments:

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cells and its applications.

Reference Books:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's textbook of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

1) *[Signature]*

2) *[Signature]*

3) *[Signature]*

4) *[Signature]*

5) *[Signature]*

6) *[Signature]*

7) *[Signature]*

8) *[Signature]*

9) *[Signature]*

10) *[Signature]*

B Tech

L T P C

I Year - I Semester

0 0 2 1

ENGINEERING CHEMISTRY LABORATORY

(CSE)

Course Objectives: The course consists of experiments related to the principles of Chemistry required for engineering student. The student will learn:

- Students will understand and perform experiments based on core chemical principles relevant to engineering applications.
- Students will learn to estimate the hardness of water to assess its suitability for drinking purposes.
- Students will acquire the ability to perform acid-base titrations using instrumental methods such as conductometry, potentiometry, and pH metry.
- Students will gain hands-on experience in synthesizing polymers like Bakelite and Nylon – 6, in the laboratory.
- Students will learn to determine the unknown concentration of potassium permanganate (KMnO_4) using a calibration curve.

Course Outcomes: The experiments will make the student gain skills on:

- Students will develop practical skills through hands-on chemistry experiments relevant to engineering.
- Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.
- Students will be able to apply techniques like conductometry, potentiometry and pH metry to determine concentrations or equivalence points in acid-base reactions.
- Students will gain experience in synthesizing polymers such as Bakelite, Nylon-6,6.
- Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).

List of Experiments:

I. Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method.

II. Conductometry:

1. Estimation of the concentration of strong acid by conductometry.
2. Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry.

III. Potentiometry:

1. Estimation of concentration of Fe^{+2} ion by Potentiometry using KMnO_4 .
2. Estimation of concentration of strong acid with strong base by Potentiometry using quinhydrone

IV. pH -Metry: Determination of an acid concentration using pH-meter.

V. Colorimetry: Verification of Lambert-Beer's law using KMnO_4 .

VI. Preparations:

1. Preparation of Bakelite.
2. Preparation Nylon-6, 6.

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

1) *[Signature]* 2) *[Signature]* 3) *[Signature]* 4) *[Signature]* 5) *[Signature]*
6) *[Signature]* 7) *[Signature]* 8) *[Signature]* 9) *[Signature]* 10) *[Signature]*

VIII. Virtual lab experiments:

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cells and its applications.

Reference Books:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's textbook of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

1) 

2) 

3) 

4) 

5) 

6) 

7) 

8) 

9) 

10) 

B Tech

L T P C

I Year - II Semester

3 0 0 3

ENGINEERING CHEMISTRY
(Common to CSE(AIML), CSE(DS), IT & ECE)

Course Objectives:

- To develop adaptability to new advances in Engineering Chemistry and acquire the essential skills to become a competent engineering professional.
- To understand the industrial significance of water treatment, fundamental principles of battery chemistry, and the impact of corrosion along with its control methods for structural protection.
- To impart foundational knowledge of various energy sources and their practical applications in engineering.
- To equip students with an understanding of smart materials, bio-sensors and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

- Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.
- Students will gain basic knowledge of electro chemical processes and their relevance to corrosion and its control methods.
- Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
- Students will learn the basic concepts and properties of polymers and other engineering materials.
- Students will be able to apply the principles of UV-Visible, IR-spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.

UNIT-I: Water and its treatment:

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation - Nalgonda technique.

Boiler troubles: Scales, Sludges 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 brackish water - Reverse osmosis.

UNIT-II: Electrochemistry and Corrosion:

Introduction- Electrode potential, standard electrode potential, Nernst equation (no derivation), electrochemical cell - Galvanic cell, cell representation, EMF of cell - Numerical problems. Types of electrodes, reference electrodes - Primary reference electrode - Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode. Construction, working and determination of pH of unknown solution using SHE and Calomel electrode.

Corrosion: Introduction- Definition, causes and effects of corrosion - Theories of corrosion, chemical and electrochemical theories of corrosion, Types of corrosion: galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion - Nature of the metal, Nature of the corroding environment. Corrosion control methods - Cathodic protection Methods - Sacrificial anode and impressed current methods.

1) *[Signature]* 2) *[Signature]* 3) *[Signature]* 4) *[Signature]* 5) *[Signature]*
6) *[Signature]* 7) *[Signature]* 8) *[Signature]* 9) *[Signature]* 10) *[Signature]*

UNIT-III: Energy sources:

Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion batteries. Fuel Cells – Differences between a battery and a fuel cell, Construction and applications of Direct Methanol Fuel Cell (DMFC).

Fuels: Introduction and characteristics of a good fuel, Calorific value – Units - HCV, LCV- Dulong's formula - Numerical problems.

Fossil fuels: Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking - Moving bed catalytic cracking. LPG and CNG composition and uses.

Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen.

UNIT - IV: Polymers:

Definition - Classification of polymers: Based on origin and tacticity with examples – Types of polymerization - Addition (free radical addition mechanism) and condensation polymerization. Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6). Differences between thermoplastics and thermo setting plastics, Fiber reinforced plastics (FRP). Conducting polymers: Definition and Classification with examples - Mechanism of conduction in trans poly-acetylene and applications of conducting polymers.

Biodegradable polymers: Polylactic acid and its applications.

UNIT-V- Advanced Functional Materials:

Smart materials: Introduction, Classification with examples - Shape Memory Alloys – Nitinol, Piezoelectric materials – quartz and their engineering applications.

Biosensor - Definition, Amperometric Glucose monitor sensor.

Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Under Control- CO sensor (Passive Infrared detection), Raman spectroscopy (application) - Tumour detection in medical applications.

TEXT BOOKS:

1. Engineering Chemistry by P.C.Jain and M.Jain, Dhanpatrai Publishing Company, 2010.
2. Engineering Chemistry by Rama Devi, Dr.P.Aparna and Rath, Cengage learning, 2025.

REFERENCE BOOKS:

1. Engineering Chemistry: by Thirumala Chary Laxminarayana & Shashikala, Pearson Publications (2020)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.
3. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi 2015.
4. Engineering Analysis of Smart Material Systems by DonaldJ.Leo, Wiley, 2007.
5. Challenges and Opportunities in Green Hydrogen by Editors: Paramvir Singh, Avinash Kumar Agarwal, Anupma Thakur, R.K Sinha.
6. Raman Spectroscopy in Human Health and Bio- medicine,
<https://www.worldscientific.com/doi/epdf/10.1142/13094>
7. E-Content-<https://doi.org/10.1142/13094>|October2023
8. E-books:
<https://archive.org/details/EngineeringChemistryByShashiChawla/page/n11/mode/2u>

1) *Agar*

2) *Sh*

3) *Leo*

4) *By*

5) *T-N-L*

6) *N. Sambaiah*

7) *Sh*

8) *By*

9) *P. Ram*

10) *Sh*