

**Lecture Plan -1**

Faculty:-                      Semester:- III                      Class:- ME                      Course Code:- ME-201 E  
Subject:- Thermodynamics                      Unit:-

| <b>S. No.</b> | <b>Topic :- Basic Concepts</b>   | <b>Time Allotted:-</b> |
|---------------|--|------------------------|
| 1.            | Introduction<br><br>Introduction about self, syllabus, teaching methodology in Dronacharya College of Engineering.                 | 5 Min                  |
| 2             | Division of the Topic<br><br>Introduction about self,<br>Syllabus ,<br>Teaching Methodology in Dronacharya College of Engineering. | 35 Min                 |
| 3.            | Conclusion<br><br>Introduction about self, syllabus, teaching methodology in Dronacharya College of Engineering.                   | 5 Min                  |
| 4             | Question / Answer  | 5 Min                  |

Assignment to be given:-                      Nil

Reference Readings:-    Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
 Theory & problems of Thermodynamics – Y.V.C.Rao  
 Engg. Thermodynamics – C.P.Arora  
 Engg. Thermodynamics – P. K. Nag

## Lecture Plan -2

Faculty:-  
Course Code:- ME-201 E  
Subject:- Thermodynamics

Semester:- III    Class:- ME  
Unit:- I

| <b>S. No.</b> | <b>Topic :- Basic Concepts</b>  | <b>Time Allotted:-</b> |
|---------------|---|------------------------|
| 1.            | Introduction<br><br>A brief about Macroscopic and Microscopic Approaches. | 5 Min                  |
| 2             | Division of the Topic<br><br>Macroscopic and Microscopic Approaches.      | 35 Min                 |
| 3.            | Conclusion<br><br>Macroscopic and Microscopic Approaches to be studied.   | 5 Min                  |
| 4             | Question / Answer<br><br>What is Macroscopic study of thermodynamics?     | 5 Min                  |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

### Lecture Plan -3

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- I

| S. No. | Topic :- Basic concepts   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Thermodynamic system, surrounding and boundary, Thermodynamic property-intensive and extensive briefly to be discussed. | 5 Min           |
| 2      | Division of the Topic<br><br>Thermodynamic system, surrounding and boundary, Thermodynamic property-intensive and extensive.                | 35 Min          |
| 3.     | Conclusion<br><br>Thermodynamic system, surrounding and boundary, Thermodynamic property-intensive and extensive to be summarised.          | 5 Min           |
| 4      | Question / Answer<br><br>What is Thermodynamic system, surrounding and boundary?  | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag



## Lecture Plan -5

Faculty: -                      Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject: - Thermodynamics      Unit: - I

| S. No. | Topic :- Basic concepts   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Concept of thermodynamic Work and Heat equality of temperature, Zeroth law of Thermodynamics and its utility briefly to be discussed..<br><br>. | 5 Min           |
| 2      | Division of the Topic<br><br>Concept of thermodynamic Work and Heat equality of temperature, Zeroth law of Thermodynamics and its utility                           | 35 Min          |
| 3.     | Conclusion<br><br>Concept of thermodynamic Work and Heat equality of temperature, Zeroth law of Thermodynamics and its utility to be summerised                     | 5 Min           |
| 4      | Question / Answer<br><br>What is Zeroth law of Thermodynamics and its utility?.   | 5 Min           |

Assignment to be given:-                      Nil

Reference Readings:-      Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag



## Lecture Plan -7

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- II

| S. No. | Topic :- First law of Thermodynamics   | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Energy and its forms, Energy and first law of thermodynamics briefly to be discussed.                      | 5 Min           |
| 2      | Division of the Topic<br><br>Energy and its forms,<br>Energy and first law of thermodynamics,<br>Internal energy and Enthalpy  | 35 Min          |
| 3.     | Conclusion<br><br>Energy and its forms, Energy and first law of thermodynamics, internal energy and Enthalpy to be summerised. | 5 Min           |
| 4      | Question / Answer<br><br>Explain first law of thermodynamics, internal energy and Enthalpy?                                    | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

## Lecture Plan -8

Faculty:- Semester:- III    Class:- ME    Course Code:- ME-201 E

Subject:- Thermodynamics    Unit:- II

| S. No. | Topic :- First law of Thermodynamics   | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>PPMSK, steady flow energy equation briefly to be studied.  | 5 Min           |
| 2      | Division of the Topic<br><br>PPMSK, steady flow energy equation, first law applied to non flow processes             | 35 Min          |
| 3.     | Conclusion<br><br>PPMSK, steady flow energy equation, first law applied to non flow processes to be summarised.      | 5 Min           |
| 4      | Question / Answer<br><br>What is steady flow energy equation?<br>How is the first law applied to non flow processes? | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

## Lecture Plan -9

Faculty: -                      Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject: - Thermodynamics      Unit:- II

| S. No. | Topic :- First law of Thermodynamics  | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Steady flow process to be briefed.  | 5 Min           |
| 2      | Division of the Topic<br><br>Steady flow process and transient flow process.                  | 35 Min          |
| 3.     | Conclusion<br><br>Steady flow process and transient flow process to be explained.             | 5 Min           |
| 4      | Question / Answer<br><br>What is Steady flow process process? Explain with suitable examples. | 5 Min           |

Assignment to be given:-                      Nil

Reference Readings:-      Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag



## Lecture Plan -11

Faculty:- Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject:- Thermodynamics      Unit:- II

| S. No. | Topic :- First law of Thermodynamics  | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Formulae on various thermodynamic processes revised for numerical problems. | 5 Min           |
| 2      | Division of the Topic<br><br>Numerical problems.  | 35 Min          |
| 3.     | Conclusion<br><br>Numerical problems to be solved.  | 5 Min           |
| 4      | Question / Answer<br><br>Explain throttling process ?   | 5 Min           |

Assignment to be given:- With suitable examples explain the uses of first law of thermodynamics in non flow processes.

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

## Lecture Plan -12

Faculty:- Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject:- Thermodynamics      Unit:- III

| S. No. | Topic :- Second law of Thermodynamics  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Thermal Reservoir, Heat source and Heat sink briefly to be explained..                 | 5 Min           |
| 2      | Division of the Topic<br><br>Limitations of first law, Thermal Reservoir, Heat source and Heat sink.       | 35 Min          |
| 3.     | Conclusion<br><br>Limitations of first law, Thermal Reservoir, Heat source and Heat sink to be summerised. | 5 Min           |
| 4      | Question / Answer<br><br>What are the limitations of first law of thermodynamics?                          | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

## Lecture Plan -13

Faculty:- Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject:- Thermodynamics      Unit:- III

| S. No. | Topic :- Second law of Thermodynamics   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Heat Engine , Refrigerator and Heat Pump briefly to be discussed.   | 5 Min           |
| 2      | Division of the Topic<br><br>Heat Engine , Refrigerator and Heat Pump.<br>Kelvin Plank and Clausis statements and their equivalence.    | 35 Min          |
| 3.     | Conclusion<br><br>Heat Engine , Refrigerator and Heat Pump. Kelvin Plank and Clausis statements and their equivalence to be summerised. | 5 Min           |
| 4      | Question / Answer<br><br>Compare Heat Engine, Refrigerator and Heat Pump?   | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag



## Lecture Plan -15

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- III

| S. No. | Topic :- Second law of thermodynamics   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Thermodynamic Temperature Scale, Entropy, Clausis inequality.             | 5 Min           |
| 2      | Division of the Topic<br><br>Thermodynamic Temperature Scale,<br>Entropy, Clausis inequality. | 35 Min          |
| 3.     | Conclusion<br><br>Thermodynamic Temperature Scale, Entropy, Clausis inequality to be studied  | 5 Min           |
| 4      | Question / Answer<br><br>Explain , Clausis inequality? .                                      | 5 Min           |

Assignment to be given:- Explain in detail Thermodynamic Temperature Scale, Entropy, Clausis inequality?

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

**Lecture Plan -16**Faculty:-Semester:- IIIClass:- MECourse Code:- ME-201 ESubject:- ThermodynamicsUnit:- III

| S. No. | Topic :- Second law of Thermodynamics   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br>Principle of Entropy increase to be briefed.  | 5 Min           |
| 2      | Division of the Topic<br>Principle of Entropy increase, Temperature – Entropy plot.                       | 35 Min          |
| 3.     | Conclusion<br>Principle of Entropy increase, Temperature – Entropy diagrams plotted and to be summarised. | 5 Min           |
| 4      | Question / Answer<br>What is the principle of Entropy increase?   | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
 Theory & problems of Thermodynamics – Y.V.C.Rao  
 Engg. Thermodynamics – C.P.Arora  
 Engg. Thermodynamics – P. K. Nag

## Lecture Plan -17

Faculty:- Semester:- III    Class:- ME    Course Code:- ME-201 E  
Subject:- Thermodynamics    Unit:- III

| S. No. | Topic :- Second law of Thermodynamics  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Third law of Thermodynamics briefly to be explained.   | 5 Min           |
| 2      | Division of the Topic<br><br>Entropy change in different processes, Introduction to Third law of Thermodynamics        | 35 Min          |
| 3.     | Conclusion<br><br>Entropy change in different processes, Introduction to Third law of Thermodynamics To be summarised. | 5 Min           |
| 4      | Question / Answer<br><br>Explain Third law of Thermodynamics?  | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag





## Lecture Plan -20

Faculty:-                      Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject:- Thermodynamics      Unit:- IV

| S. No. | Topic :- Availability and Irreversibility   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Loss of Energy due to Heat transfer briefly to be discussed.  | 5 Min           |
| 2      | Division of the Topic<br><br>Loss of Energy due to Heat transfer through a finite temperature difference, Dead state of the system.       | 35 Min          |
| 3.     | Conclusion<br><br>Loss of Energy due to Heat transfer through a finite temperature difference, Dead state of the system to be summerised. | 5 Min           |
| 4      | Question / Answer<br><br>What is Dead state of the system ?   | 5 Min           |

Assignment to be given:-                      Nil

Reference Readings:-      Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag



## Lecture Plan -22

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- IV

| S. No. | Topic :- Availability and Irreversibility  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Helmholtz and Gibbs functions, effectiveness and irreversibility briefly discussed.  | 5 Min           |
| 2      | Division of the Topic<br><br>Helmholtz and Gibbs functions,<br>Effectiveness and irreversibility,<br>Second law efficiencies of process & cycle. | 35 Min          |
| 3.     | Conclusion<br><br>Helmholtz and Gibbs functions, effectiveness and irreversibility, second law efficiencies of process & cycle.                  | 5 Min           |
| 4      | Question / Answer<br><br>Explain Irreversibility?  | 5 Min           |

Assignment to be given:- Explain in detail Helmholtz and Gibbs functions, irreversibility, second law efficiencies of process & cycle.

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

## Lecture Plan -23

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- IV

| S. No. | Topic :- Availability and Irreversibility   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Formulae on Availability and Irreversibility briefly to be discussed. | 5 Min           |
| 2      | Division of the Topic<br><br>Numerical problems   | 35 Min          |
| 3.     | Conclusion<br><br>Numerical problems to be solved.  | 5 Min           |
| 4      | Question / Answer<br><br>Explain Availability?  | 5 Min           |

Assignment to be given:-

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

**Lecture Plan -24**Faculty:-Semester:- IIIClass:- MECourse Code:- ME-201 ESubject:- ThermodynamicsUnit:- V

| S. No. | Topic :- Pure substance  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Pure Substance and its properties, phase and phase transformation, vaporization, Evaporation and Boiling briefly to be discussed..               | 5 Min           |
| 2      | Division of the Topic<br><br>Pure Substance and its properties, phase and phase transformation, vaporization, Evaporation and Boiling.                               | 35 Min          |
| 3.     | Conclusion<br><br>Pure Substance and its properties, phase and phase transformation, vaporization, Evaporation and Boiling to be explained completely with diagrams. | 5 Min           |
| 4      | Question / Answer<br><br>What is Pure Substance and its properties?<br>What is vaporization, Evaporation and Boiling?.   | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
 Theory & problems of Thermodynamics – Y.V.C.Rao  
 Engg. Thermodynamics – C.P.Arora  
 Engg. Thermodynamics – P. K. Nag

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## Lecture Plan -25

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- V

| S. No. | Topic :- Pure substance   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Saturated and superheated steam briefly to be discussed.                                | 5 Min           |
| 2      | Division of the Topic<br><br>Saturated and superheated steam, solid liquid vapor equilibrium.               | 35 Min          |
| 3.     | Conclusion<br><br>Saturated and superheated steam, solid liquid vapor equilibrium. to be studied completely | 5 Min           |
| 4      | Question / Answer<br><br>What are the properties of Saturated and superheated steam?                        | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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## Lecture Plan -26

Faculty:- Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject:- Thermodynamics      Unit:- V

| S. No. | Topic :- Pure substance  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>A brief idea about T-V, P-V and P-T plots during steam formation | 5 Min           |
| 2      | Division of the Topic<br><br>T-V, P-V and P-T plots during steam formation           | 35 Min          |
| 3.     | Conclusion<br><br>T-V, P-V and P-T plots during steam formation to be explained      | 5 Min           |
| 4      | Question / Answer<br><br>Draw the T-V, P-V and P-T diagrams?                         | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

## Lecture Plan -27

Faculty:- Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject:- Thermodynamics      Unit:- V

| S. No. | Topic :- Pure substance  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Properties of dry, wet and superheated steam, properties changes during steam processes briefly to be explained. | 5 Min           |
| 2      | Division of the Topic<br><br>Properties of dry, wet and superheated steam , properties changes during steam processes                | 35 Min          |
| 3.     | Conclusion<br><br>Properties of dry, wet and superheated steam , properties changes during steam processes completely                | 5 Min           |
| 4      | Question / Answer<br><br>Enumerate the Properties of dry, wet and superheated steam?   | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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## Lecture Plan -28

Faculty:- Semester:- III      Class:- ME      Course Code:- ME-201 E

Subject:- Thermodynamics      Unit:- V

| S. No. | Topic :- Pure substance  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Temperature Entropy (TS) and Entropy- Enthalpy properties diagrams shown.        | 5 Min           |
| 2      | Division of the Topic<br><br>Temperature Entropy (TS) and Entropy- Enthalpy properties diagrams      | 35 Min          |
| 3.     | Conclusion<br><br>Temperature Entropy (TS) and Entropy- Enthalpy properties diagram to be explained. | 5 Min           |
| 4      | Question / Answer<br><br>Why Entropy- Enthalpy properties diagrams used for the study of steam?      | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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## Lecture Plan -29

Faculty:- Semester:- III    Class:- ME    Course Code:- ME-201 E

Subject:- Thermodynamics    Unit:- V

| S. No. | Topic :- Pure substance   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Throttling and Measurements of dryness friction of steam briefly to be discussed. | 5 Min           |
| 2      | Division of the Topic<br><br>Throttling and Measurements of dryness friction of steam.                | 35 Min          |
| 3.     | Conclusion<br><br>Throttling and Measurements of dryness friction of steam to be studied completely.  | 5 Min           |
| 4      | Question / Answer<br><br>How do you measure dryness friction of steam by throttling?.                 | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
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### Lecture Plan -30

Faculty:- Semester:- III      Class:- ME      Course Code:- ME-201 E  
Subject:- Thermodynamics      Unit:- V

| S. No. | Topic :- Pure substance   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Formula on dryness fraction for Numerical Problems to be discussed. | 5 Min           |
| 2      | Division of the Topic<br><br>Numerical Problems   | 35 Min          |
| 3.     | Conclusion<br><br>Numerical Problems on dryness fraction to be solved.                  | 5 Min           |
| 4      | Question / Answer<br><br>What is dryness fraction?                                      | 5 Min           |

Assignment to be given:- Differentiate between Boiling, Evaporation and condensation.

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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### **Lecture Plan -31**

Faculty:- Semester:- III    Class:- ME    Course Code:- ME-201 E  
Subject:- Thermodynamics    Unit:- VI

| <b>S. No.</b> | <b>Topic :- Ideal and Real Gases</b>   | <b>Time Allotted:-</b> |
|---------------|--|------------------------|
| 1.            | Introduction<br><br>Concept of an Ideal Gas , Basic gas law , , characteristic Gas Equation briefly to be studied. | 5 Min                  |
| 2             | Division of the Topic<br><br>Concept of an Ideal Gas, Basic gas law, characteristic Gas Equation.                  | 35 Min                 |
| 3.            | Conclusion<br><br>Concept of an Ideal Gas, Basic gas law, characteristic Gas Equation to be explained thoroughly.  | 5 Min                  |
| 4             | Question / Answer<br><br>What is basic Gas Law? Characteristic Gas Equation?                                       | 5 Min                  |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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## Lecture Plan -32

Faculty:- Semester:- III    Class:- ME    Course Code:- ME-201 E

Subject:- Thermodynamics    Unit:- V

| S. No. | Topic :- Ideal and Real Gases   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Avogadro's law and Universal gas constant briefly to be explained.                  | 5 Min           |
| 2      | Division of the Topic<br><br>Avogadro's law and Universal gas constant, PVT surface of an Ideal Gas     | 35 Min          |
| 3.     | Conclusion<br><br>Avogadro's law and Universal gas constant, PVT surface of an Ideal Gas to be studied. | 5 Min           |
| 4      | Question / Answer<br><br>Establish relation between Universal Gas Constant and PVT?                     | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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### Lecture Plan -33

Faculty:- Semester:- III    Class:- ME    Course Code:- ME-201 E

Subject:- Thermodynamics    Unit:- VI

| S. No. | Topic :- Ideal and Real Gases  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Vander Waal's Equation of state briefly to be explained.           | 5 Min           |
| 2      | Division of the Topic<br><br>Vander Waal's Equation of state, Reduced co-ordinates.    | 35 Min          |
| 3.     | Conclusion<br><br>Vander Waal's Equation of state, Reduced co-ordinates to be studied. | 5 Min           |
| 4      | Question / Answer<br><br>Explain Vander Waal's Equation of State.                      | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
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### Lecture Plan -34

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- VI

| S. No. | Topic :- Ideal and Real Gases   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br>Compressibility factor to be studied in brief.                      | 5 Min           |
| 2      | Division of the Topic<br>Compressibility factor and Law of corresponding states.    | 35 Min          |
| 3.     | Conclusion<br>Compressibility factor and Law of corresponding states to be studied. | 5 Min           |
| 4      | Question / Answer<br>What is law of corresponding states?.                          | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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### Lecture Plan -35

Faculty:- Semester:- III Class:- ME Course Code:- ME-201 E

Subject:- Thermodynamics Unit:- VI

| S. No. | Topic :- Ideal and Real Gases  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br>Mass, Mole and Volume fraction briefly to be explained..         | 5 Min           |
| 2      | Division of the Topic<br>Mixture of Gases, Mass, Mole and Volume fraction.       | 35 Min          |
| 3.     | Conclusion<br>Mixture of Gases, Mass, Mole and Volume fraction to be completed.. | 5 Min           |
| 4      | Question / Answer<br>What is Mixture of Gases, Mass, Mole and Volume fraction?.  | 5 Min           |

Assignment to be given:- Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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### Lecture Plan-36

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- VI

| S. No. | Topic :- Ideal and Real Gases  | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br>Gibson Dalton's law, Gas constant and specific Heats briefly to be studied.  | 5 Min           |
| 2      | Division of the Topic<br>Gibson Dalton's law , Gas constant and specific Heats               | 35 Min          |
| 3.     | Conclusion<br>Gibson Dalton's law, Gas constant and specific Heats to be studied thoroughly. | 5 Min           |
| 4      | Question / Answer<br>What is Gibson Dalton's law?  | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

### Lecture Plan -37

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- VI

| S. No. | Topic :- Ideal and Real Gases   | Time Allotted:- |
|--------|---|-----------------|
| 1.     | Introduction<br><br>Entropy for a mixture of non- reactive gases briefly to be discussed.         | 5 Min           |
| 2      | Division of the Topic<br><br>Entropy for a mixture of non- reactive gases                         | 35 Min          |
| 3.     | Conclusion<br><br>Entropy for a mixture of non- reactive gases to be studied thoroughly.          | 5 Min           |
| 4      | Question / Answer<br><br>Establish the relation for Entropy for a mixture of non- reactive gases? | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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### **Lecture Plan -38**

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- VI

| <b>S. No.</b> | <b>Topic :- Ideal and Real Gases</b>  | <b>Time Allotted:-</b> |
|---------------|---|------------------------|
| 1.            | Introduction<br><br>Formula on entropy reviewed for Numerical problems.         | 5 Min                  |
| 2             | Division of the Topic<br><br>Numerical problems.                                | 35 Min                 |
| 3.            | Conclusion<br><br>Numerical problems to be solved.                              | 5 Min                  |
| 4             | Question / Answer<br><br>What is the entropy change during isothermal process?. | 5 Min                  |

Assignment to be given:- Explain compressibility factor and the law of corresponding states clearly.

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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### Lecture Plan -39

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- VII

| S. No. | Topic :- Thermodynamic Relations   | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>A brief idea about Max well Relations, Clapeyron Equation.     | 5 Min           |
| 2      | Division of the Topic<br><br>Max well Relations, Clapeyron Equation.               | 35 Min          |
| 3.     | Conclusion<br><br>Max well Relations, Clapeyron Equation to be studied thoroughly. | 5 Min           |
| 4      | Question / Answer<br><br>What is the application of Clapeyron Equation?            | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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### **Lecture Plan -40**

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- VII

| <b>S. No.</b> | <b>Topic :- Thermodynamic Relations</b>  | <b>Time Allotted:-</b> |
|---------------|--|------------------------|
| 1.            | Introduction<br><br>Enthalpy and internal energy & Entropy to be studied in brief..                      | 5 Min                  |
| 2             | Division of the Topic<br><br>Relations for changes in Enthalpy and internal energy & Entropy.            | 35 Min                 |
| 3.            | Conclusion<br><br>Relations for changes in Enthalpy and internal energy & Entropy to be completed.       | 5 Min                  |
| 4             | Question / Answer<br><br>Establish the Relations for changes in Enthalpy and internal energy & Entropy?. | 5 Min                  |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishnan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

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## Lecture Plan -41

Faculty:-

Semester:- III

Class:- ME

Course Code:- ME-201 E

Subject:- Thermodynamics

Unit:- VII

| S. No. | Topic :- Thermodynamic Relations                                     | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Specific heat capacity Relations to be briefed.  | 5 Min           |
| 2      | Division of the Topic<br><br>Specific heat capacity Relations.       | 35 Min          |
| 3.     | Conclusion<br><br>Specific heat capacity Relations to be explained.. | 5 Min           |
| 4      | Question / Answer<br><br>What are Specific heat capacity Relations?. | 5 Min           |

Assignment to be given:-

Nil

Reference Readings:-

Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag

## Lecture Plan -42

Faculty:- Semester:- III    Class:- ME    Course Code:- ME-201 E

Subject:- Thermodynamics    Unit:- VII

| S. No. | Topic :- Thermodynamic Relations   | Time Allotted:- |
|--------|--|-----------------|
| 1.     | Introduction<br><br>Joule Thomson coefficient & inversion curve briefly to be discussed. | 5 Min           |
| 2      | Division of the Topic<br><br>Joule Thomson coefficient & inversion curve.                | 35 Min          |
| 3.     | Conclusion<br><br>Joule Thomson coefficient & inversion curve to be studied.             | 5 Min           |
| 4      | Question / Answer<br><br>Explain Joule Thomson coefficient? .                            | 5 Min           |

Assignment to be given:- Explain in detail Max well Relations, Clapeyron Equation and their uses.

Reference Readings:- Engg. Thermodynamics – Jones & Dugan, E. Radhakrishan  
Theory & problems of Thermodynamics – Y.V.C.Rao  
Engg. Thermodynamics – C.P.Arora  
Engg. Thermodynamics – P. K. Nag