

ECAT Prep (Physics)

(Total Videos # 994)

Chapter # 01

Measurements (23 Videos)

1.1 Introduction to physics

1. Introduction to Physics

1.2 Islam and Science

2. Teaching of Islam and Science

1.3 Contribution to Physical Sciences by th

3. Contribution to Science By Muslim Scientists

1.4 Physical Quantities

4. Physical Quantities

5. Problem on Physical Quantities

1.5 International System of Units

6. International Systems of Base Units

7. Supplementary units

8. Scientific Notation

9. Conventions for Indicating units

1.6 Precision and Accuracy

10. Precision and Accuracy

1.7 Errors and Uncertainties

11. Errors and Uncertainty in Measurement

1.8 ignificant Figures

12. Introduction to Significant Figures

1.9 Precision and Accuracy

13. Precision and Accuracy

14. Problem on Precision and Accuracy

1.10 Assessment of Total Uncertainty in the Final result

15. Assessment of Total Uncertainty in the Final result

16. More on Assessment of Total Uncertainty in the Final result

17. Problem on Assessment of Total Uncertainty in the Final result

18. Problem on Assessment of Total Uncertainty in the Final result

1.11 Dimensions of Physical Quantities

19. Dimensions of Physical Quantities
20. More on Dimensions of Physical Quantities
21. Problem on Dimensions of Physical Quantities
22. Deriving a possible Formula
23. Problem on Deriving a possible Formula

Chapter # 02

Vectors and Equilibrium (46 Videos)

2.1 Basic Concepts of Vectors

1. Scalars and Vectors
2. Rectangular Coordinate system
3. Vector and its Representation
4. Addition of Forces
5. Problem 1 on Vector Addition and Subtraction
6. Problem 2 on Vector Addition and Subtraction
7. Resultant Vectors
8. Vectors Subtraction
9. Multiplication of Vector by a scalar

2.3 Division of a Vector by a Number (Non Z)

10. Division of a Vector by a Number (Non Zero)
11. Unit and Null vector
12. Problem on Unit and Null vector
13. Rectangular Components of a Vector

2.4 Free Vector

14. Free vector
15. Determination of a Vector from its Rectangular Components
16. Problem on Determination of a Vector from its Rectangular Components
17. Position and Equal Vectors

2.5 Vector Addition by Rectangular Componen

18. Vector Addition by Rectangular Components
19. Steps of vector Addition by Rectangular Components
20. Problem2 on Vector Addition by Rectangular Components
21. More on Problem2 on Vector Addition by Rectangular Components

2.6 Properties of Vector Addition

22. Commutative Property of Addition of Vectors
23. Associative Law of Vector Addition

2.7 Product of two Vectors

24. Product of two Vectors

- 25. Scalar or Dot product
- 26. Problem1 on Scalar or Dot product
- 27. Problem2 on Scalar or Dot product
- 28. Characteristics of Scalar Product
- 29. Vector or Cross Product
- 30. Characteristics of Cross Product
- 31. Example of Vector product
- 32. Problem1 on Vector or Cross Product
- 33. Problem2 on Vector or Cross Product

2.8 Torque

- 34. Introduction to Torque or Moment of a Force
- 35. More on Torque
- 36. Problem on More on Torque
- 37. Introduction to Couple

2.9 Equilibrium of Forces

- 38. Introduction to Equilibrium
- 39. Equilibrium of Bodies Under the Action of Coplanar Forces

2.10 Equilibrium of Torques

- 40. Conditions for Equilibrium
- 41. Problem 1 on Conditions for Equilibrium
- 42. Problem 2 on Conditions for Equilibrium
- 43. Problem 3 on Conditions for Equilibrium
- 44. Problem 4 on Conditions for Equilibrium

2.11 Centre of Mass

- 45. Center of Mass
- 46. More on Centre of Mass

Chapter # 03

Motion and Force (53 Videos)

3.1 Displacement

- 1. Difference between Distance and Displacement

3.2 Velocity

- 2. Introduction to velocity
- 3. Problem on Introduction to Velocity
- 4. Graphical Interpretation of Velocity and Instantaneous velocity
- 5. Instantaneous Velocity
- 6. Uniform Velocity
- 7. The Displacement-Time Graph

3.3 Acceleration

- 8. Introduction to Acceleration
- 9. Average Acceleration and Retardation
- 10. Problem on Introduction to Acceleration

3.4 Velocity - Time Graph

- 11. Speed-time Graph
- 12. Problem on Speed-Time Graph

3.5 Review of Equations of Uniformly Accele

- 13. Review of Equations of Uniformly Accelerated Motion
- 14. Problem on Review of Equations of Uniformly Accelerated Motion
- 15. Motion of Freely Falling Bodies

3.6 Newton's Laws of Motion

- 16. First Law of Newton
- 17. Second Law of Newton
- 18. Problem on Second Law of Newton
- 19. Third Law of Newton

3.7 Momentum

- 20. Advanced Momentum
- 21. Momentum and Newton's Second Law of motion
- 22. Impulse
- 23. Problem on Impulse
- 24. Newton's Second Law of motion for Changing Mass
- 25. Law of Conservation of Momentum
- 26. Problem1 on Law of Conservation of Momentum
- 27. Problem2 on Law of Conservation of Momentum

3.8 Elastic and Inelastic Collisions

- 28. Elastic and Inelastic Collisions
- 29. Elastic Collision in one Dimension
- 30. More on Elastic Collision in one Dimension
- 31. Some Cases of Elastic Collision
- 32. Problem on Elastic Collision in one Dimension

3.9 Force due to Water Flow

- 33. Force due to water Flow

3.10 Friction

- 34. Introduction to Friction
- 35. Problem on Introduction to Friction

3.11 Coefficient of Friction

- 36. Static and Kinetic Friction
- 37. Viscous Drag and Stokes Law

3.12 The Inclined Plane

- 38. The Inclined Plane
- 39. More on The Inclined Plane

- 40. Particular Cases
- 41. Problem on The Inclined Plane
- 3.13 Momentum and Explosive Forces**
 - 42. Momentum and Explosive Forces
- 3.14 Rocket Propulsion**
 - 43. Rocket Propulsion
- 3.15 Projectile Motion**
 - 44. Projectile Motion
 - 45. More on Projectile Motion
 - 46. Features of Projectile
 - 47. More on Features of Projectile
 - 48. Projectile Trajectory
 - 49. More on Projectile Trajectory
 - 50. Application to Ballistic Missiles
 - 51. problem1 on Features of Projectile
 - 52. problem2 on Features of Projectile
 - 53. More on Applications of Projectile Motion

Chapter # 04

Work and Energy (34 Videos)

- 4.1 Work Done by a Constant Force**
 - 1. Work Done by a Constant Forces
 - 2. Problem on Work Done by a Constant Force
- 4.2 Work Done By a Variable Force**
 - 3. Work Done By a Variable Forces
 - 4. Problem on Introduction to Work
- 4.3 Work done by Gravitational Field**
 - 5. Work done by Gravitational Field
 - 6. More on Work done by Gravitational Field
 - 7. Prove that the work done along a closed path in a gravitational Field
- 4.4 Power**
 - 8. Introduction to Power
 - 9. Power and velocity

4.5 Energy

10. Introduction to Energy
11. Kinetic Energy
12. Potential Energy
13. Work-Energy Principle
14. Problem on Work-Energy Principle
15. Absolute Potential Energy
16. More on Absolute Potential energy
17. Escape Velocity
18. Problem on Escape Velocity

4.6 Interconversion of Potential Energy and Kinetic Energy

19. Interconversion of Potential Energy and Kinetic Energy
20. problem on Interconversion of Potential Energy and Kinetic Energy

4.7 Conservation of Energy

21. Advance law of Conservation of Energy
22. Problem on Law of Conservation of Energy
23. Conservative and Non-Conservative Forces

4.8 Implication of Energy Losses in Practical Devices and Efficiency

24. Implication of Energy Losses in Practical Devices and Efficiency
25. Ideal Machine

4.9 Non Conventional Energy sources

26. Energy from Non-Renewable Sources
27. Energy from Tides
28. Energy from Waves
29. Solar Energy
30. Energy from Biomass
31. Energy from Waste product
32. Geothermal Energy
33. Wind Power
34. Nuclear Energy and Electrical Energy

Chapter # 05

Circular Motion (42 Videos)

5.1 Angular Displacement

1. Angular Displacement

- 2. More on Angular Displacement
- 5.2 Angular Velocity**
 - 3. Angular Velocity
- 5.3 Angular Acceleration**
 - 4. Angular Acceleration
- 5.4 Location of Axis**
 - 5. Location of Axis
- 5.5 Relation Between Angular and Linear Vel**
 - 6. Relation Between Angular and Linear Velocities
 - 7. Equation of Angular Motion
 - 8. Problem on Equation of Angular Motion
- 5.6 Centripetal Forces**
 - 9. Centripetal Forces
 - 10. More on Centripetal Forces
 - 11. Problem on Centripetal Forces
- 5.7 The Period**
 - 12. The Period
 - 13. Road Reaction
 - 14. A Vehicle Passing Through a Dip
 - 15. The Conical Pendulum
 - 16. Air Planes
 - 17. Cream Separators and Centrifuges
- 5.8 Moment of Inertia**
 - 18. Moment of Inertia
 - 19. More on Moment of Inertia
 - 20. Problem on Moment of Inertia
- 5.9 Angular Momentum**
 - 21. Angular Momentum
 - 22. More on Angular Momentum
 - 23. Problem on Angular Momentum
 - 24. Spin and Orbital Angular Momentum
- 5.10 Law of Conservation of Angular Momentum**
 - 25. Law of Conservation of Angular Momentum
 - 26. Problem on Law of Conservation of Angular Momentum
- 5.11 Rotational Kinetic Energy**
 - 27. Rotational Kinetic Energy
 - 28. Rotational Kinetic Energy of a Disc and Hoop
 - 29. Problem on Rotational Kinetic Energy of a Disc and Hoop
- 5.12 Artificial Satellites**
 - 30. Artificial Satellites

5.13 Real and Apparent weight

31. Real and Apparent weight

5.14 Weightlessness in Satellites and Gravity Free system

32. weightlessness in Satellites and Gravity Free system

5.15 Variation of g with Altitude and Depth

33. Variation of g with Altitude and Depth

34. More on Variation of g with Altitude and Depth

5.16 Weight

35. Difference Between Mass and Weight

5.17 Orbital Velocity

36. Orbital Velocity

37. Problem on Orbital Velocity

5.18 Artificial Gravity

38. Artificial Gravity

5.19 Geostationary Orbits

39. Geostationary Orbits

5.20 Communication Satellites

40. Communication Satellites

5.21 Newton's and Einstein's Views of Gravitation

41. Newton's and Einstein's Views of Gravitation

42. Effect of Gravity of Space Time

Chapter # 06

Fluid Dynamics (18 Videos)

6.1 Viscous Drag and Stokes Law

1. Viscous Drag and Stokes Law

2. Problem on Viscous Drag and Stokes Law

6.2 Terminal Velocity

3. Advanced Terminal Velocity

4. Problem on Terminal velocity

5. Terminal Velocity of Paratrooper

6.3 Fluid Flow

6. Fluid Flow

7. Turbulent Flow

6.4 Equation of Continuity

8. Equation of Continuity
9. problem on Equation of Continuity

6.5 Bernoulli's Equation

10. Bernoulli's Equation
11. More on Bernoulli's Equation

6.6 Applications of Bernoulli's Equation

12. Torricelli's Theorem
13. Relation Between Speed and Pressure of the Fluid
14. More on Relation Between Speed and Pressure of the Fluid
15. Venturi Relation
16. Problem on Venturi Relation
17. Blood Flow
18. Applications of Bernoulli's Equation

Chapter # 07

Oscillations (23 Videos)

7.1 Simple Harmonic Motion

1. Simple Harmonic Motion
2. More on Simple Harmonic Motion
3. Instantaneous Displacement and Amplitude of Vibration
4. Some other Parameters of Simple Harmonic Motion
5. Problem on Parameters of Simple Harmonic Motion

7.2 SHM and Uniform Circular Motion

6. SHM and Uniform Circular Motion
7. Problem on SHM and Uniform Circular Motion
8. Displacement
9. Instantaneous Velocity of Mass Spring System
10. Acceleration in Terms of ?

7.3 Phase

11. Phase

7.4 Horizontal Mass Spring system

12. A Horizontal Mass Spring system
13. Problem on A Horizontal Mass Spring system

7.5 Simple Pendulum

14. Simple Pendulum
15. Problem on Simple Pendulum

7.6 Energy conservation in SHM

- 16. Energy conservation in SHM
- 17. More on Energy conservation in SHM
- 18. Problem on Energy conservation in SHM
- 7.7 Free and Forced Oscillations**
 - 19. Free and Forced Oscillations
- 7.8 Resonance**
 - 20. Introduction to Resonance
 - 21. Advantages and Disadvantages of Resonance
- 7.9 Damped Oscillations**
 - 22. Damped Oscillations
- 7.10 Sharpness of Resonance**
 - 23. Sharpness of Resonance

Chapter # 08

Waves (56 Videos)

- 8.1 Progressive Waves**
 - 1. Progressive Waves
 - 2. Necessary Conditions for Wave motion
 - 3. Transverse and Longitudinal Waves
- 8.2 Analytical Treatment of Travelling waves**
 - 4. Analytical Treatment of Travelling waves
- 8.3 Periodic Waves**
 - 5. Periodic Waves
 - 6. Transverse periodic Waves
 - 7. Phase Relationship between two Points on a Wave
 - 8. Longitudinal Periodic Waves
- 8.4 Energy in Waves**
 - 9. Energy in Waves
- 8.5 Speed of Sound in Air**
 - 10. Binomial Theorem
 - 11. Speed of Sound in Air
 - 12. Laplace's Correction
 - 13. Effects of Various Factors on Speed of Sound in Air
 - 14. More on Effects of Various Factors on Speed of Sound in Air
 - 15. More on Effects of Various Factors on Speed of Sound in Air
 - 16. Problem on Effects of Various Factors on Speed of Sound in Air

8.6 Principle of Superposition

17. Principle of Superposition

8.7 Interference

18. Interference

19. More on Interference

20. More on Interference

21. Problem on Interference

8.8 Beats

22. Beats

23. More on Beats

24. problem on Beats

Uses of Beats

8.9 Reflection of waves

25. Reflection of waves

26. Reflection of Sound Waves

8.10 Acoustics

27. Acoustics

28. More on Acoustics

8.11 Stationary waves

29. Stationary waves

30. More on Stationary waves

8.12 Stationary waves in a Stretched String

31. Stationary waves in a Stretched String

32. More on Stationary waves in a Stretched String

33. Fundamental and Overtone Vibration

34. Problem on Stationary Waves in Stretched String

8.13 Stationary Waves in Air Columns

35. Stationary Waves in Air Columns

36. More on Stationary Waves in Air Columns

37. Problem on Stationary Waves in Air Columns

8.14 Sonometer

38. Sonometer

8.15 Musical Sound and Noise

39. Musical Sound and Noise

40. Characteristics of a Musical Sound

41. Loudness of Sound

42. Quality of Sound

43. Pitch of Sound

44. Sound Intensity and Sound Level

45. More on Sound Intensity and Sound Level

8.16 Doppler Effect

- 46. Doppler Effect
- 47. Doppler Effect: When Source at Rest, Observer is Moving
- 48. Doppler Effect: When Observer at Rest, Source is Moving
- 49. Doppler Effect: When both Source and Observer are Moving
- 50. Problem on Doppler Effect
- 51. Applications of Doppler Effect
- 52. More on Applications of Doppler Effect
- 53. More on Applications of Doppler Effect

8.17 Ultrasonic Waves

- 54. Ultrasonic Waves
- 55. Uses of Ultrasonic Waves

Chapter # 09

Physical Optics (33 Videos)

9.1 Nature of Light

- 1. Nature of Light
- 2. More on Nature of Light

9.2 Wave Fronts

- 3. Wave Fronts

9.3 Huygen's principle

- 4. Huygen's principle

9.4 Coherent sources

- 5. Coherent sources

9.5 Interference of Light Waves

- 6. Interference of Light Waves

9.6 Young's Double slit Experiment

- 7. Young's Double slit Experiment
- 8. More on Young's Double slit Experiment
- 9. More on Young's Double slit Experiment
- 10. More on Young's Double slit Experiment
- 11. problem on Young's Double slit Experiment

9.7 Interference in Thin Films

- 12. Interference in Thin Films
- 13. Wedge Shaped Film

9.8 Newton's Rings

- 14. Newton's Rings

9.9 Michelson's Interferometer

15. Michelson's Interferometer

16. Michelson's Interferometer

9.10 Diffraction of Light

17. Diffraction of Light

9.11 Diffraction due to a Narrow slit

18. Diffraction due to a Narrow slit

19. Fresnel Diffraction

20. Fraunhofer Diffraction

9.12 Diffraction Grating

21. Diffraction Grating

22. More on Diffraction Grating

23. Problem on Diffraction Grating

24. More on Problem on Diffraction Grating

9.13 Diffraction of X-Rays by Crystals

25. Diffraction of X-Rays by Crystals

26. More on Diffraction of X-Rays by Crystals

27. Problem on Diffraction of X-Rays by Crystals

9.14 Polarization

28. Polarization

29. Production and Detection of Plane Polarized Light

30. Polarization by Reflection

31. Applications of Polarized Light

32. More on Applications of Polarized Light

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Chapter # 10

Optical Instruments (38 Videos)

10.1 Lenses

1. Types of Lenses

10.2 Image Formation

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10.3 The Thin Lens Formula

4. Convex Lense Formula

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- 7. Combination of Thin Lenses
- 8. Power of a Lens
- 9. Defects of Lenses
- 10. Correction of Defects
- 11. Linear Magnification of Lenses

10.4 Least Distance of Distinct Vision

- 12. Least Distance of Distinct Vision

10.5 Magnifying Power and Resolving power of

- 13. Magnifying power and Resolving power of Optical Instruments
- 14. More on Magnifying power and Resolving power of Optical Instruments

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- 15. Simple Microscope
- 16. Problem on Simple Microscope

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- 17. Compound Microscope
- 18. More on Compound Microscope
- 19. Problem on Compound Microscope
- 20. More on Problem on Compound Microscope

10.8 Astronomical Telescope

- 21. Astronomical Telescope
- 22. Galilean Telescope
- 23. Terrestrial Telescope
- 24. Reflecting Telescope
- 25. Problem on Astronomical Telescope

10.9 Spectrometer

- 26. Spectrometer

10.10 The Eye

- 27. Image Formation in Human Eye

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- 29. Introduction to Fibre Optics

10.13 Fibre Optic Principles

- 30. Optical Fiber
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10.14 Types of Optical Fibres

- 32. Types of Optical Fibres
- 33. Single Mode Step Index Fibre
- 34. Multimode Step Index Fibre
- 35. Multimode Graded Index Fibre
- 36. Problem on Optical Fibres

10.15 **Signal Transmission and Conversion to Sound**

37. Signal Transmission and Conversion to sound

10.16 **Losses of Power**

38. Losses of power

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Heat and Thermodynamics (62 Videos)

11.1 **Review of Gas Laws**

1. Boyle's Law
2. Problem on Boyles law
3. Charle's Law

11.2 **Thermal Equilibrium**

4. Thermal Equilibrium

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5. General Gas Equation
6. Problem on General Gas Equation

11.4 **Kinetic Theory of Gasses**

7. Kinetic Theory of Gases
8. Interpretation of Pressure on Kinetic Theory of Gases
9. More on Interpretation of Pressure on Kinetic Theory of Gases-part1
10. More on Interpretation of Pressure on Kinetic Theory of Gases-part2
11. Problem on Interpretation of Pressure
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14. Derivation of Gas Laws
15. Problem on Derivation of Gas Laws
16. Boltzmann's Constant and Avogadro's Number

11.5 **Internal Energy**

17. Internal Energy

11.6 **Work and Heat**

18. Heat and Work

11.7 **Equivalence of Heat and Work**

19. Equivalence of Heat and Work
20. Thermodynamic System
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11.8 **First Law of Thermodynamics**

22. First Law of Thermodynamics

- 23. Problem on First Law of Thermodynamics
- 24. Special Cases
- 25. Isothermal Process
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11.9 Specific Heat Capacity

- 29. Specific Heat of Solids and Liquids

11.10 Determination of The Specific Heat Capacity

- 30. Measurement of specific Heat Capacity
- 31. More on Measurement of Specific Heat

11.11 Molar Specific Heats of a Gas

- 32. Molar Specific Heat of a Gas
- 33. Constant Volume Molar Specific heat of a Gas (C_v)
- 34. Constant Pressure Molar Specific heat of a Gas (C_p)
- 35. Derivation of $C_p - C_v = R$

11.12 Reversible and Irreversible Processes

- 36. Reversible and Irreversible Processes

11.13 Heat Engine

- 37. Heat Engine

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- 38. Second Law of Thermodynamics
- 39. More on Second Law of Thermodynamics

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- 40. Carnot Engine
- 41. More on Carnot Engine-part1
- 42. More on Carnot Engine-part2
- 43. Problem on Carnot Engine

11.16 Scales of Temperature

- 44. Scales of Temperature

11.17 Thermodynamic Scale of Temperature

- 45. Thermodynamic Scale of Temperature

11.18 Thermometric Properties

- 46. Thermometric Properties

11.19 Thermal Expansion

- 47. Thermal Expansion
- 48. Linear Thermal Expansion in Solids
- 49. More on Linear Thermal Expansion in Solids
- 50. Problem on Linear Thermal Expansion in Solids

11.20 Volume Expansion

- 51. Volume Thermal Expansion in Solids

52. Problem on Volume Thermal Expansion in Solids

11.21 Bimetallic Thermostat

53. Bimetallic Thermostat

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11.22 Petrol Engine

55. Petrol Engine

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58. Coefficient of Performance

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59. Entropy

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11.24 Environmental Crisis as Entropy Crisis

62. Entropy Crises

Chapter # 12

Electrostatics (62 Videos)

12.1 Coulomb's Law

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2. More on Coulomb's Law

3. Problem-Coulomb's Law

12.2 Fields of Force

4. Fields of Force

5. More on Fields of Force

6. Problem-Field of Force

7. Intensity of Electric Field

12.3 Electric Field Lines

8. Electric Field Lines

12.4 Applications of Electrostatics

9. Xerography (Photocopier)

10. Inkjet Printers

12.5 Electric Flux

11. Electric Flux

12. Problem-Electric Flux

12.6 Electric Flux Through a Surface Enclosing a Charge

- 13. Electric Flux Through a Surface Enclosing a Charge
- 14. Problem-Electric Flux Through a Surface Enclosing a Charge

12.7 Gauss's Law

- 15. Gauss's Law
- 16. Problem-Gauss's Law

12.8 Applications of Gauss's Law

- 17. Absence of Electric Field and Absence of Charge Inside a Conductor
- 18. More on Absence of Electric Field and Absence of Charge Inside a Cond
- 19. Intensity of Field Inside a Hollow Charged Sphere
- 20. Electric Intensity Due to an Infinite Sheet of Charge
- 21. Problem-Electric Intensity Due to an Infinite Sheet of Charge
- 22. Electric Intensity Between Two Oppositely Charged Parallel Plates
- 23. Problem-Electric Intensity Between Two Oppositely Charged Parallel PI

12.9 Electric Potential

- 24. Electric Potential
- 25. Problem-Electric Potential
- 26. Electric Field as Potential Gradient
- 27. Problem-Electric Field as Potential Gradient
- 28. Relation Between Electric Field and Potential
- 29. Electric Potential at a Point due to a Point Charge
- 30. More on Electric Potential at a Point due to a Point Charge
- 31. More on Electric Potential at a Point due to a Point Charge
- 32. Problem-Electric Potential at a Point due to a Point Charge

12.10 Absolute Potential at a Point

- 33. Absolute Potential at a Point

12.11 Electron Volt

- 34. Electron Volt
- 35. Problem-Electron Volt
- 36. Equipotential Surfaces

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- 37. Electric and Gravitational Forces (A Comparison)
- 38. Problem-Electric and Gravitational Forces (A Comparison)

12.13 Charge on an Electron by Millikan's Method

- 39. Charge on an Electron by Millikan's Method
- 40. More on Charge on an Electron by Millikan's Method
- 41. Problem-Charge on an Electron by Millikan's Method

12.14 Capacitor

- 42. Capacitor
- 43. Problem-Capacitor

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- 44. Capacitance of a Parallel Plate Capacitor
- 45. Problem-Capacitance of a Parallel Plate Capacitor

12.16 **Combinations of Capacitor**

- 46. Parallel Combination
- 47. Problem-Parallel Combination of Capacitors
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12.17 **Different Types of Capacitors**

- 50. Multiplate Capacitor
- 51. Variable Capacitor
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12.18 **Electric Polarization of Dielectrics**

- 53. Electric Polarization of Dielectrics

12.19 **Energy Stored in a Capacitor**

- 54. Energy Stored in a Capacitor
- 55. More on Energy Stored in a Capacitor
- 56. Problem1-Energy Stored in a Capacitor
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12.20 **Charging and Discharging a Capacitor**

- 58. Charging and Discharging a Capacitor
- 59. More on Charging and Discharging a Capacitor-part1
- 60. More on Charging and Discharging a Capacitor-part2
- 61. More on Charging and Discharging a Capacitor-part3
- 62. Problem-Charging and Discharging a Capacitor

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Current Electricity (55 Videos)

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- 1. Electric Current
- 2. Problem-Electric Current
- 3. Current Through a Metallic Conductor
- 4. Problem-Current Through a Metallic Conductor

13.2 **Source of Current**

- 5. Source of Current

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- 6. Effects of Current
- 7. More on Effects of Current

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10. Problem-Ohm's Law
11. Applications of Ohm's Law in Circuit Analysis
12. Applications of Ohm's Law in Circuit Analysis
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14. Problem1-Review of Series and Parallel Combination of Resistors
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16. Resistivity and Conductivity
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13.6 Resistivity and its Dependence Upon Temperature

18. Resistivity and its Dependence Upon Temperature
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13.7 Colour Code for Carbon Resistances

21. Colour Code for Carbon Resistances
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24. Rheostat
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26. Thermistors

13.8 Electrical Power and Power Dissipation in Resistors

27. Electrical Power and Power Dissipation in Resistors
28. Problem-Electrical Power and Power Dissipation in Resistors

13.9 Electromotive Force (EMF) and Potential Difference

29. Electromotive Force (EMF) and Potential Difference
30. More on Electromotive Force (EMF) and Potential Difference
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13.10 Kirchhoff's Rules

32. Relation Between Electromotive Force and Potential Difference and Int
33. More on Relation Between Electromotive Force and Potential Difference
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37. Kirchhoff's First Rules
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41. Node Analysis
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13.11 **Wheatstone Bridge**

46. Wheatstone Bridge

47. Problem-Wheatstone Bridge

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49. Meter Bridge

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13.13 **Post Office Box (P.O. Box)**

51. Post Office Box (P.O. Box)

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Chapter # 14

Electromagnetism (48 Videos)

14.1 **Magnetic Field Due to Current in a Long**

1. Magnetism and Electromagnetism

2. Magnetic Field Due to Current in a Long Straight Wire

3. Problem-Magnetic Field Due to Current in a Long Straight Wire

14.2 **Force on a Current Carrying Conductor i**

4. Force on a Current Carrying Conductor in a Uniform B Field

5. More on Force on a Current Carrying Conductor in a Uniform B Field

6. Problem1-Force on a Current Carrying Conductor Place in a Magnetic Fi

7. Problem2-Force on a Current Carrying Conductor Place in a Magnetic Fi

14.3 **Magnetic Flux and Flux Density**

8. Magnetic Flux and Flux Density

9. Problem-Magnetic Flux and Flux Density

14.4 **Ampere's Law and Determination of Flux**

10. Ampere's Law and Determination of Flux Density B

11. More on Ampere's Law and Determination of Flux Density B

12. Problem-Ampere's Law and Determination of Flux Density B

13. Field Due to a Current Carrying Solenoid

14. More on Field Due to a Current Carrying Solenoid

15. Problem-Field Due to a Current Carrying Solenoid

- 16. Toroidal Field
- 17. More on Toroidal Field
- 18. Problem-Toroidal Field

14.5 Force on a Moving Charge in a Magnetic

- 19. Force on a Moving Charge in a Magnetic Field
- 20. More on Force on a Moving Charge in a Magnetic Field
- 21. Problem-Force on a Moving Charge in a Magnetic Field
- 22. Circular Trajectory of a Charged Particle in a Magnetic Field

14.6 Motion of Charged Particle in an E and B Field

- 23. Motion of Charged Particle in an Electric and Magnetic Field
- 24. Problem-Motion of Charged Particle in an Electric and Magnetic Field
- 25. Cross Electric and Magnetic Fields; Velocity Selector

14.7 Determination of e/m of an Electron

- 26. Determination of e/m of an Electron
- 27. More on Determination of e/m of an Electron
- 28. Problem-Determination of e/m of an Electron

14.8 Cathode Ray Oscilloscope

- 29. Cathode Ray Oscilloscope
- 30. Uses of CRO

14.9 Torque on a Current Carrying Coil

- 31. Torque on a Current Carrying Coil in a Magnetic Field
- 32. More on Torque on a Current Carrying Coil in a Magnetic Field
- 33. Problem-Torque on a Current Carrying Coil in a Magnetic Field

14.10 Galvanometer

- 34. Galvanometer
- 35. More on Galvanometer
- 36. Ammeter
- 37. More on Ammeter
- 38. Problem-Ammeter
- 39. Multi-Range Ammeter
- 40. Voltmeter
- 41. More on Voltmeter
- 42. Problem-Voltmeter

14.11 AVO meter-Multimeter

- 43. Ohmmeter
- 44. AVO meter - Multimeter
- 45. Multi-Range D.C. Voltmeter
- 46. Multi-Range A.C. Voltmeter
- 47. Multi-Range Ohmmeter
- 48. Motion of a Charge Particle in Electric Field

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Electromagnetic Induction (38 Videos)

15.1 Induced EMF and Induced Current

1. Induced EMF and Induced Current
2. More on Induced EMF and Induced Current

15.2 Motional EMF

3. Motional EMF
4. More on Motional EMF
5. Problem-Motional EMF

15.3 Faraday's Law and Induced EMF

6. Faraday's Law and Induced EMF
7. Problem-Faraday's Law and Induced EMF

15.4 Lenz's Law and Direction of Induced EMF

8. Lenz's Law and Direction of Induced EMF
9. Problem-Lenz's Law and Direction of Induced EMF

15.5 Mutual Induction

10. Mutual Induction
11. More on Mutual Induction
12. Problem-Mutual Induction

15.6 Self Induction

13. Self Induction
14. Problem-Self Induction
15. Self Inductance of a Solenoid
16. Non-Inductive Wire Wound Resistance

15.7 Energy Stored in an Inductor

17. Energy Stored in an Inductor
18. More on Energy Stored in an Inductor
19. Problem1-Energy Stored in an Inductor
20. Problem2-Energy Stored in an Inductor

15.8 Alternating Current Generator

21. Alternating Current Generator
22. More on Alternating Current Generator
23. More on Alternating Current Generator
24. Problem-Alternating Current Generator

15.9 D.C. Generator

25. D.C. Generator

15.10 Back Motor Effect in Generator

26. Back Motor Effect in Generator

15.11 **D.C. Motor**

- 27. Motor
- 28. Electric Motor
- 29. More on Electric Motor

15.12 **Back EMF Effect in Motors**

- 30. Back EMF Effect in Motors
- 31. Problem1-Back EMF Effect in Motors
- 32. Problem2-Back EMF Effect in Motors
- 33. Problem3-Back EMF Effect in Motors

15.13 **Transformer**

- 34. Transformer
- 35. More on Transformer
- 36. Problem-Transformer
- 37. Sources of Power Loss in Transformer
- 38. Power Transmission

Chapter # 16

Alternating Current (68 Videos)

16.1 **Alternating Current**

- 1. Alternating Current
- 2. More on Alternating Current
- 3. More on Alternating Current
- 4. Problem-Alternating Current

16.2 **A.C. Circuits**

- 5. Phase of A.C.
- 6. Phase of A.C.
- 7. Initial Phase and The Phase Change
- 8. More on Initial Phase and The Phase Change
- 9. More on Initial Phase and The Phase Change
- 10. Vector Representation of an Alternating Current
- 11. A.C. Circuits

16.3 **A.C. Through a Resistor**

- 12. Through a Resistor
- 13. More on A.C. Through a Resistor
- 14. Problem1-A.C. Through a Resistor
- 15. Problem2-A.C. Through a Resistor

16.4 **A.C. Through a Capacitor**

- 16. A.C. Through a Capacitor

- 17. More on A.C. Through a Capacitor
- 18. More on A.C. Through a Capacitor
- 19. Reactance of Capacitive Circuit
- 20. Problem-A.C. Through a Capacitor
- 21. More on Problem-A.C. Through a Capacitor
- 22. Problem-Capacitive Reactance

16.5 A.C. Through an Inductor

- 23. Through an Inductor
- 24. more on A.C. Through an Inductor
- 25. Problem-A.C. Through an Inductor
- 26. A.C. Through Resistor and Inductor in Series
- 27. More on A.C. Through Resistor and Inductor in Series
- 28. A.C. Through Resistor and Capacitor in Series
- 29. More on A.C. Through Resistor and Capacitor in Series

16.6 Impedance

- 30. Impedance
- 31. Problem1-Impedance
- 32. Problem2-Impedance
- 33. Inductive Choke
- 34. Phasors; Phasor Diagrams
- 35. More on Phasors; Phasor Diagrams

16.7 R-C and R-L Series Circuits

- 36. R-C and R-L Series Circuits
- 37. More on R-C and R-L Series Circuits
- 38. More on R-C and R-L Series Circuits
- 39. More on R-C and R-L Series Circuits
- 40. Problem1-R-C and R-L Series Circuits
- 41. Problem2-R-C and R-L Series Circuits
- 42. More on Problem2-R-C and R-L Series Circuits

16.8 Power in A.C. Circuits

- 43. Power in A.C. Circuits
- 44. More on Power in A.C. Circuits
- 45. Problem-Power in A.C. Circuits
- 46. More on Problem-Power in A.C. Circuits

16.9 Series Resonance Circuits

- 47. Series Resonance Circuits
- 48. More on Series Resonance Circuits

16.10 Parallel Resonance Circuits

- 49. Parallel Resonance Circuits
- 50. More on Parallel Resonance Circuits
- 51. RLC Series AC Circuit
- 52. More on RLC Series AC Circuit
- 53. Problem-RLC Series AC Circuit

16.11 **Three Phase A.C. Supply**

54. Three Phase A.C. Supply

16.12 **Principle of Metal Detectors**

55. Principle of Metal Detectors

16.13 **Choke**

56. Choke

16.14 **Electromagnetic Waves**

57. Electromagnetic Waves

58. Electric Field Due to a Changing Magnetic Flux

59. Magnetic Field Due to a Changing Electric Flux

60. More on Magnetic Field Due to a Changing Electric Flux

16.15 **Principle of Generation, Transmission and Reception of Electromagnetic Waves**

61. Principle of Generation of e.m Waves

62. Principle of Transmission and Reception

63. Radiation From Antenna

64. Electronic Systems

65. More on Transmission and Reception of Information

66. More on Transmission and Reception of Information

16.16 **Modulation**

67. Modulation

68. Percentage of Modulation

69. Sidebands

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Physics of Solids (43 Videos)

17.1 **Classification of Solids**

1. Crystalline and Amorphous or Glassy Solids

2. Polymeric Solids and Crystal Lattice

3. Crystal Lattice and Unit Cell

17.2 **Mechanical Properties of Solids**

4. Deformation in Solids

5. Stress and Strain

6. More on Stress and Strain

7. Problem-Stress and Strain

8. Elastic Constants

9. Tensile and Compressive Stress and Strain

10. Problem-Tensile and Compressive Stress and Strain
11. Bulk Stress and Strain; Bulk Modulus
12. Problem-Bulk Stress and Strain; Bulk Modulus
13. Shear Stress and Strain; Shear Modulus
14. Elasticity and Plasticity
15. Elastic Limit and Yield Strength
16. Problem-Elastic Limit and Yield Strength
17. Problem-Elastic Limit and Yield Strength
18. More on Energy Stored in a Stretched Force
19. Strain Energy in Deformed Materials
20. More on Strain Energy in Deformed Materials

17.3 Electrical Properties of Solids

21. Electrical Properties of Solids
22. Energy Band Theory
23. Free Electron Theory
24. Insulators and Conductors
25. Semiconductors

17.4 Atomic Binding in Semi Conductors

26. Atomic Binding in Semi Conductors

17.5 Preparation of Semi Conductors

27. Preparation of Semi Conductors
28. More on Preparation of Semi Conductors

17.6 Crystallography

29. Crystallography
30. Intrinsic Semiconductors
31. Extrinsic Semiconductors
32. Conduction by Electrons and Holes in Semiconductors

17.7 Superconductors

33. Superconductors
34. More on Superconductors

17.8 Magnetic Properties of Solids

35. Magnetic Properties of Solids
36. Atomic Origin of Magnetism
37. Paramagnetic Material
38. Diamagnetic Material
39. More on Diamagnetic Material
40. Origin of Ferromagnetism
41. More on Origin of Ferromagnetism
42. Hysterises Loop
43. More on Hysterises Loop

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Electronics (59 Videos)

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1. Brief Review of p-n Junction and its Characteristics
2. More on Brief Review of p-n Junction and its Characteristics
3. More on Brief Review of p-n Junction and its Characteristics
4. More on Brief Review of p-n Junction and its Characteristics
5. Characteristic Curve of a P-N Junction (Diode)
6. Characteristic Curve of a P-N Junction (Diode)
7. Reverse Biased p-n Junction

18.2 Rectification

8. Rectification
9. Half Wave Rectification
10. Full Wave Rectification
11. Centre-Tape Full-Wave Rectifier
12. Full-Wave Bridge Rectifier

18.3 Specially Designed p-n Junction

13. Full-Wave Bridge Rectifier
14. More on Light Emitting Diode
15. Photo Diode
16. More on Photo Diode
17. Photo-Voltaic Cell
18. More on Photo-Voltaic Cell
19. Zener Diodes

18.4 Transistors

20. Transistors
21. More on The Transistor
22. Problem- Transistors
23. Problem- Transistors
24. Problem- Current Flow in a n-p-n Transistor
25. Transistor Action
26. More on Transistor Action
27. transistor Configurations
28. Uses of Tansistors
29. Working of p-n-p Transistor

18.5 Transistor as an Amplifier

30. Transistor as an Amplifier
31. More on Transistor as an Amplifier
32. More on Transistor as an Amplifier

18.6 Transistor as a Switch

- 33. Transistor as a Switch
- 34. More on Transistor as a Switch
- 18.7 Operational Amplifier**
 - 35. Operational Amplifier
 - 36. More on Operational Amplifier
 - 37. Characteristics of op-amp
- 18.8 OP-AMP as Inverting Amplifier**
 - 38. OP-AMP as Inverting Amplifier
 - 39. More on OP AMP as Inverting Amplifier
 - 40. Problem- OP-AMP as Inverting Amplifier
- 18.9 OP-AMP as Non-Inverting Amplifier**
 - 41. OP-AMP as Non-Inverting Amplifier
 - 42. Problem- OP-AMP as Non-Inverting Amplifier
 - 43. Operational Amplifier Adder or Summer
- 18.10 OP-AMP as a Comparator**
 - 44. OP-AMP as a Comparator
- 18.11 Comparator as a Night Switch**
 - 45. Comparator as a Night Switch
- 18.12 Digital Systems**
 - 46. Digital Systems
- 18.13 Fundamental Logic Gates**
 - 47. Fundamental Logic Gates
 - 48. OR Gate
 - 49. AND Gate
 - 50. NOT Gate
- 18.14 Other Logic Gates**
 - 51. Other Logic Gates
 - 52. NOR Gate
 - 53. NAND Gate
 - 54. Exclusive OR Gate(XOR)
 - 55. Exclusive - NOR Gate (XNOR)
 - 56. Problem-Exclusive - NOR Gate (XNOR)
- 18.15 Applications of Gates in Control Systems**
 - 57. Control Systems Using Logic Gates
 - 58. Problem-Control Systems Using Logic Gates
 - 59. More on Control Systems Using Logic Gates

Chapter # 19

Dawn of Modern Physics (62 Videos)

19.1 Relative Motion

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19.2 Frames of Reference

2. Frames of Reference
3. Frames of Reference
4. Frames of Reference in Uniform Relative Motion
5. More on Frames of Reference in Uniform Relative Motion
6. More on Frames of Reference in Uniform Relative Motion

19.3 Special Theory of Relativity

7. Special Theory of Relativity
8. More on Special Theory of Relativity
9. Time Dilation
10. Problem-Time Dilation
11. Length Contraction
12. Problem-Length Contraction
13. Mass Variation
14. Problem-Mass Variation
15. Mass energy relation
16. Problem-Energy - Mass Relation
17. NAVSTAR Navigation System

19.4 Black Body Radiation

18. Black Body Radiation
19. 1-More on Black-Body Radiation
20. 2-More on Black-Body Radiation
21. Problem1-Black Body Radiation
22. Problem2-Black Body Radiation
23. Planck's Assumption
24. More on Planck's Assumption
25. Problem-Planck's Assumption
26. The Photon
27. More on The Photon
28. Problem-The Photon

19.5 Interaction of Electromagnetic Radiatio

29. Interaction of Electromagnetic Radiation With Matter
30. Photoelectric Effect
31. More on Photoelectric effect
32. 2-More on Photoelectric Effect
33. 3-More on Photoelectric Effect
34. Problem-Photoelectric Effect
35. Explanation on the Basis of Quantum Theory
36. More on Explanation on the Basis of Quantum Theory
37. Problem-Explanation on the Basis of Quantum Theory

- 38. Photocell
- 39. More on Photocell
- 40. Compton Effect
- 41. 1-More on Compton Effect
- 42. 2-More on Compton Effect
- 43. Problem-Compton Effect
- 44. Pair Production
- 45. More on Pair Production
- 46. Problem-Pair Production

19.6 Annihilation of Matter

- 47. Annihilation of Matter

19.7 Wave Nature of Particles

- 48. Wave Nature of Particles
- 49. More on Wave Nature of Particles
- 50. Davisson and Germer Experiment
- 51. More on Davisson and Germer Experiment
- 52. Problem-Davisson and Germer Experiment
- 53. Wave Particle Duality
- 54. More on Wave Particle Duality
- 55. Uses of Wave Nature of Particles
- 56. Electron Microscope
- 57. More on Electron Microscope

19.8 Uncertainty Principle

- 58. Uncertainty Principle
- 59. 1-More on Uncertainty Principle
- 60. 2-More on Uncertainty Principle
- 61. Problem1-Uncertainty Principle
- 62. Problem2-Uncertainty Principle

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Atomic Spectra (45 Videos)

20.1 Atomic Spectra

- 1. Atomic Spectra
- 2. More on Atomic Spectra
- 3. More on Atomic Spectra
- 4. Atomic Spectrum of Hydrogen
- 5. Atomic Spectrum of Hydrogen
- 6. Atomic Spectrum of Hydrogen
- 7. Atomic Spectrum of Hydrogen

20.2 Bohr's Model of the Hydrogen Atom

8. Bohr's Model of the Hydrogen Atom
9. Problem-Bohr's Model of the Hydrogen Atom
10. De-Broglie's Interpretation of Bohr's Orbits
11. De-Broglie's Interpretation of Bohr's Orbits
12. More on Energy Level Diagram
13. Success and Failure of Bohr's Theory
14. Quantized Radii
15. More on Quantized Radii
16. Problem-Quantized Radii
17. Quantized Energies
18. More on Quantized Energies
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20. Hydrogen Emission Spectrum
21. Excitation and Ionization Potential
22. more on Excitation and Ionization Potential

20.3 Inner Shell Transitions and Characteris

23. Inner Shell Transitions and Characteristic X-Rays
24. Production of X-Rays
25. More on Production of X-Rays
26. Problem-Production of X-Rays
27. The Continuous X-Ray Spectrum
28. Properties of X-Rays
29. More on Properties of X-Rays
30. Uses of X-Ray
31. CAT - Scanner
32. Biological Effects of X-Rays

20.4 Uncertainty Within the Atom

33. Uncertainty Within the Atom

20.5 Laser

34. More on Uncertainty Within the Atom
35. Laser
36. More on Laser
37. Spontaneous and Stimulated Emission
38. Population Inversion and Laser Action
39. More on Population Inversion and Laser Action
40. Ruby Laser
41. Helium - Neon Laser
42. Uses of Laser in Medicine and Industry
43. Kinds of Lasers
44. More on Kinds of Lasers
45. More on Kinds of Lasers

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Nuclear Physics (85 Videos)

21.1 Atomic Nucleus

1. Thomson Atomic Model
2. Rutherford's Scattering Experiment
3. More on Rutherford's Scattering Experiment
4. Atomic Nucleus
5. Atomic Nucleus

21.2 Isotopes

6. Isotopes and Isobars
7. 1-More on Isotopes and Isobars
8. 2-More on Isotopes and Isobars
9. Mass Spectrograph
10. More on Mass Spectrograph

21.3 Mass Defect and Binding Energy

11. Mass Defect and Binding Energy
12. 2-More on Mass Defect and Binding Energy
13. Mass defect and binding energy-problem
14. Mass defect and binding energy-problem

21.4 Radioactivity

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16. Alpha Emission
17. Beta Emission
18. Gamma Emission
19. Laws of Radioactive decay
20. More on Laws of Radioactive decay
21. More on Laws of Radioactive decay
22. Radioactive decay law-problem

21.5 Half Life

23. Half Life
24. 1-More on Half Life
25. 2-More on Half Life
26. Half life-problem
27. Half life-problem

21.6 Nuclear Changes and The Conservation Laws

28. Nuclear Changes and The Conservation Laws
29. More on Nuclear Changes and The Conservation Laws
30. Nuclear changes and the conservation law
31. Nuclear changes and the conservation law
32. Nuclear changes and the conservation law

21.7 Interaction of Radiation With Matter

33. Interaction of Radiation With Matter
34. Interaction of Alpha Particles With Matter

- 35. More on Interaction of Alpha Particles With Matter
- 36. Interaction of Beta Particles With Matter
- 37. Interaction of Gamma Rays With Matter
- 38. More on Interaction of Gamma Rays With Matter
- 39. Interaction of Neutrons With Matter
- 40. Comparison between Alpha, Beta and Gamma Radiations

21.8 Radiation Detectors

- 41. More on Comparison between Alpha, Beta and Gamma Radiations
- 42. Radiation Detectors
- 43. Wilson Cloud Chamber
- 44. More on Wilson Cloud Chamber
- 45. Geiger-Muller Counter
- 46. 1-More on Geiger-Muller Counter
- 47. 2-More on Geiger-Muller Counter
- 48. Solid State Detector
- 49. More on Solid State Detector

21.9 Nuclear Reactions

- 50. Nuclear Reactions
- 51. 1-More on Nuclear Reactions

21.10 Nuclear Fission

- 52. 2-More on Nuclear Reactions
- 53. Nuclear Fission
- 54. 1-More on Nuclear Fission
- 55. 2-More on Nuclear Fission
- 56. Fission Chain Reaction
- 57. Nuclear Reactor
- 58. 1-More on Nuclear Reactor
- 59. 2-More on Nuclear Reactor
- 60. Uses of Reactors
- 61. Liquid Metal Fast Breeder Reactor (LMFBR)
- 62. 1-More on Liquid Metal Fast Breeder Reactor (LMFBR)
- 63. 2-More on Liquid Metal Fast Breeder Reactor (LMFBR)

21.11 Fusion Reaction

- 64. Fusion Reaction
- 65. More on Fusion Reaction
- 66. Fusion and Stellar Energy
- 67. More on Fusion and Stellar Energy

21.12 Radiation Exposure

- 68. Radiation exposure
- 69. More on Radiation exposure

21.13 Biological Effects of Radiation

- 70. Biological effects of radiation
- 71. More on Biological effects of radiation
- 72. Biological effects of radiation-problem

21.14 Biological and Medical Uses of Radiation

- 73. Protection from Radiation
- 74. Biological and Medical uses of Radiation
- 75. More on Biological and medical uses of radiation
- 76. Treatment of Cancer
- 77. Polymerisation, Sterilization and food preservation
- 78. More on Polymerisation, Sterilization and food preservation
- 79. Radiation Methods in Archaeology
- 80. More on Polymerisation, Sterilization and food preservation
- 81. Agricultural Uses

21.15 Basic Forces of Nature

- 82. Basic forces of nature
- 83. More on Basic forces of nature

21.16 Building Blocks of Matter

- 84. Building Blocks of Matter
- 85. More on Building Blocks of Matter

ECAT Prep (Chemistry)

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Chapter # 01

Basic Concepts (78 Videos)

1.1 Atom

1. Atoms
2. Evidence of Atoms
3. Molecule
4. Ion
5. Molecular Ion
6. More On Molecular Ion

1.2 Relative Atomic Mass

7. Relative Atomic Mass in Grams
8. Calculating the Average Atomic Mass

1.3 Significant Figures

9. Introduction to Significant Figures
10. Rules to Find the Significant Digits in a Measurement
11. Zero as Significant Figure
12. Rounding Off the Numbers
13. Rounding Off the Numbers (continued)
14. Addition and Subtraction of Significant Figures
15. Introduction to Scientific Notation

1.4 Use of Exponents

16. Logarithm Definition
17. Characteristic & Mantissa of Logarithm
18. How to Find Characteristic of Given Number
19. Finding Mantissa of Number by Log Table
20. Introduction to Anti-Logarithms
21. Common Logarithm
22. Product Law of Logarithm
23. Power Law of Logarithm
24. Quotient Law of Logarithm
25. Applications of Logarithm Laws in Calculations
26. Errors and Uncertainty in Measurement

1.5 Isotopes

27. Isotopes

- 28. More on Isotopes
- 29. Relative Abundance of Isotopes
- 30. Determination of Ar of Isotopes by Mass Spectrometry
- 31. More on Determination of Ar of Isotopes
- 32. Average Atomic Masses
- 33. Calculate Percentage Abundance.

1.6 Analysis of a Compound

- 34. The Percentage Composition of Elements in a Molecule
- 35. The Percentage Composition of Sodium Carbonate crystal
- 36. Empirical formula
- 37. Empirical formula-covalent and ionic compound
- 38. The Empirical Formula from the Percentage Composition
- 39. Empirical Formula from Combustion Analysis
- 40. Empirical Formula from Combustion Analysis (continued)
- 41. Molecular formula
- 42. More on Molecular Formula
- 43. Calculating Percentage Composition
- 44. Calculating Empirical Formula from Combustion Analysis
- 45. Determining Empirical Formula of a Compound

1.7 Concept of Mole

- 46. Mole
- 47. More on Concept of Mole
- 48. Relative Atomic Mass in Grams
- 49. Relative Molecular Mass in Grams
- 50. Relative Formula Mass in Grams
- 51. Avogadro's Number
- 52. More on Avogadro's Number
- 53. Determination of Mass of Hydrogen atom
- 54. Molar Gas Volume
- 55. Calculations of Molar Gas Volume
- 56. Mole-Mass Calculations
- 57. Representative particles

1.8 Stoichiometry

- 58. Stoichiometry
- 59. Stoichiometric Calculations
- 60. Calculations Based on Balanced Chemical Equations
- 61. The Percentage Composition of Elements in a Molecule
- 62. Mole-Mass Calculations
- 63. Calculating Moles from Mass
- 64. Calculating Mass from Moles
- 65. Calculating Mass in Grams and Moles
- 66. Mole-Particle Calculations
- 67. More on Mole-Particle Calculations
- 68. Calculating Mass in Grams of a Single Atom
- 69. Calculating Number of Ions in the Compounds

- 70. Calculating Number of Particles from Mass
- 71. Calculating Mass and Moles of an Element from a Compound

1.9 Limiting Reactant

- 72. Limiting Reactants
- 73. Importance of Limiting Reactants
- 74. More on Importance of Limiting Reactants
- 75. Calculating Limiting and Excess Reactants

1.10 Yield

- 76. Percentage Yield
- 77. More on Yield
- 78. Calculation of Percentage Yield

Chapter # 02

Experimental Techniques in Chemistry (16 Videos)

2.1 Filtration

- 1. Filtration Through Filter Paper
- 2. Filtration Through Filter Crucibles

2.2 Crystallization

- 3. Choice of a Solvent
- 4. Steps Involved in Crystallization
- 5. More on Steps Involved in Crystallization
- 6. Separating Solids Using Sublimation
- 7. Solvent Extraction
- 8. Separating Immiscible Liquids Using Separating Funnel
- 9. Distribution Law
- 10. Chromatography
- 11. Paper Chromatography
- 12. More on Paper Chromatography
- 13. Analysis of a Sample Using Paper Chromatography
- 14. Chromatography for Colourless Substances
- 15. Uses of Chromatography
- 16. Instrumental Methods of Analysis

Chapter # 03

Gases (55 Videos)

3.1 States of Matter

1. Shape and Volume of Gases
2. Diffusion and Effusion in Gases
3. Effect of Molecular Mass on the Rate of Diffusion
4. Atmosphere Pressure
5. Compressibility, Mobility and Density of Gases
6. Condensation
7. Shape and Volume of Liquids
8. Compressibility and Ease of Flow of Liquids
9. Evaporation in Liquids and its Uses
10. Evaporation
11. Dissolving, Filtering and Evaporating
12. Shape and Volume of Solids
13. Compressibility and Ease of Flow of Solids
14. Melting
15. Rigidity and Melting point of Solids
16. Effect of Impurities on Melting Point of Solids
17. Sublimation of solids
18. Density in Solids
19. Diffusion in Solids
20. Units of Pressure
21. Determining Pressure of a Gas

3.2 Gas Laws

22. Boyle's Law of Gases
23. Experimental Verification of Boyle's Law
24. Graphical Explanation of Boyle's Law
25. Charles's Law
26. Experimental Verification of Charles's Law
27. Derivation of Absolute Zero
28. Graphical Explanation of Charles' Law
29. Measurement of Temperature

3.3 General Gas Equation

30. General Gas Equation
31. Ideal Gas Constant R
32. Density of an Ideal Gas

3.4 "Avogadro"'s Law"

33. Avogadro's Law

3.5 Dalton's Law of Partial Pressures

34. Dalton's Law of Partial Pressures

- 35. Calculation of Partial Pressure of a Gas
- 3.6 Diffusion and Effusion**
 - 36. Diffusion and Effusion in Gases
 - 37. Effect of Molecular Mass on the Rate of Diffusion
 - 38. Demonstration of Graham's Law
- 3.7 Kinetic Molecular Theory of Gases**
 - 39. Kinetic Molecular Theory of Gases
 - 40. More on Kinetic Molecular Theory of Gases
 - 41. Explanation of Boyle's Law from Kinetic Molecular Theory of Gases
 - 42. Explanation of Charles's Law from Kinetic Molecular Theory of Gases
 - 43. Explanation of Avogadro's Law from Kinetic Molecular Theory of Gases
 - 44. Explanation of Graham's Law from Kinetic Molecular Theory of Gases
- 3.8 Kinetic Interpretation of Temperature**
 - 45. Kinetic Interpretation of Temperature
- 3.9 Liquefaction of Gases**
 - 46. General Principle of Liquefaction
 - 47. Joule Thomson Effect
 - 48. Linde's Method of Liquefaction of Gases
- 3.10 Non-Ideal Behaviour of Gases**
 - 49. Non-Ideal Behaviour of Gases
 - 50. Causes for Deviations from Ideality
 - 51. Van der Waals Equation for Real Gases; Volume Correction
 - 52. Pressure Correction
 - 53. Proving Correction of Volume and Pressure
 - 54. Van der Waal's Constants
- 3.11 Plasma State**
 - 55. Plasma

Chapter # 04

Liquids and Solids (61 Videos)

- 4.1 Intermolecular Forces**
 - 1. Intermolecular Forces
 - 2. Ion-dipole Forces
 - 3. Dipole-Dipole Interactions
 - 4. Dipole-Induced Dipole Forces
 - 5. London Dispersion Forces
 - 6. Factors Affecting the London Forces
 - 7. Hydrogen Bonding

8. Thermodynamic Properties of Covalent Hydrides
9. Thermodynamic Properties of Covalent Hydrides (continued)
10. Solubility of Hydrogen-Bonded Molecules
11. Anomalous Behaviour of Water
12. More on Anomalous Behaviour of Water
13. Function of Soaps
14. Function of Detergents
15. Hydrogen Bonding in Paints, Dyes and Textile Materials

4.2 Evaporation

16. Evaporation in Liquids and its Uses
17. Evaporation
18. Vapour Pressure
19. Effect of Temperature on Vapour Pressure
20. Manometric Method of Measuring Vapour Pressure
21. Boiling Points of Liquids
22. Boiling Point and External Pressure
23. Energetics of Phase Changes
24. Energy Changes and Intermolecular Attractions
25. Dynamic Chemical Equilibrium
26. Surface tension
27. Measurement of Surface Tension
28. Viscosity
29. Measurement of Viscosity

4.3 Liquid Crystals

30. Liquid Crystals

4.4 Introduction to Solids

31. Amorphous Solids
32. Crystalline Solids
33. Properties of Crystalline Solids
34. Anisotropy
35. Symmetry and Habit of a Crystal
36. Isomorphism
37. Polymorphism
38. Concept of Allotropy
39. Transition Temperature

4.5 Crystal Lattice

40. Crystal Lattice
41. Unit Cell

4.6 Crystals and Their Classification

42. Crystals and Their Classification
43. More on Crystals and Their Classification

4.7 Classification of Solids

- 44. Amorphous Solids
- 45. Crystalline Solids
- 46. Compressibility and Ease of Flow of Solids
- 47. Properties of Ionic Solids
- 48. More on Properties of Ionic Solids
- 49. Structure of Sodium Chloride
- 50. Lattice Energy
- 51. Covalent Solids
- 52. Properties of Covalent Crystals
- 53. Diamond
- 54. Structure of Diamond
- 55. Molecular compounds
- 56. Molecular Solids
- 57. Structure of Solid Iodine
- 58. Metallic Solids
- 59. Properties of Metals
- 60. Structure of Metals

4.8 Determination of Avogadro's Number (NA)

- 61. Determination of Avogadro's Number

Chapter # 05

Atomic Structure (78 Videos)

5.1 Sub-atomic particles

- 1. Discovery of Electron(Cathode rays)
- 2. Properties of Cathode rays
- 3. More on Properties of Cathode rays
- 4. Discovery of Proton
- 5. Properties of positive rays
- 6. Discovery of Neutron
- 7. Properties of Neutron
- 8. More on Properties of Neutron
- 9. Measurement of e/m Value of Electron
- 10. Measurement of Charge on Electron-Millikan's Drop Method
- 11. More on Measurement of Charge on Electron
- 12. Mass of Electron
- 13. Properties of Fundamental Particles

5.2 Rutherford's Model of Atom (Discovery o

- 14. Rutherford's Atomic Model
- 15. Advantages and Defects in Rutherford's Atomic Model

5.3 Plank's Quantum Theory

- 16. J.J Thomson Atomic Model
- 17. Planck's Quantum Theory
- 18. More on Planck's Quantum Theory

5.4 Bohr's Model of Atom

- 19. Bohr's Atomic Theory
- 20. Derivation of Radius of Revolving Electron in nth Orbit
- 21. More on Derivation of Radius of Revolving Electron in nth Orbit
- 22. Determining Radius of an Orbit Using Bohr's Equation
- 23. Energy of Revolving Electron
- 24. More on Energy of Revolving Electron
- 25. Energy of Electron in nth Orbit
- 26. Determination of nth Orbit Energy Using Bohr's Equation

5.5 Spectrum

- 27. Instrumental Methods of Analysis
- 28. Spectrum
- 29. Continuous Spectrum
- 30. Line Spectrum
- 31. Atomic Emission Spectrum
- 32. Atomic Absorption Spectrum
- 33. Hydrogen Spectrum
- 34. More on Hydrogen Spectrum
- 35. Calculations of Frequency of Photons by Bohr's Theory
- 36. Calculations of Wave Numbers of Photons by Bohr's Theory
- 37. Lyman Series
- 38. Balmer Series
- 39. Paschen Series
- 40. Brackett series
- 41. Pfund series
- 42. Calculation of Wave Number of Spectral series
- 43. Defects of Bohr's Atomic Model
- 44. More on Defects of Bohr's Atomic Model

5.6 X-Rays and Atomic Number

- 45. X-Rays
- 46. Properties of X-rays
- 47. Types of X-rays
- 48. Study of X-Rays by Moseley
- 49. Importance of Moseley's Law

5.7 Wave-Particle Nature of Matter (Dual Nature of Matter)

- 50. Dual Nature of Matter
- 51. More on Dual Nature of Matter
- 52. Experimental Verification of Dual Nature of Matter

5.8 Heisenberg's Uncertainty Principle

- 53. Heisenberg's Uncertainty Principle
- 54. Concept of Orbital

- 55. The Quantum Mechanical Model of Atom
- 56. Consequence of The Quantum Mechanical Treatment Of Atom
- 57. Difference Between Quantum and Bohr's Model
- 58. Quantum Numbers
- 59. Principal Quantum Numbers (n)
- 60. Azimuthal Quantum Numbers (l)
- 61. Magnetic Quantum Numbers (m)
- 62. Spin Quantum Numbers (s)
- 63. Quantum Numbers of Electrons
- 64. Calculation of Combination of Quantum Numbers
- 65. Shape of s-Orbitals
- 66. Shapes of p-Orbitals
- 67. Shapes of d-Orbitals

5.9 **Electronic Distribution**

- 68. The Relative Energies of Atomic Orbitals
- 69. (n+l) Rule
- 70. Aufbau Principle
- 71. Pauli's Exclusion Principle and Hund's Rule
- 72. Electronic configuration
- 73. More on Electronic configuration
- 74. Magnetic properties
- 75. Isotopes
- 76. Isotopes of Carbon, Chlorine and Uranium
- 77. More on Isotopes
- 78. Uses of Isotopes

Chapter # 06

Chemical Bonding (56 Videos)

6.1 **Introduction to Chemical Bonding**

- 1. Why do Atoms Form Chemical Bonds?
- 2. Energetics of Bond Formation

6.2 **Atomic Sizes, Atomic Radii, Ionic Radii**

- 3. Atomic Size and Atomic Radius
- 4. Trend of Atomic Size and Atomic Radius in Periodic Table
- 5. Ionic Radius

6.3 **Ionization Energy, Electron Affinity and**

- 6. Ionization Energy
- 7. Factors Influencing the Ionization Energies
- 8. Trend of Ionization Energy in Periodic Table
- 9. Higher Ionization Energies

10. Electron Affinity
11. Factors Influencing the Electron Affinity
12. Trend of Electron Affinity in Periodic Table
13. more on Electronegativity
14. Variation of Electronegativities in Periodic Table

6.4 Types of Bonds

15. Ionic Bond
16. More on Ionic Bond
17. Covalent Bond
18. Types of Covalent Bonds
19. Single Covalent Bond
20. Double Covalent Bond
21. Triple Covalent Bond
22. Polar Covalent Bond
23. Non polar Covalent Bond
24. Dative Covalent Bond or Co-ordinate Covalent Bond
25. Valence Shell Electron Pair Repulsion Theory
26. Molecules Containing Two Electron Pairs (AB₂ Type) and AB₃ Type
27. AB₂E and AB₃ Type With Multiple Bonds
28. AB₄ Type With No Lone Pairs AB₃E₁ Type and AB₂E₂
29. Molecules Containing Five Electron Pairs (AB₅ Type)
30. Molecules Containing Six Electron Pairs (AB₆ Type)
31. Valence Bond Theory
32. More on Valence Bond Theory
33. Bonding and Structure of Ammonia
34. Bonding and Structure of Water
35. sp²-Hybridization; Bonding and Structure of Boron Trifluoride
36. Bonding and Structure of Beryllium Dichloride
37. Molecular Orbital Theory
38. Head on approach and sideways Approach
39. Strength of Sigma and Pi Bonds
40. Relative Energies of the Molecular Orbitals
41. MOT Diagrams for O₂ and F₂
42. MOT Diagrams for Be₂, B₂ and N₂
43. Molecular Orbital Structure of He₂
44. Molecular Orbital energy level Diagrams of Li₂
45. Comparison between VBT and MOT

6.5 Bond Energy, Bond Length and Dipole Mom

46. Bond Energy
47. Ionic Character and Bond Energy
48. More on Ionic Character and Bond Energy
49. Bond Length
50. More on Bond Length
51. Dipole Moment
52. Dipole Moments and Molecular Structure; Percentage Ionic Character
53. Bond Angles or Geometry of Molecules

6.6 The Effect of Bonding on the Properties of Compounds

- 54. Effect of Bonding on Solubility
- 55. Effect of Bonding on Isomerism
- 56. Effect of Bonding on Reaction Kinetics

Chapter # 07

Thermochemistry (22 Videos)

7.1 Introduction

- 1. Introduction to Thermochemistry
- 2. Some Examples of Endothermic and Exothermic Reactions

7.2 Spontaneous and Non-Spontaneous Reactio

- 3. Spontaneous and Non-Spontaneous Reactions

7.3 System, Surrounding and State Function

- 4. System and Surroundings
- 5. Intensive Properties
- 6. Extensive Properties

7.4 Internal Energy and First Law of Thermo

- 7. work and Heat
- 8. First Law of Thermodynamics
- 9. Heat Capacity

7.5 Enthalpy

- 10. The Latent Heat of Fusion
- 11. Enthalpy
- 12. Enthalpy Change of Different Reactions

14. Enthalpy of Formation
15. Enthalpy of Atomization
16. Enthalpy of Neutralization
17. Enthalpy of Combustion
18. Calorimetry
19. Estimation of Heat of Reaction from Experimental Data
20. Estimation of Energy Available from Food(Bomb Calorimeter)

7.6 Hess's Law of Constant Heat Summation

21. Hess's Law of Constant Heat Summation
22. Verification of Hess's Law
23. The Born-Haber Cycle

Chapter # 08

Chemical Equilibrium (66 Videos)

8.1 Reversible and Irreversible Reactions

1. Introduction to Thermochemistry
2. Static Chemical Equilibrium
3. Dynamic Chemical Equilibrium
4. Conditions and Recognition of Chemical Equilibrium

6. Concept of Law of mass action
7. Derivation of Law of Mass Action
8. More on derivation of law of mass action
9. Application of Law of Mass Action
10. Equilibrium Constant K_c and its Units

12. More on Units of Equilibrium Constant
13. Equilibrium Constant Expressions for Esterification
14. Equilibrium Constant Expressions for Dissociation of PCl_5
15. Equilibrium Constant Expressions for Decomposition of N_2O_4
16. Equilibrium Constant Expressions for Synthesis of NH_3
17. Relationship Between Equilibrium Constants
18. Applications of Equilibrium Constants; Direction of Reaction
19. Relationship Between K_p and K_x
20. Relationship Between K_c , K_p , K_x and K_n
21. Extent of Reaction
22. The Effect of Conditions on the Position of Equilibrium
23. Le-Chatelier's Principle; Effect of Change in Concentration
24. Effect of Change in Pressure or Volume
25. Quantitative Effect of Volume on Equilibrium Position

- 27. Effect of Change in Temperature
- 28. Effect of Catalyst on Equilibrium Constant
- 29. Calculating the Equilibrium Constant for Reversible Reaction
- 30. Calculate the Equilibrium Concentration

8.2 Applications of Chemical Equilibrium in

- 31. The Haber's Process
- 32. More on Haber process
- 33. Preparation of Sulphur Trioxide

8.3 Ionic Product of Water

- 34. Dissociation of Water
- 35. The Ion Product of Water
- 36. More on Ion Product of Water
- 37. Importance of pH
- 38. Measuring of pH by Universal Indicator
- 39. Measuring of pH by pH Meter
- 40. Calculating pH

8.4 Ionization Constant of Acids

- 41. pH, pOH and pK_w
- 42. Ionization Constants of Acids
- 43. Percentage of Ionization of Acids
- 44. Ostwald's Dilution Law

8.5 Ionization Constant of Bases

- 45. Ionization Constant of Bases
- 46. pK_a and pK_b

8.6 Lowry Bronsted Acid and Base Concept

- 47. Bronstead-Lowry Concept of Acids
- 48. Bronstead-Lowry Concept of Bases
- 49. Relationship between K_a and K_b
- 50. Strong Acids
- 51. Weak Acids
- 52. Concentration and Strength
- 53. Indicators
- 54. More on Indicators

- 56. Dissociation of Acids
- 57. Dissociation of Bases
- 58. Identifying Weak or Strong Acids or Bases
- 59. Levelling Effect

8.7 Common Ion Effect

- 60. Common Ion Effect
- 61. Some Examples of Common Ion Effect

8.8 Buffer Solutions

- 62. Buffer Solutions
- 63. Buffer Action
- 64. Calculation of pH of a Buffer
- 65. More on Calculation of pH of a Buffer
- 66. Buffer Capacity

8.9 Solubility Product

- 67. Solubility Product
- 68. Determination of Solubility Product from Solubility
- 69. Determination of Solubility from Solubility Product

Chapter # 09

Solutions (57 Videos)

9.1 Concept of a Solution

- 1. Introduction to Solutions

9.2 Concentration Units of Solutions

- 2. Percentage Mass/Mass
- 3. Percentage Mass/Volume
- 4. Percentage Volume/Mass
- 5. Percentage Volume/Volume
- 6. Moles and Solution
- 7. Calculations Related to Concentration of Solutions
- 8. Finding Concentration of the Solution
- 9. Molarity and Preparation of Molar Solution
- 10. Molality
- 11. Mole Fraction (x)
- 12. Parts Per Million, Parts Per Billion, Parts Per Trillion
- 13. Interconversion of Various Concentration Units of Solutions
- 14. More on Interconversion of Various Concentration Units of Solutions

9.3 Types of Solution

- 15. Types of Solutions on the Basis of Physical States

- 16. Solutions of Solids in Liquids
- 17. Solutions of Completely Miscible and Practically Immiscible Liquids
- 18. Partially Miscible Liquids
- 19. Phenol-Water System
- 20. Types of Solutions on the Basis of Concentration
- 21. Comparison of Solution, Suspension and Colloid

9.4 Ideal and Non-Ideal Solutions

- 22. Ideal and Non-Ideal Solutions
- 23. Raoult's Law
- 24. Raoult's Law When Both Components are Volatile
- 25. More on Raoult's Law When Both Components are Volatile

9.5 Vapour Pressures of Liquid-Liquid Solut

- 26. Fractional Distillation of Ideal Mixture of Two Liquids
- 27. Azeotropic Mixtures
- 28. More on Azeotropic Mixtures
- 29. Positive Deviations
- 30. Negative Deviations
- 31. Hydrophillic and Hydrophobic Molecules

9.6 Solubility and Solubility Curves

- 32. The Nature of Solution in Liquid Phase
- 33. Introduction to Solubility
- 34. Solubility and Solute-Solvent Interactions
- 35. Solubility Curves
- 36. Fractional Crystallization
- 37. The Effect of Temperature
- 38. The Effect of Pressure
- 39. Solubility and Nature of Solute
- 40. Solubility and Nature of Solvent

9.7 Colligative Properties of Solutions

- 41. Colligative Properties
- 42. More on Colligative Properties
- 43. Lowering of Vapour Pressure
- 44. Elevation of Boiling Point
- 45. More on Elevation of Boiling Point
- 46. Depression of Freezing Point of a Solvent by a Solute
- 47. Measurement of Freezing Point Depression
- 48. Applications of Boiling Point Elevation and Freezing Point Depression
- 49. Osmosis and Osmotic Pressure

9.8 Energetics of Solution

- 50. Energetics of Solution
- 51. Hydration Energy of Ions

9.9 Hydration and Hydrolysis

- 52. Hydration
- 53. Hydrolysis

- 54. More on Hydrolysis
- 55. Colloids
- 56. Types of Colloids
- 57. Properties of Colloids

Chapter # 10

Electrochemistry (48 Videos)

10.1 Introduction

- 1. Introduction to Electrolysis
- 2. Explaining Electrolysis
- 3. Introduction to Electrochemistry
- 4. Concepts of Electrolytes

10.2 Oxidation State and Balancing of Redox

- 5. Finding out the Oxidation Numbers
- 6. Identifying Substances Which are Oxidized or Reduced
- 7. Identifying Oxidizing and Reducing Agents from the Reactions
- 8. Balancing of Redox Equations by Oxidation Number Method
- 9. More on Balancing of Redox Equations by Oxidation Number Method
- 10. Balancing of Redox Equations by Ion-Electron Method
- 11. Balancing of Redox Equations in Acidic Medium by Ion-Electron Method
- 12. Reduction and Oxidation at the Same Time

10.3 Electrolytic Conduction

- 13. Introduction to Electrolysis
- 14. Explaining Electrolysis
- 15. Electrolytic Cells
- 16. Construction of an Electrolytic Cell
- 17. Working of Electrolytic cell
- 18. Products of Electrolysis
- 19. Electrolysis of Fused Salts
- 20. Electrolysis of Aqueous Solution of Salts
- 21. Industrial Applications of Electrolysis
- 22. Uses of Electrolysis
- 23. Galvanic Cell and its construction
- 24. Working of the Cell
- 25. Voltaic Cell is Reversible Cell
- 26. Rusting of Iron
- 27. Prevention of Corrosion
- 28. Corrosion of Aluminium
- 29. Electrolytic purification
- 30. Convention and Cell Notation

10.4 Electrode Potential

31. Electrode Potential
32. Standard Hydrogen Electrode
33. Measurement of Electrode Potential
34. Electrochemical Series
35. Prediction of Feasibility of a Chemical Reaction
36. Calculation of the Voltage or emf of Cells
37. Metals and Non-metals as Reducing and Oxidising Agents
38. Relative Chemical Reactivity of Metals
39. Reaction of Metals with Dilute Acids
40. Displacement of One Metal by Another from its Solution

10.5 The Electrochemical Series

41. Lead-Storage Battery
42. Discharging of Lead Battery
43. Charging of Lead Battery
44. Alkaline Battery
45. Silver Oxide Battery
46. Nickel Cadmium Cell
47. Fuel Cells
48. More on Fuel Cells

Chapter # 11

Reaction Kinetics (32 Videos)

11.1 Introduction

1. Introduction to Reaction Kinetics

11.2 Rate of Reaction

2. Rate of Chemical Change
3. Instantaneous and Average Rate
4. Specific Rate Constant or Velocity Constant
5. Order of Reaction
6. Examples of Reactions Showing Different Orders
7. Half Life Period
8. Rate Determining Step

11.3 Determination of the Rate of a Chemical

9. Determination of the Rate of a Chemical Reaction
10. Physical Methods, Spectrometry and Electrical Conductivity
11. Dilatometric, Refractometric and Optical Rotation Method
12. Chemical Method

11.4 Energy of Activation

- 13. Activation Energy
- 14. More on Activation Energy
- 15. Energy profile Diagram for Exothermic Reactions
- 16. Energy profile Diagram for Endothermic Reactions
- 17. Energy of Activation and Transition State Theory
- 18. More on Energy of Activation and Transition State Theory

11.5 Finding the Order of Reaction

- 19. Finding the Order of Reaction

11.6 Factors Affecting Rates Of Reactions

- 20. Factors Affecting Rates Of Reactions, Nature of Reactants
- 21. Effect of Concentration on Speed of Reaction
- 22. More on Effect of Concentration on Speed of Reaction
- 23. Effect of Particle Size on Speed of Reaction
- 24. Effect of Light on Speed of Reaction
- 25. Effect of Temperature on Speed of Reaction
- 26. More on Effect of Temperature on Speed of Reaction
- 27. Arrhenius Equation

11.7 Catalysis

- 28. Catalysts
- 29. Types of Catalysis, Homogeneous and Heterogeneous Catalysis
- 30. Characteristics of Catalyst
- 31. Activation of Catalyst, Negative Catalyst and Autocatalyst
- 32. Enzymes

Chapter # 12

Periodic Classification of Elements and (31 Videos)

12.1 Introduction

- 1. Improvements in Mendeleev's Periodic Table

12.2 The Modern Periodic Table

- 2. Groups in Modern Periodic Table
- 3. Periods in Modern Periodic Table
- 4. Chemical Families
- 5. Metals and Non-Metals
- 6. More on Metals and Non-Metals
- 7. Metals, Non-Metals and Metalloids

12.3 : The Modern Periodic Table

- 8. Atomic Size and Atomic Radius

9. Trend of Atomic Size and Atomic Radius in Periodic Table
10. Ionic Radius
11. Ionization Energy
12. Trend of Ionization Energy in Periodic Table
13. Ionization Energy Variation within a Group
14. Ionization Energy Variation Across a Period
15. Electron Affinity
16. Melting and Boiling points
17. Melting and Boiling points variation in a period
18. Melting and Boiling points variation in a Group
19. Oxidation State
20. More on Oxidation State
21. Electrical Conductance
22. Hydration Energy

12.4 Periodic Relationship in Compounds

23. Halides
24. More on Halides
25. Hydrides
26. Covalent Hydrides
27. More on Hydrides
28. Oxides
29. More on Oxides
30. Position of Hydrogen
31. More on Position of Hydrogen

Chapter # 13

s-Block Elements (17 Videos)

13.1 Introduction

1. Chemical Properties of Alkali and Alkaline Earth Metals
2. Peculiar Behaviour of Lithium
3. More on Peculiar Behaviour of Lithium
4. Peculiar Behaviour of Beryllium

13.2 General Behaviour of Alkali Metals

5. Trends in Chemical Properties of Alkali Metals
6. More on Trends in Chemical Properties of Alkali Metals
7. Trends in Chemical Properties of Alkaline-Earth Metals
8. More on Trends in Chemical Properties of Alkaline-Earth Metals
9. Properties of Alkali and Alkaline Earth Metals Oxides
10. More on Properties of Alkali and Alkaline Earth Metals Oxides
11. Properties of Alkali and Alkaline Earth Metals Hydroxides

- 12. Properties of Alkali and Alkaline Earth Metals Carbonates
- 13. More on Properties of Alkali and Alkaline Earth Metals Carbonates
- 14. Properties of Alkali and Alkaline Earth Metals Nitrates
- 15. Properties of Alkali and Alkaline Earth Metals Sulphates

13.3 Commercial Preparation of Sodium by Dow

- 16. Electrolysis of Sodium Chloride

13.4 Commercial Preparation of Sodium Hydrox

- 17. Manufacture of NaOH from Brine

13.5 Role of Gypsum in Agriculture and Indus

No vidoes available yet. Still under development.

13.6 ole of Lime in Agriculture and industry

No vidoes available yet. Still under development.

Chapter # 14

Group III A and Group IVA Elements (14 Videos)

14.1 Group IIIA Elements

- 1. Peculiar Behaviour of Boron

14.2 Compounds of Boron

- 2. Manufacture of Borax
- 3. Properties of Borax
- 4. Borax Bead Test
- 5. Preparation of Boric acid on Commercial Scale
- 6. Properties of Boric acid

14.3 Reactions of Aluminium

- 7. Reaction of Aluminium with Air
- 8. Reaction of Aluminium with Non-Metals
- 9. Reaction of Aluminium with Acids and Alkalies
- 10. Uses of Aluminium

14.4 Group IVA Elements

- 11. Occurrence of Carbon
- 12. Occurrence of Silicon

14.5 Compounds of carbon and Silicon

- 13. Oxides of Carbon
- 14. Silicones

14.6 Semiconductors

No vidoes available yet. Still under development.

14.7 Uses of Lead Compounds in Paints

No videos available yet. Still under development.

Chapter # 15

Group VA and Group VIA Elements (33 Videos)

15.1 Group VA Elements Introduction

1. Preparation and Properties of Dinitrogen Oxide
2. Nitric Oxide Preparation and Properties
3. Nitrogen Dioxide Preparation and Properties
4. Dinitrogen Trioxide
5. Dinitrogen Pentoxide
6. Preparation of Nitric Acid in Industry
7. Physical Properties of Nitric Acid
8. Nitric Acid as an Acid
9. Reaction of Nitric Acid with Carbonates and Bicarbonates
10. Reaction of Nitric Acid with Non-Metals
11. Reaction of Nitric Acid with Metals & Metalloids
12. Reaction of Nitric Acid with Mg and Mn
13. Reaction of Nitric Acid with Cu, Ag and Hg
14. Reaction of conc. Nitric Acid with Metals
15. Reaction of Nitric Acid with Zn
16. Nitric Acid as Oxidizing Agent
17. Formation of Aqua Regia
18. Uses of Nitric Acid

15.2 Nitrogen and its Compounds

19. Allotropes of Phosphorus
20. Phosphorus Trichloride
21. Phosphorus Pentachloride
22. Phosphorus Trioxide
23. Phosphorus Pentoxide Preparation and Properties
24. Phosphorus Acid Preparation & Properties
25. Orthophosphoric Acid

15.3 Phosphorus and its Compounds

26. General Characteristics of Group VIA Elements
27. Similarities and Differences Between Oxygen and Sulphur

15.4 Group VIA Elements

28. Reactions of Sulphuric Acid
29. More on Reactions of Sulphuric Acid
30. Reactions of Sulphuric Acid as a Dehydrating Agent
31. Reactions of Sulphuric Acid as an Oxidizing Agent
32. Reactions of Sulphuric Acid With Gases, Benzene and Oxidizing Agents

33. Uses of Sulphuric Acid

15.5 ulphuric Acid (H₂SO₄)

No vidoes available yet. Still under development.

Chapter # 16

The Halogens and The Noble Gases (29 Videos)

16.1 Introduction

No vidoes available yet. Still under development.

16.2 Occurrence

No vidoes available yet. Still under development.

16.3 Peculiar Behaviour of Fluorine

1. Peculiar Behaviour of Fluorine

16.4 Oxidizing properties

2. Relative Reactivities of the Halogens as Oxidizing Agents

3. More on Relative Reactivities of the Halogens as Oxidizing Agents

4. Volatility of Halides

16.5 Compounds of Halogens

5. Hydrogen Halides

6. Hydrogen Fluoride

7. Properties of Hydrogen Halides

8. Oxides of Fluorine

9. Oxides of Chlorine

10. Oxides of Bromine

11. Oxides of Iodine

12. Reactions of Chlorine with Alkalies

13. Oxyacids of Halogens

14. More on Oxyacids of Halogens

15. Perchloric Acid

16. Bleaching Powder

17. Preparation of Bleaching Powder in Industry

18. Reaction of Bleaching Powder with Strong Acids

19. Reaction of Bleaching Powder with Ammonia

20. Uses of Bleaching Powder

21. Manufacture of Bleaching Powder by Beckmann's Method

16.6 Commercial Uses of Halogens and Their Compounds

22. Importance of Halogens in Daily Life

23. Uses of Chlorine

16.7 Noble Gases

24. Properties of Noble Gases
25. Compounds of Xenon
26. Fluorides of Xenon
27. Chemical Reactions of Fluorides of Xenon
28. Xenon Oxyfluorides
29. Oxides of Xenon

Chapter # 17

Transition Elements (33 Videos)

17.1 Introduction

1. Introduction to the Transition Elements
2. Typical and non-Typical Transition Elements

17.2 Properties of Transition Elements

3. Binding Energies of Transition Elements
4. More on Binding Energies of Transition Elements
5. Melting and Boiling points of Transition Elements
6. Paramagnetism of Transition Elements
7. Oxidation State of Transition Elements
8. More Characteristics of Transition Elements
9. Catalytic Properties of Transition elements

17.3 Complex Compounds

10. Complex Compounds
11. Components of Complex Compounds
12. More on Components of Complex Compounds
13. Chelates
14. Nomenclature of Complex Compounds
15. More on Nomenclature of Complex Compounds
16. Geometry of Complexes

17.4 Iron

17. Wrought Iron
18. From Iron to Steel
19. Manufacture of Steel by Bessemer's Process

17.5 Corrosion

20. Rusting of Iron
21. Corrosion of Aluminium
22. Prevention of Corrosion
23. Tin Coating
24. Zinc Coating

17.6 Chromates and Dichromates

- 25. Preparation of Potassium Chromate
- 26. Properties of Potassium Chromate
- 27. Preparation of Potassium Dichromate
- 28. Properties of Potassium Dichromate
- 29. More on Properties of Potassium Dichromate

17.7 Potassium Permanganate (KMnO₄)

- 30. Preparation of Potassium Permanganate
- 31. More on Preparation of Potassium Permanganate
- 32. Properties of Potassium Permanganate

Chapter # 18

Fundamental Principles of Organic Chemis (31 Videos)

18.1 Introduction

- 1. Basic Introduction to Organic Chemistry
- 2. Modern Definition of Organic Chemistry

18.2 Some Features of Organic compounds

- 3. Features of Organic Compounds
- 4. More on Features of Organic Compounds

18.3 Importance of Organic Chemistry

- 5. Importance of Organic Chemistry

18.4 Sources of Organic Compounds

- 6. Coal
- 7. Natural Gas
- 8. Petroleum
- 9. Carbon Chains

18.5 Cracking of Petroleum

- 10. Types of Carbon Atoms in a Compound
- 11. Cracking of Petroleum
- 12. More on Cracking of Petroleum
- 13. More on Reforming

18.6 Reforming

- 14. Reforming of Petroleum

18.7 Classifications of Organic Compounds

- 15. Classification of Organic Compound
- 16. Types of Acyclic Compounds

17. Types of Cyclic Compounds

18.8 Functional Group

18. Functional Groups

19. More on Functional Groups

18.9 Hybridization of Orbitals and the Shapes of Molecules

20. Ground and Excited State of Carbon

21. Sp³ Hybridization

22. More on Sp³ Hybridization

23. Sp² Hybridization

24. Sp Hybridization

18.10 Isomerism

25. Isomerism

26. Structural Isomerism

27. Position Isomerism

28. Functional group Isomerism

29. Metamerism

30. Tautomerism

31. Cis-trans Isomerism or Geometrical Isomerism

Chapter # 19

Aliphatic Hydrocarbons (63 Videos)

19.1 Introduction

1. Introduction to Hydrocarbons

19.2 Nomenclature of Aliphatic Hydrocarbons

2. Common and IUPAC names

3. Nomenclature of Alkyl Groups

4. Nomenclature of Alkanes

5. More on Nomenclature of Alkanes

6. Nomenclature of Alkenes

7. Nomenclature of Alkynes

19.3 Alkanes or Paraffins

8. Saturated Hydrocarbons

9. Hydrogenation of Alkenes

10. Preparation of Alkanes from Alkyl Halides

11. Decarboxylation of Monocarboxylic Acids

12. Kolbe's Electrolytic Method

13. Preparation of Alkanes from Carbonyl Compounds

14. Preparation of Alkanes from Grignard Reagents

15. Physical properties of Alkanes

16. Reactivity of Alkanes
17. Combustion of Alkanes
18. Catalytic Oxidation of Alkanes
19. Nitration of Alkanes
20. Halogenation of Alkanes
21. More on Halogenation of Alkanes
22. Uses of Methane and Ethane

19.4 Alkenes

23. Dehydrohalogenation of Alkyl Halides
24. Dehydration of Alcohols
25. More on Dehydration of Alcohols
26. Dehydrohalogenation of Vicinal Dihalides
27. Electrolysis of Salts of Dicarboxylic Acid
28. Partial Hydrogenation of Alkynes
29. Physical properties of Alkenes
30. Addition of Hydrogen in Alkene
31. More on Addition of Hydrogen in Alkene
32. Addition of Hydrogen Halides in Alkene
33. More on Addition of Hydrogen Halides in Alkene
34. Addition of Sulphuric Acid in Alkene
35. Addition of Halogens in Alkene
36. Addition of Hypohalous Acid (HOX) in Alkene
37. Addition of Oxygen in Alkene
38. Hydroxylation of Alkene
39. Combustion of Alkenes
40. Ozonolysis of Alkene
41. More on Ozonolysis of Alkene
42. Polymerisation of Alkenes
43. Uses of Ethene

19.5 Alkynes

44. Dehalogenation of Vicinal Dihalides
45. Dehalogenation of Tetrahalides
46. Electrolysis of Salts of Unsaturated Dicarboxylic Acid
47. Preparation of Ethyne
48. Physical properties of Alkynes
49. Reactivity of Alkynes
50. Hydrogenation of Ethyne
51. Addition of Halogens in Alkynes
52. Addition of Halogen Acids in Alkynes
53. Addition of Water in Alkynes
54. Addition of Ammonia and Hydrogen Cyanide in Alkynes
55. Oxidation Reactions in Alkynes
56. Combustion of Ethyne
57. Conversion of Acetylene to DiVinyl Acetylene
58. Formation of Neoprene from Vinyl Acetylene
59. Conversion of Acetylene to Benzene

60. Acidic Nature of Alkynes
61. Uses of Acetylene
62. Comparison of Reactivities of Alkanes, Alkenes and Alkynes
63. Convert Ethane to Ethyne

Chapter # 20

Aromatic Hydrocarbons (29 Videos)

20.1 Introduction to Aromatic Hydrocarbons

1. Monocyclic Aromatic Hydrocarbons and their Derivatives
2. Polycyclic Aromatic Hydrocarbons

20.2 Nomenclature of Monocyclic Aromatic Hyd

3. Nomenclature of Monosubstituted Benzene
4. Nomenclature of Disubstituted Benzene

20.3 Benzene

5. Benzene, Molecular Formula
6. X-Ray Studies of benzene Structure
7. Structure of Benzene
8. The Stability of Benzene
9. Resonance

20.4 Preparation of Benzene

10. Preparation of Benzene from cyclohexane and Acetylene
11. Preparation of Benzene from Alkanes
12. Preparation of Benzene in the Laboratory
13. Wurtz-Fittig Reaction

20.5 Reactions of Benzene

14. Reactivity of Benzene Towards Electrophiles
15. Halogenation of Benzene
16. Halogenation of Alkyl benzene
17. Nitration of Benzene
18. Sulphonation of Benzene
19. Friedel-Crafts Reaction, Alkylation
20. Friedel-Crafts Reaction, Acylation
21. Reduction of Benzene
22. Halogenation of Benzene in the Presence of Light
23. Combustion of Benzene
24. Catalytic Oxidation of Benzene
25. Ozonolysis of Benzene
26. Side Chain Oxidation of Alkyl Benzene
27. ortho and para Directing Groups

28. Reactivities of Alkanes, Alkenes and Benzene

20.6 Comparison of Reactivities of Alkanes, Alkenes and Benzene

29. Reactivities of Alkanes, Alkenes and Benzene

Chapter # 21

Alkyl Halides (21 Videos)

21.1 Introduction

1. Introduction to Alkyl Halides

21.2 Nomenclature Of Alkyl Halides

2. Nomenclature of Alkyl Halides

21.3 Methods of Preparation of Alkyl Halides

3. Preparation of Alkyl Halides From Alcohols

21.4 Reactivity of Alkyl Halides

4. Reactivity of Alkyl Halides

21.5 Reactions of Alkyl Halides

5. Nucleophilic Substitution Reactions
6. Nucleophilic Substitution Bimolecular(SN2)
7. Nucleophilic Substitution Unimolecular(SN1)
8. Reaction of Alkyl halides With Ammonia
9. Reaction of Alkyl halides With Silver Oxide
10. Reaction of Alkyl halides With KCN & KOH
11. β -Elimination Reactions
12. E1 Mechanism
13. E2 Mechanism
14. Wurtz Reaction
15. Reduction of Alkyl Halides
16. Reaction of Alkyl halide with Sodium Lead Alloy(Na4Pb)

21.6 Grignard Reagent

17. Preparation of Grignard Reagent
18. Reactivity of Grignard Reagent
19. Reactions of Grignard Reagent with CNCl, Alcohols and CO2
20. Reactions of Grignard Reagent with Methanal and Ethanal
21. Reactions of Grignard Reagent with Propanone and Epoxide

Chapter # 22

Alcohols, Phenols and Ethers (22 Videos)

22.1 Introduction

1. Introduction to Alcohols, Phenols and Ethers
2. Classification of Alcohols

22.2 Nomenclature of Alcohols

3. Nomenclature of Alcohols
4. Industrial Preparation of Methanol
5. Industrial Preparation of Ethanol
6. Physical Properties of Alcohol
7. Reactions of Alcohols in which C-O Bond is Broken
8. Reactions of Alcohols in which O-H Bond is Broken
9. More on Oxidation of Alcohols
10. Dehydration of Alcohols

22.3 Distinction Between Primary, Secondary

11. Lucas Test
12. Distinction Between Methanol and Ethanol

22.4 Phenol

13. Preparation of Phenol
14. Acidic Behaviour of Phenol
15. Reactions of Phenol Due to -OH Group
16. Nitration of Phenol
17. Sulphonation of Phenol
18. Halogenation & Hydrogenation of Phenol
19. Reaction of Phenol with Formaldehyde

22.5 Ethers

20. Nomenclature of Ethers
21. Preparation of Ethers
22. Chemical Reactivity of Ethers

Chapter # 23

Aldehydes and Ketones (20 Videos)

23.1 Introduction

No videos available yet. Still under development.

23.2 Nomenclature of Aldehydes

1. Nomenclature of Aldehydes

2. Nomenclature of Ketones

23.3 Preparation of Aldehydes and Ketones

3. Preparation of Formaldehyde

4. Preparation of Acetaldehyde

5. General Methods of Preparation of Ketones

23.4 Reactivity of Carbonyl Group

6. Reactivity of Carbonyl Group

23.5 Reactions of Carbonyl Group

7. Addition of Hydrogen Cyanide in Carbonyl Compounds

8. More on Addition of Hydrogen Cyanide in Carbonyl Compounds

9. Aldol Condensation

10. Cannizaro's Reaction

11. Reactions of Carbonyl compounds with Hydroxylamine

12. Reactions of Carbonyl compounds with Hydrazine

13. Reaction of Carbonyl compounds with 2,4-Dinitrophenylhydrazine

14. Addition of Alcohols in Ethanal

15. Reduction of Carbonyl compounds with Sodium Borohydride

16. Catalytic Reduction of Aldehyde and Ketone

17. Oxidation of Aldehydes

18. Oxidation of Ketones

23.6 Identification of Carbonyl Compounds

19. Detection of Aldehyde and Ketones

20. Fehling's Solution Test

23.7 Uses of Aldehyde

No videos available yet. Still under development.

Chapter # 24

Carboxylic Acids (22 Videos)

24.1 Introduction

No videos available yet. Still under development.

24.2 Nomenclature of Carboxylic Acids

21. Nomenclature of Carboxylic Acids

24.3 General Methods of Preparation

22. Preparation of Carboxylic Acids from Primary Alcohols & Aldehydes

23. Preparation of Carboxylic Acids from Nitriles

24. Preparation of Carboxylic Acids from Grignard Reagents

- 25. Preparation of Carboxylic Acids by Hydrolysis of Esters
- 26. Preparation of Carboxylic Acids by Oxidative Cleavage of Alkenes
- 27. Preparation of Derivatives of Carboxylic Acids
- 28. Conversion of Acid Derivatives into Carboxylic Acid

24.4 Physical Characteristics of Carboxylic

No videos available yet. Still under development.

24.5 Reactivity of Carboxyl Group

No videos available yet. Still under development.

24.6 Reactions of Carboxylic Acids

- 29. Reactions Involving H Atom of the Carboxyl Group
- 30. Reactions Involving -OH Group of the Carboxylic Acids
- 31. More on Reactions Involving -OH Group of the Carboxylic Acids
- 32. Formation of Acid Anhydride
- 33. Reactions Involving -COOH Group of the Carboxylic Acids

24.7 Acetic Acid

- 34. Preparation of Acetic Acid in Laboratory
- 35. Manufacture of Acetic Acid

24.8 Amino Acids

- 36. Amino Acids
- 37. Nomenclature of Amino Acids
- 38. Structure of Amino Acids
- 39. Synthesis of Amino Acids
- 40. Reactions of Amino Acids
- 41. Test of Amino Acids, Ninhydrin Test
- 42. Peptides and Proteins

Chapter # 25

Macromolecules (38 Videos)

25.1 Introduction

No videos available yet. Still under development.

25.2 Structure of Polymers

- 1. Structure of Polymers

25.3 Types of Polymers

- 2. Thermoplastics
- 3. Manufacture of Thermoplastic
- 4. More on Manufacture of Thermoplastic
- 5. Thermosetting Plastics
- 6. Manufacturing of Thermosetting Plastic
- 7. Addition Polymerisation

8. Condensation Polymerisation
9. More on Addition Polymerisation
10. More on Condensation Polymerisation

25.4 Brief Description of Synthetic Polymers

11. Polyvinyl Chloride and Polystyrene
12. Polyvinyl Acetate Acrylic and Epoxy Resins
13. Nylon

25.5 Biopolymer

14. Carbohydrates
15. Classification of Carbohydrates, Monosaccharides
16. Disaccharides
17. Polysaccharides
18. Starch
19. Cellulose
20. Glycogen
21. Protein
22. Classification of Proteins
23. More on Classification of Proteins
24. Lipids
25. Sources of Lipids
26. Structure and Composition of Fats and Oils
27. Classification of Lipids
28. Chemical Properties of Lipids
29. Saponification
30. Saponification Number & Iodine Number
31. Rancidity of Fats and Oils
32. Steroids
33. Phospholipids
34. Enzymes
35. Classification of Enzyme
36. Properties of Enzymes
37. Factors Affecting Enzyme Activity
38. Nucleic Acids

Chapter # 26

Common Chemical Industries in Pakistan (04

Videos)

26.1 Introduction

1. Introduction to Chemical Industries

26.2 Fertilizers

No videos available yet. Still under development.

26.3 Elements Essential for Plant Growth

2. Micro-Nutrients and Macro-Nutrients

26.4 Classification of Fertilizers

3. Manufacture of Fertilisers

26.5 Cement

4. Raw Materials and Processes Involved in Manufacturing of Cement

26.6 Paper Industry

No videos available yet. Still under development.

Chapter # 27

Environmental Chemistry (17 Videos)

27.1 Introduction

1. Composition of Atmosphere

27.2 Types of Pollution

2. Carbon Monoxide and Chlorofluorocarbons as Air Pollutants
3. Ozone Depletion due to Oxides of Nitrogen and Sulphur
4. Acid Rain
5. Smog as Pollutant
6. Role of Chlorofluorocarbons in Destroying Ozone
7. Water pollutants, Oxygen-Demanding Wastes(Industrial Effluents)
8. Disease-causing Wastes (Domestic Effluents)
9. Agricultural Water Pollutants
10. Water Pollutants - Synthetic Organic Compounds
11. Effects of Water Pollution
12. Nutrient and Thermal Water Pollution

27.3 Factors Affecting the Quality of Water

13. Dissolved Oxygen(DO)
14. Biochemical Oxygen Demand (BOD)
15. Chemical Oxygen Demand (COD)
16. Purification of Water
17. Water Disinfection by Chlorine

27.4 Solid Waste Management

No videos available yet. Still under development.

ECAT Prep (Mathematics)

(Total Videos # 1764)

Chapter # 01

Numbers System (143 Videos)

1.1 Introduction

1. Introduction to Real Numbers
2. Problem-Introduction to Real Numbers

1.2 Rational Numbers and Irrational Numbers

3. Presenting Rational Numbers on Number Line
4. Problem-Decimal Representation of Rational Number
5. Representation of Irrational Number on Number Line
6. Problem1-Decimal Representation of Irrational Number
7. Problem2-Representation of Irrational Number on Number Line
8. Proving Square Root of Prime Number is Irrational Number
9. Problem-Proving Square Root of Prime Number is Irrational Number

1.3 Properties of Real Numbers

10. Closure law of Rational Numbers Subtraction and Division
11. Problem-Closure Law of Rational Numbers
12. Problem 1: Closure Law of Rational Numbers
13. Commutative Law
14. More on Commutative Law
15. Problem-Commutative Law
16. Associative Law
17. More on Associative Law
18. Problem1-Associative Law
19. Problem2-Associative Law
20. Additive Identity & Additive Inverse
21. Problem1-Additive Identity & Additive Inverse
22. Problem2-Additive Identity & Additive Inverse
23. Multiplicative Identity & Inverse
24. Problem1-Multiplicative Identity & Inverse
25. Problem2-Multiplicative Identity & Inverse
26. Distributive Law
27. 'More on Distributive Law
28. Problem1-Distributive Law
29. Problem2-Distributive Law
30. Problem3- Distributive Law
31. Trichotomy Property of Inequality
32. Problem1-Trichotomy Property of Inequality
33. Problem2-Trichotomy Property of Inequality
34. Reflexive and Symmetric Property of Equality
35. Problem-Reflexive-Symmetric Property of Equality
36. Transitive Property of Equality
37. Problem1-Transitive Property of Equality
38. Problem2-Transitive Property of Equality
39. Additive Property of Equality
40. Problem-Additive Property of Equality
41. Multiplicative Property of Equality
42. Problem-Multiplicative Property of Equality
43. Cancellation Property of Equality
44. Problem-Cancellation Property of Equality
45. Density Property
46. Problem-Density Property
47. Archimedian Property of Inequality
48. Problem1-Transitive property of Inequality
49. Problem2-Transitive property of Inequality
50. Additive property of inequality
51. Problem-Additive property of inequality
52. Multiplicative Property of Inequality
53. Problem2-Multiplicative Property of Inequality
54. Inequality multiplicative Inverse
55. Problem-Inequality multiplicative Inverse

56. Indeterminate Form
57. Golden Rule of Fractions
58. Principle of Equality of Fractions
59. Rule for Quotient of Fractions

1.4 Complex Numbers

60. Complex Number Introduction
61. Problem1-Complex Number Introduction
62. Problem2-Complex Number Introduction
63. Introduction to Complex Numbers
64. Problem2-Definition of Complex Number
65. Conjugate of Complex Number
66. Problem1-Conjugate of Complex Number
67. Problem2-Conjugate of Complex Number
68. Problem3-Conjugate of Complex Number
69. Equality of Complex Number
70. Problem1-Equality of Complex Number
71. Problem2-Equality of Complex Number
72. Properties of Complex Number
73. Problem1-Properties of Complex Number
74. Problem2-Properties of Complex Number
75. Reflexive & Symmetric Law of Complex Number
76. Problem 1: Reflexive & Symmetric Law of Complex Number
77. Problem-Reflexive & Symmetric Law of Complex Number
78. Transitive Law of Complex Number
79. Problem 1: Transitive Law of Complex Number
80. Problem-Transitive Law of Complex Number
81. Addition of Complex Number
82. Problem1-Addition of Complex Number
83. Problem2-Addition of Complex Number
84. Multiplication of Complex with Scalar Numbers
85. Problem1-Multiplying Complex Numbers with Scalar
86. Problem2-Scalar Multiplication of Complex Numbers
87. Multiplication of Complex Numbers
88. Problem1-Multiplication of Complex Numbers
89. Problem2-Multiplication of Complex Numbers
90. Problem1-Subtraction of Complex Numbers
91. Problem2-Subtraction of Complex Numbers
92. Division of Complex Numbers
93. Problem1-Division of Complex Numbers
94. Problem2-Division of Complex Numbers
95. Division Property of Complex Numbers
96. Problem1-Division Property of Complex Numbers
97. Problem2-Division Property of Complex Numbers
98. Commutative Property of Complex Numbers
99. Problem-Commutative Property of Complex Numbers
100. Associative Property of Complex Numbers
101. Problem-Associative Property of Complex Numbers

- 102. The Distributive Property of Complex Numbers
- 103. Problem-The Distributive Property of Complex Numbers
- 104. Additive Identity and Multiplicative Identity of Complex Numbers
- 105. Problem-Additive Identity and Multiplicative Identity of Complex Number
- 106. Additive Inverse and Multiplicative Inverse of Complex Numbers
- 107. Problem-Additive Inverse and Multiplicative Inverse of Complex Numbers
- 108. Solution of Simultaneous Linear Equations with Complex Co-efficients
- 109. Problem-Solution of Simultaneous Linear Equations with Complex Co-eff
- 110. Expression of the Polynomial $P(z)$ as a Product of Linear Factors
- 111. Problem-Expression of the Polynomial $P(z)$ as a Product of Linear F
- 112. Quadratic Equation of Complex Variables
- 113. Problem-Quadratic Equation of Complex Variables

1.5 The Real Line

- 114. Presenting Rational Numbers on Number Line
- 115. Problem-Decimal Representation of Rational Number
- 116. Problem-Argand Diagram
- 117. Representation of Irrational Number on Number Line
- 118. Problem1-Decimal Representation of Irrational Number
- 119. Problem-Modulus of Complex Number
- 120. Cartesian Coordinate System & Cartesian Plane
- 121. Problem on Cartesian Coordinate System & Cartesian Plane

1.6 Geometrical Representation of Complex Numbers

- 122. Argand Diagram
- 123. Problem-Argand Diagram
- 124. The Order Relations
- 125. Problem-The Order Relations
- 126. Modulus of Complex Number
- 127. Problem-Modulus of Complex Number
- 128. Theorems on Complex Number
- 129. More on Theorems on Complex Numbers
- 130. Problem-Theorems on Complex Number
- 131. Vector Interpretation of Complex Numbers
- 132. Problem-Vector Interpretation of Complex Numbers
- 133. The Triangle Inequality
- 134. Problem-The Triangle Inequality
- 135. Polar Form of a Complex Number
- 136. Problem-Polar Form of a Complex Number
- 137. Problem2-Polar Form of a Complex Number
- 138. Properties of the Arguments
- 139. Problem-Properties of the Arguments
- 140. Formula for Finding the Principal Argument
- 141. Problem-Formula for Finding the Principal Argument

1.7 To Find Real and Imaginary Parts of $(x + iy)^n$

- 142. Real and Imaginary parts of Expression of Power n
- 143. Problem-Real and Imaginary parts of Expression of Power n

Chapter # 02

Sets, Functions and Groups (266 Videos)

2.1 Introduction

1. Set Definition
2. Problem-Set Definition
3. Set Notation & its Characteristics
4. Problem-Set Notation & its Characteristics
5. Presentation of a Set
6. Problem-Presentation of a Set
7. Empty Set & Singleton Set
8. Problem on Empty Set & Singleton Set
9. Problem-Empty Set & Singleton Set
10. Finite & Infinite Set
11. Problem on Finite & Infinite Set
12. Problem-Finite & Infinite Set
13. Subset Definition
14. Problem on Subset Definition
15. Problem-Subset Definition
16. Proper Subset & Improper Subset
17. Problem on Proper Subset & Improper Subset
18. Properties of Subset
19. Problem on Properties of Subset
20. Power Set
21. Problem on Power Set
22. Equal & Equivalent Sets
23. Problem on Equal & Equivalent Sets
24. Universal Set
25. Definition of One to One Correspondence
26. Some Important Sets of Numbers
27. Problem on Set Builder Notation
28. Order of a Set
29. Problem-Order of a Set
30. Interval Notation of a Set

2.2 Operations on Sets

31. Disjoint Set
32. Overlapping Sets
33. Union of Two Sets
34. Problem on Union of Two Sets
35. Exhaustive Sets and Cells
36. Intersection of Set

37. Problem on Intersection of Set
38. Difference of Sets
39. Problem-Difference of two sets
40. Symmetric Difference of two sets
41. Problem-Symmetric Difference of two sets
42. Complement of a Set
43. Problem-Complement of a Set

2.3 Venn Diagrams

44. Introduction to Venn Diagrams
45. Problem on Introduction to Venn Diagrams
46. Difference of Sets for Overlapping Sets
47. Problem on Difference of Sets for Overlapping Sets
48. Difference of Sets for Disjoint Sets
49. Problem on Difference of Sets for Disjoint Sets
50. Difference of Sets for a Set & its Subset
51. Problem on Difference of Sets for a Set & its Subset
52. Complement of Union for Overlapping Sets
53. Problem on Complement of Union for Overlapping Sets
54. Complement of Intersection for Overlapping Sets
55. Problem on Complement of Intersection for Overlapping Sets
56. Complement of Intersection for Disjoint Sets
57. Problem on Complement of Intersection for Disjoint Sets
58. Complement of Union for Disjoint Sets
59. Problem on Complement of Union for Disjoint Sets
60. Complement of Union for Set & its Subset
61. Problem on Complement of Union for Set & its Subset
62. Complement of Intersection for Set & its Subset
63. Problem on Complement of Intersection for Set & its Subset
64. Demorgans Law for Overlapping Sets
65. Problem on Demorgans Law for Overlapping Sets
66. Identity Laws
67. Problem-Identity Laws
68. Laws of Complement
69. Problem-Laws of Complement
70. Idempotent Laws
71. Problem-Idempotent Laws
72. Demorgans Law for Disjoint Sets
73. Problem on Demorgans Law for Disjoint Sets
74. Demorgans Law for Set & its Subset
75. Problem on Demorgans Law for Set & its Subset

2.4 Operations on Three Sets

76. Associative Property of Union of Sets
77. Problem on Associative Property of Union of Sets
78. Associative Property of Intersection of Sets
79. Problem on Associative Property of Intersection of Sets
80. Distributive Property of Union Over Intersection

81. Problem on Distributive Property of Union Over Intersection
82. Double Complementation Law
83. Problem-Double Complementation Law
84. Operations of Union and Intersection on three sets
85. Commutative Property of Union
86. Commutativity of Intersection
87. Distributive property of Intersection over Union
88. Problem 1: Distributive property of Intersection over Union
89. Distributive Property of Cartesian Product Over Union
90. Problem-Distributive Property of Cartesian Product Over Union
91. Distributive Property of Cartesian Product Over Intersection
92. Problem-Distributive Property of Cartesian Product Over Intersection
93. Distributive Property of Cartesian Product Over Difference
94. Problem-Distributive Property of Cartesian Product Over Difference
95. Identity With Respect to Intersection
96. Problem-Identity With Respect to Intersection

2.5 Properties of Union and Intersection

97. Associative Property of Union of Sets
98. Problem on Associative Property of Union of Sets
99. Associative Property of Intersection of Sets
100. Problem on Associative Property of Intersection of Sets
101. Distributive Property of Union Over Intersection
102. Problem on Distributive Property of Union Over Intersection
103. Demorgan Law 1
104. Problem on Demorgan Law 1
105. Demorgan Law 2
106. Problem on Demorgan Law 2
107. Introduction to Venn Diagrams
108. Problem on Introduction to Venn Diagrams
109. Commutative Law of Union of Sets
110. Problem-Commutative Law of Union of Sets
111. Commutative Law of Intersection of Sets
112. Problem-Commutative Law of Intersection of Sets
113. Intersection Associativity for Overlapping Sets
114. Problem on Intersection Associativity for Overlapping Sets
115. Intersection Associativity for Disjoint Sets
116. Problem on Intersection Associativity for Disjoint Sets
117. Intersection Associativity for Sets
118. More on Intersection Associativity for Sets
119. Problem on Intersection Associativity for Sets
120. Problem on More on Intersection Associativity for Sets
121. Union Associativity for Overlapping Sets
122. Problem on Union Associativity for Overlapping Sets
123. Union Associativity for Disjoint Sets
124. Problem on Union Associativity for Disjoint Sets
125. Union Associativity for Sets
126. Problem on Union Associativity for Sets

- 127. More on Union Associativity for Set
- 128. Problem on More on Union Associativity for Set
- 129. Distributivity of Union Over Intersection of Sets
- 130. Problem on Distributivity of Union Over Intersection of Sets
- 131. Distributivity of Intersection Over Union of Sets
- 132. Problem on Distributivity of Intersection Over Union of Sets
- 133. Difference of Sets for Overlapping Sets
- 134. Problem on Difference of Sets for Overlapping Sets
- 135. Difference of Sets for Disjoint Sets
- 136. Problem on Difference of Sets for Disjoint Sets
- 137. Difference of Sets for a Set & its Subset
- 138. Problem on Difference of Sets for a Set & its Subset
- 139. Complement of Union for Overlapping Sets
- 140. Problem on Complement of Union for Overlapping Sets
- 141. Complement of Intersection for Overlapping Sets
- 142. Problem on Complement of Intersection for Overlapping Sets
- 143. Complement of Intersection for Disjoint Sets
- 144. Problem on Complement of Intersection for Disjoint Sets
- 145. Complement of Union for Disjoint Sets
- 146. Problem on Complement of Union for Disjoint Sets
- 147. Complement of Union for Set & its Subset
- 148. Problem on Complement of Union for Set & its Subset
- 149. Complement of Intersection for Set & its Subset
- 150. Problem on Complement of Intersection for Set & its Subset
- 151. Demorgans Law for Overlapping Sets
- 152. Problem on Demorgans Law for Overlapping Sets
- 153. Demorgans Law for Disjoint Sets
- 154. Problem on Demorgans Law for Disjoint Sets
- 155. Demorgans Law for Set & its Subset
- 156. Problem on Demorgans Law for Set & its Subset

2.6 Inductive and Deductive Logic

- 157. Concept of Induction and Deduction
- 158. Problem-Concept of Induction and Deduction
- 159. Aristotelian and Non Aristotelian Logics
- 160. Problem-Aristotelian and Non Aristotelian Logics
- 161. Symbolic Logics
- 162. Problem-Symbolic Logics

2.7 Implication or Conditional

- 163. Introduction to Implication or Conditional
- 164. Problem-Introduction to Implication or Conditional
- 165. Concept of Bi-Conditional
- 166. Problem-Concept of Bi-Conditional
- 167. Conditionals Related with a Given Conditional
- 168. Problem-Conditionals Related with a Given Conditional
- 169. Introducing Tautologies
- 170. Problem-Introducing Tautologies

171. Introducing Quantifiers

2.8 Truth Sets, A Link Between Sets Theory and Logic

172. A link Between Set Theory and Logic

173. More on A link Between Set Theory and Logic

174. Further on A link Between Set Theory and Logic

175. Problem-A link Between Set Theory and Logic

2.9 Relations

176. Introduction to Binary Relation

177. Problem-Introduction to Binary Relation

178. Problem 2-Introduction to Binary Relation

179. Domain & Range of Binary Relation

180. Problem1-Domain & Range of Binary Relation

181. Problem-Domain & Range of Binary Relation

2.10 Functions

182. Introduction to Function

183. More on Introduction to Functions

184. Problem on Introduction to Function

185. Problem2-Introduction to Function

186. Problem3-Introduction to Function

187. Problem4-Introduction to Function

188. Implied Domain

189. Finding Domain and Range of Functions

190. Types of Relations

191. Into Function

192. Problem on Into Function

193. Problem2-Into Function

194. Onto Function

195. Problem on Onto Function

196. Problem2-Onto Function

197. One to One Function

198. Problem on One to One Function

199. Problem2-One to One Correspondence

200. Bijective Function

201. Problem on Bijective Function

202. Problem2-Bijective Function

203. Injective Function

204. Problem on Injective Function

205. Problem2-Injective Function

206. One-One Function

207. Problem-One-One Function

208. Set Builder Notation for a Function

209. Problem-Set Builder Notation for a Function

210. Formulization of Functions

211. Algebraic Functions

212. Linear and Quadratic Functions

- 213. Problem-Linear and Quadratic Functions
- 214. Sketching Graphs of Quadratic Functions
- 215. Problem-Sketching Graphs of Quadratic Functions

2.11 Inverse of a Function

- 216. Inverse of a Function
- 217. More on Inverse of a Function
- 218. Problem1-Inverse of a Function
- 219. Problem2-Inverse of a Function
- 220. Domain & Range of Inverse Function
- 221. Square Root and Absolute Value Functions
- 222. Problem-Square Root and Absolute Value Functions
- 223. Common Types of Functions
- 224. Problem-Constant, Identity and Rational Functions
- 225. Even and Odd Functions
- 226. Problem-Even and Odd Functions
- 227. The Modulus of a Function

2.12 Binary Operations

- 228. Introduction to Binary Operations
- 229. Problem-Introduction to Binary Operations
- 230. Multiplication Table
- 231. Problem-Multiplication Table
- 232. Operations on Residue Classes Modulo n
- 233. Problem-Operations on Residue Classes Modulo n
- 234. Properties of Binary Operations
- 235. Problem-Properties of Binary Operations
- 236. Theorems on Binary Operation
- 237. More on Theorems on Binary Operation
- 238. Problem-Theorems on Binary Operation

2.13 Groups

- 239. Introduction to Semi-Group
- 240. Problem-Introduction to Semi-Group
- 241. Introduction to Groups
- 242. Problem-Introduction to Groups
- 243. Introduction to Abelian and Non-Abelian Group
- 244. Problem-Introduction to Abelian and Non-Abelian Group
- 245. Finite and Infinite Group
- 246. Problem1-Finite and Infinite Group
- 247. Problem2-Finite and Infinite Group

2.14 Solution of Linear Equations

- 248. Solving Simple Linear Equations in 1 Variable
- 249. Problem1-Solution of Linear Equations
- 250. Problem2-Solution of Linear Equations

2.15 Reversal Law of Inverse

- 251. Introduction to Reversal Laws of Inverses

252. Problem-Introduction to Reversal Laws of Inverses
253. Theorems on Groups
254. More on Theorems on Groups
255. Problem-Theorems on Groups
256. Problem-Theorems on Abelian Groups
257. Composition of a Functions
258. Problem-Composition of Functions
259. Logical Proofs of the Operations on Sets
260. More on Logical Proofs of the Operations on Sets
261. The Set of Rational Numbers is an Abelian Group
262. The Set of Non-Zero Real Numbers is an Abelian Group
263. The Set of Complex Numbers is an Abelian Group
264. Algebraic Method to find the Inverse Function
265. Problem-Algebraic Method to find the Inverse Function

Chapter # 03

Matrices and Determinants (157 Videos)

3.1 Introduction

1. Introducing Matrix
2. More on Introducing Matrix
3. Problem-Introducing Matrix
4. Order of Matrix
5. Problem-Order of Matrix
6. Equal Matrices
7. Problem1-Equal Matrices
8. Problem2-Equal Matrices
9. Row-Column Matrix
10. Problem-Row-Column Matrix
11. Square-Rectangular Matrix
12. Problem-Square-Rectangular Matrix
13. Null Matrix or Zero Matrix
14. Problem-Null Matrix or Zero Matrix
15. Practical Application of Matrices
16. Transpose of Matrix
17. Problem-Transpose of Matrix
18. Negative of Matrix
19. Problem-Negative of Matrix
20. Symmetric & Skew-Symmetric Matrices
21. Problem1-Symmetric & Skew-Symmetric Matrices
22. Problem2-Symmetric & Skew-Symmetric Matrices
23. Hermitian and Skew Hermitian Matrix

24. Problem-Hermitian and Skew Hermitian Matrix
25. Triangular Matrices
26. Problem-Triangular Matrices
27. Diagonal Matrix
28. Problem-Diagonal Matrix
29. Scalar Matrix
30. Problem-Scalar Matrix
31. Identity Matrix
32. Problem-Identity Matrix
33. Adjoint of Matrix
34. Problem-Adjoint of Matrix
35. Addition of Matrices
36. Problem-Addition of Matrices
37. Subtraction of Matrices
38. Problem-Subtraction of Matrices
39. Multiplication of Matrix by Real Number
40. Problem-Multiplication of Matrix by Real Number
41. Multiplicative Identity of a Matrix
42. Problem-Multiplicative Identity of a Matrix
43. Properties of Transposed Matrices
44. Problem-Properties of Transposed Matrices
45. Multiplication of Matrices
46. More on Multiplication of Matrices
47. Problem1-Multiplication of Matrices
48. Problem2-Multiplication of Matrices
49. Problem3-Multiplication of Matrices

3.2 Determinant of a 2x2 Matrix

50. Determinant of 2-by-2 Matrix
51. Problem1-Singular and Non-Singular Matrix
52. Problem2-Singular and Non-Singular Matrix
53. Singular and Non-Singular Matrix
54. Problem-Singular and Non-Singular Matrix
55. Adjoint of Matrix
56. Problem-Adjoint of Matrix
57. Multiplicative Inverse of Non-Singular Matrix
58. Problem-Multiplicative Inverse of Non-Singular Matrix
59. Matrix Inverse Using Adjoint
60. More on Matrix Inverse Using Adjoint
61. Problem1-Matrix Inverse Using Adjoint
62. Problem2-Matrix Inverse Using Adjoint
63. Problem3-Matrix Inverse Using Adjoint
64. Problem4-Matrix Inverse Using Adjoint

3.3 Solution of Simultaneous Linear Equatio

65. Solving Simultaneous Equations-Inversion Method
66. Problem-Solving Simultaneous Equations-Inversion Method

3.4 Field

- 67. Introducing Field
- 68. Problem-Introducing Field

3.5 Properties of Matrix Addition, Scalar M

- 69. Commutative Law Under Addition for Matrices
- 70. Problem-Commutative Law Under Addition for Matrices
- 71. Associative Law under Addition and Multiplication of Matrices
- 72. Problem-Associative Law Under Addition for Matrices
- 73. Additive Identity of a Matrix
- 74. Problem-Additive Identity of a Matrix
- 75. Additive Inverse of a Matrix
- 76. Problem-Additive Inverse of a Matrix
- 77. Multiplication of Matrices
- 78. Problem1-Multiplication of Matrices
- 79. Problem2-Multiplication of Matrices
- 80. Associative Law under Multiplication of Matrices
- 81. Problem-Associative Law under Multiplication of Matrices
- 82. Distributive Law of Matrices
- 83. Problem-Distributivity of Matrices
- 84. Commutative Law of Multiplication of Matrices
- 85. Problem-Commutative Law of Multiplication of Matrices
- 86. Prove That $c(AB) = (cA)B = A(cB)$
- 87. Problem-Prove That $c(AB) = (cA)B = A(cB)$
- 88. Properties of Scalar Multiplication

3.6 Determinants

- 89. Minor of an Element of a Matrix and Its Determinant
- 90. Problem-Minor of an Element of a Matrix or Its Determinant
- 91. Cofactor of an Element of a Matrix
- 92. Problem-Cofactor of an Element of a Matrix
- 93. Determinant of a Square Matrix of Order 3 or greater
- 94. Problem-Determinant of a Square Matrix of Order 3 or greater

3.7 Properties of Determinants Which Help in Their Evaluation

- 95. Properties of Determinants
- 96. More on Properties of Determinants
- 97. Problem 1-Properties of Determinants
- 98. Problem 2-Properties of Determinants
- 99. Problem 3-Properties of Determinants
- 100. Problem 4-Properties of Determinants
- 101. Properties of Determinants of Order Three
- 102. Problem-Properties of Determinants of Order Three
- 103. Alternate Method For Expanding a Third Order Determinant
- 104. Problem-Alternate Method For Expanding a Third Order Determinant

3.8 Adjoint and Inverse of a Square Matrix of Order $n = 3$ or $n > 3$

- 105. Matrix Inverse Using Adjoint
- 106. More on Matrix Inverse Using Adjoint
- 107. Problem1-Matrix Inverse Using Adjoint
- 108. Problem2-Matrix Inverse Using Adjoint
- 109. Adjoint of a Square Matrix of Order $n = 3$ or $n > 3$
- 110. Problem-Adjoint of a Square Matrix of Order $n = 3$ or $n > 3$
- 111. Transpose of Product of Matrices
- 112. Property for Whole Inverse of Product of Matrices
- 113. More on Property for Whole Inverse of Product of Matrices
- 114. Problem- Matrices Law for Whole Transpose of Product

3.9 Elementary Row and Column Operations on a Matrix

- 115. Deriving a Method For Determining Inverses
- 116. Problem-Deriving a Method For Determining Inverses
- 117. Inverse of Matrix by Row Operation
- 118. Problem-Inverse of Matrix by Row Operation
- 119. More on Problem- Inverse of Matrix by Row Operation
- 120. Inverse of Matrix by Column Operation
- 121. Problem-Inverse of Matrix by Column Operation
- 122. More on Problem-Inverse of Matrix by Column Operation
- 123. Triangular Matrices
- 124. Problem-Triangular Matrices
- 125. Symmetric & Skew-Symmetric Matrices
- 126. Problem1-Symmetric & Skew-Symmetric Matrices
- 127. Hermitian and Skew Hermitian Matrix
- 128. Problem-Hermitian and Skew Hermitian Matrix

3.10 Echelon and Reduced Echelon Forms of Matrices

- 129. Echelon and Reduced Echelon Form of Matrix
- 130. Problem-Echelon and Reduced Echelon Form of Matrix
- 131. Echelon Form of Matrix
- 132. Problem-Echelon Form of Matrix
- 133. Reduced Echelon Form of Matrix
- 134. Problem-Reduced Echelon Form of Matrix
- 135. Rank of a Matrix
- 136. Problem-Rank of a Matrix
- 137. Invertible Matrix
- 138. Problem-Invertible Matrix
- 139. Theorems on Invertible Matrix
- 140. More Theorems on Invertible Matrix

3.11 Systems of Linear Equations

- 141. Solution of System of Linear Equations by Row Operation
- 142. Problem-Solution of System of Linear Equations by Row Operation
- 143. Problem-More on Solution of System of Linear Equations by Row Operati

- 144. Solution of Homogeneous Linear Equations
- 145. More on Solution of Homogeneous Linear Equations
- 146. Problem-Solution of Homogeneous Linear Equations
- 147. More on Problem-Solution of Homogeneous Linear Equations

3.12 Cramer's Rule

- 148. System of Linear Equations
- 149. More on System of Linear Equations
- 150. Problem-System of Linear Equations
- 151. Consistency and Inconsistency of a System
- 152. Problem-Consistency and Inconsistency of a System
- 153. Solving a System of Three Non-Homogeneous Linear Equations
- 154. Problem-Solving a System of Three Non-Homogeneous Linear Equations
- 155. Solving Simultaneous Equations-Cramers Rule
- 156. Problem1-Solving Simultaneous Equations-Cramers Rule
- 157. Problem2-Solving Simultaneous Equations-Cramers Rule

Chapter # 04

Quadratic Equations (105 Videos)

4.1 Introduction

- 1. Quadratic Equations in 1 Variable
- 2. Problem-Quadratic Equations in 1 Variable
- 3. Solving Quadratic Equations by Factorization
- 4. Problem-Solving Quadratic Equations by Factorization
- 5. The Theory of Quadratic Equations
- 6. More on the Theory of Quadratic Equations
- 7. Problem-The Theory of Quadratic Equations
- 8. Solving Quadratic Equations-Completing Squares
- 9. Problem1-Solving Quadratic Equations-Completing Squares
- 10. Problem2-Solving Quadratic Equations-Completing Squares
- 11. Derivation of Quadratic Formula by Completing Square
- 12. Problem-Derivation of Quadratic Formula by Completing Square
- 13. Solving Quadratic Equation-Quadratic Formula
- 14. Problem1-Solving Quadratic Equation-Quadratic Formula
- 15. Problem2-Solving Quadratic Equation-Quadratic Formula

4.2 Solutions of Equations Reduceable to th

- 16. Solving Equation Having Degree $2n$
- 17. Problem-Solving Equation Having Degree $2n$
- 18. Problem2-Solving Equation Having Degree $2n$
- 19. Solving Degree Four Equation
- 20. Solving Rational Equations
- 21. Solving Reciprocal Algebraic Equation

22. Solving Exponential Equations
23. Equations with Different Exponential Functions
24. More on Equations with Different Exponential Functions
25. Problem-Equations with Different Exponential Functions
26. Equations with Special Base e
27. Problem-Equations with Special Base
28. Exponential Modelling
29. Problem1-Exponential Modelling
30. Problem2-Exponential Modelling
31. Equations Containing Logarithms
32. Problem-Equations Containing Logarithms
33. Disguised Quadratic Equations
34. Problem-Disguised Quadratic Equations
35. Solving Algebraic Equations in Products Factors
36. Solving Radical Equations in 1 Variable
37. Problem1-Solving Radical Equations in 1 Variable
38. Problem2-Solving Radical Equations in 1 Variable
39. Solving Equations with Quadratic Radicand at one Side
40. Problem-Solving Equations with Quadratic Radicand at one Side
41. Solving Equations with Quadratic Radicands at Both Sides
42. Problem-Solving Equations with Quadratic Radicands at Both Sides
43. Problem- More on Solving Equations with Quadratic Radicands at Both S
44. Solving sum of radicals equal to constant
45. Solving Sum of Radicals Equal to Linear Expression
46. Problem-Solving Sum of Radicals Equal to Linear Expression

4.3 Three Cube Roots of Unity

47. The Cube Roots of Unity
48. Problem on The Cube Roots of Unity
49. Recognise Complex Cube Roots of Unity
50. Properties of Cube Roots of Unity
51. Problem-properties of Cube Roots of Unity
52. Problems on Cube Roots of Unity
53. Problem- Cube Roots of Unity

4.4 Four Fourth Roots of Unity

54. Four Fourth Roots of Unity
55. Problem-Four Fourth Roots of Unity
56. Properties of Four Fourth Roots of Unity
57. Problem-Properties of Four Fourth Roots of Unity

4.5 Polynomial Functions

58. Introducing Variable and Constant
59. Problem-Introducing Variable & Constant
60. Introducing Coefficient & Exponent
61. Problem-Introducing Coefficient & Exponent
62. Introduction to Polynomials
63. Problem-Introduction to Polynomials

4.6 Theorems

- 64. Remainder Theorem
- 65. Problem-Remainder Theorem
- 66. Factor Theorem
- 67. Problem1-Remainder Theorem
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4.7 Synthetic Division

- 69. Synthetic Division Method
- 70. Finding Quotient & Remainder
- 71. Problem on Finding Quotient & Remainder

4.8 Relations Between the Roots and the Coefficients of a Quadratic Equation

- 72. Roots & Coefficients of Quadratic Equation
- 73. Problem 1: Roots & Coefficients of Quadratic Equation

4.9 Formation of an Equation Whose Roots are Given

- 74. Find a Quadratic Equation from Given Roots
- 75. Form Quadratic Equations Whose Roots are Given
- 76. Problem on Form Quadratic Equations Whose Roots are Given

4.10 Nature of the Roots of a Quadratic Equation

- 77. Discriminant of Quadratic Expression
- 78. Problem on Discriminant of Quadratic Expression
- 79. Finding Discriminant of Quadratic Equation
- 80. Problem on Finding Discriminant of Quadratic Equation
- 81. Nature of the Roots of a Quadratic Equation
- 82. Problem on Nature of the Roots of a Quadratic Equation
- 83. Quadratic Function
- 84. Geometrical Interpretation and the Discriminant
- 85. Problem1-Geometrical Interpretation and the Discriminant-1
- 86. Problem1-Geometrical Interpretation and the Discriminant-2
- 87. Problem2-Geometrical Interpretation and the Discriminant-1
- 88. Verification of Nature of Roots of Equation
- 89. Finding s when Nature of Roots is given
- 90. Problem on Finding s when Nature of Roots is given
- 91. Problem on Finding s when Nature of Roots is given-2

4.11 Systems of Two Equations Involving Two Variables

- 92. System of Two Equations Involving Two Variables
- 93. Problem-System of Two Equations Involving Two Variables
- 94. Solving Linear and Quadratic Equations
- 95. Problem-Solving Linear and Quadratic Equations
- 96. Solving Simultaneous Quadratic Equations
- 97. Solving 2nd Degree Equations in General Form Type 1
- 98. Problem-Solving 2nd Degree Equations in General Form Type 1
- 99. Solving 2nd Degree Equations in General Form Type 2

100. Case2-Solving 2nd Degree Equations in General Form Type 2
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103. Case5-Solving 2nd Degree Equations in General Form Type 2

4.12 Problems on Quadratic Equations

104. Problem Leading to Quadratic Equations.
105. Problem on Problem Leading to Quadratic Equations.

Chapter # 05

Partial Fractions (20 Videos)

5.1 Introduction

1. Partial Fractions
2. Problem2-Introducing Partial Fractions
3. Problem-Resolving Fractions-Repeated Irreducible Factors
4. Problem-Resolving Fractions-Repeated Irreducible Factors
5. Kinds of Equations
6. Problem-Kinds of Equations

5.2 Rational Fraction

7. Introduction to Rational Fraction
8. Problem-Introduction to Rational Fraction

5.3 Resolution of a Rational Fraction $P(x)/$

9. Problem-Resolving Fractions-Non-Repeated Linear Factors
10. Problem1-Resolving Fractions-Non-Repeated Linear Factors
11. Problem-More on Resolving Fractions-Non-Repeated Linear Factors
12. Resolving Fractions-Repeated Linear Factors
13. Problem1-Resolving Fractions-Repeated Linear Factors
14. Problem2-Resolving Fractions-Repeated Linear Factors
15. Resolving Fractions-Non-Repeated Irreducible Factors

17. Problem1-Resolving Fractions-Non-Repeated Irreducible Factors
18. Problem2-Resolving Fractions-Non-Repeated Irreducible Factors
19. Resolving Fractions-Repeated Irreducible Factors
20. Problem1-Resolving Fractions-Repeated Irreducible Factors
21. Problem-Resolving Fractions-Repeated Irreducible Factors

Chapter # 06

Sequences and Series (97 Videos)

6.1 Introduction

1. Introduction to Sequence and Series
2. Problem-Introduction to Sequence and Series
3. Convergent, Divergent and Periodic Sequences
4. Problem-Convergent, Divergent and Periodic Sequences

6.2 Types of Sequences

5. Types of Sequences
6. Problem-Types of Sequences

6.3 Arithmetic Progression (A.P)

7. Concept of Arithmetic Progression
8. Problem-Concept of Arithmetic Progression

6.4 Arithmetic Mean (A.M)

9. Concept of Arithmetic Mean
10. Problem-Concept of Arithmetic Mean
11. n Arithmetic Means Between Two Given Numbers

6.5 Series

12. Concept of Series
13. Problem1-Concept of Series
14. Problem2-Concept of Series
15. Sum of First n Terms of an Arithmetic Series
16. Problem-Sum of First n Terms of an Arithmetic Series
17. To Find the Sum of n A.M
18. Problem-To Find the Sum of n A.M
19. To Find the Sum of p A.M
20. Problem-To Find the Sum of p A.M

6.6 Word Problems on A.P

21. Word Problems on Arithmetic Progression
22. Solving Word Problem on Arithmetic Progression
23. Problem1-Word Problems on Arithmetic Progression
24. Problem2-Word Problems on Arithmetic Progression

6.7 Geometric Progressions (G.P)

- 25. Concept of Geometric Progressions
- 26. Problem1-Concept of Geometric Progressions
- 27. Problem2-Concept of Geometric Progressions

6.8 Geometric Means

- 28. Concept of Geometric Means
- 29. Problem-Concept of Geometric Means
- 30. n Geometric Means Between Two Given Numbers
- 31. Problem-n Geometric Means Between Two Given Numbers

6.9 Sum of n Terms of a Geometric Series

- 32. Introduction to Geometric Series
- 33. Problem-Introduction to Geometric Series
- 34. Sum of n Terms of a Geometric Series
- 35. Problem-Sum of n Terms of a Geometric Series

6.10 The Infinite Geometric Series

- 36. The Infinite Geometric Series
- 37. More on The Infinite Geometric Series
- 38. Problem1-The Infinite Geometric Series
- 39. Problem2-The Infinite Geometric Series
- 40. Recurring Decimals

6.11 Word Problems on G.P

- 41. Word Problems on Geometric Series
- 42. More on Word Problems on Geometric Series
- 43. Problem1-Word Problems on Geometric Series
- 44. Problem2-Word Problems on Geometric Series
- 45. Problem3-Word Problems on Geometric Series

6.12 Harmonic Progression (H.P)

- 46. Concept of Harmonic Progression
- 47. Problem-Concept of Harmonic Progression
- 48. General Term of Harmonic Progression
- 49. The Characteristic Relation for H.P
- 50. Problem-The Characteristic Relation for H.P
- 51. An Important Theorem
- 52. More on An Important Theorem
- 53. Problem-An Important Theorem
- 54. Problem-Concept of Harmonic Mean
- 55. Concept of Harmonic Mean
- 56. Problem-General Term of Harmonic Progression
- 57. n Harmonic Means Between Two Numbers
- 58. Problem-n Harmonic Means Between Two Numbers

6.13 Relations Between Arithmetic, Geometric and Harmonic Means

- 59. Relations Between A.M, G.M & H.M

60. More on Relations Between A.M, G.M & H.M

61. Problem-Relations Between A.M, G.M & H.M

6.14 Sigma Notation (or Summation Notation)

62. Sigma Notation (or Summation Notation)

63. Problem 1-Sigma Notation (or Summation Notation)

64. Problem 2 -Sigma Notation (or Summation Notation)

6.15 To Find Formulae For The Sums

65. Sum of Positive Integral Powers of Natural Numbers

66. Alternate Formula For sum of n Numbers

67. Problem-Alternate Formula For sum of n Numbers

68. Alternate Formula For Sum of n Squares

69. More on Alternate Formula For Sum of n Squares

70. Problem-Alternate Formula For Sum of n Squares

71. Alternate Formula For Sum of n Cubes

72. More on Alternate Formula For Sum of n Cubes

73. Problem1-Alternate Formula For Sum of n Cubes

74. Problem2-Alternate Formula For Sum of n Cubes

75. Arithmetical-Geometric Series

76. Problem-Arithmetical-Geometric Series

77. Sum of n Terms of Arithmetical-Geometric Series

78. More on Sum of n Terms of Arithmetical-Geometric Series

79. Further on Sum of n Terms of Arithmetical-Geometric Series

80. Problem-Sum of n Terms of Arithmetical-Geometric Series

81. Sum to Infinity of Arithmetico-Geometric Series

82. Problem-Sum to Infinity of Arithmetico-Geometric Series

84. The Method of Differences
85. Problem-The Method of Differences
86. A Series Each Term Having r Factors in A.P
87. More on A Series Each Term Having r Factors in A.P-1
88. More on A Series Each Term Having r Factors in A.P-2
89. More on A Series Each Term Having r Factors in A.P-3
90. Problem-A Series Each Term Having r Factors in A.P
91. Introduction to Reciprocal Series
92. More on Introduction to Reciprocal Series1
93. More on Introduction to Reciprocal Series2
94. More on Introduction to Reciprocal Series3
95. Problem-Introduction to Reciprocal Series1
96. Problem-Introduction to Reciprocal Series2
97. Summation of Series By Partial Fractions
98. Problem-Summation of Series By Partial Fractions

Chapter # 07

Permutation, Combination and Probability (45

Videos)

7.1 Introduction

1. The Counting Principles
2. Introduction to Factorial Notation
3. Problem-Introduction to Factorial Notation

7.2 Permutation

4. Introduction to Permutation
5. Problem-Introduction to Permutation
6. Permutation of Things Not All Different
7. Problem-Permutation of Things Not All Different
8. Circular Permutation
9. Problem-Circular Permutation

7.3 Combinations

10. Introduction to Combinations
11. Problem1-Introduction to Combinations
12. Problem2-Introduction to Combinations
13. Complementary Combination
14. Problem1-Complementary Combination
15. Problem2-Complementary Combination

7.4 Probability

16. Introduction to Probability

17. Problem-Introduction to Probability
18. Experiments and Sample Space
19. Problem-Experiments and Sample Space
20. Definition of Probability
21. Problem-Definition of Probability
22. Basic Terminology
23. Probability as Long Term Relative Frequency
24. Problem Solving Strategies in Probability
25. Probability and Venn Diagrams
26. More on Probability and Venn Diagrams
27. Possible Outcomes in the Sample Space
28. Problem-Possible Outcomes in the Sample Space
29. Simple Combined Events and Possibility Diagrams
30. Problem-Simple Combined Events and Possibility Diagrams
31. Simple Combined Events and Tree Diagrams
32. Estimating Probabilities and Tally Marks
33. Problem-Estimating Probabilities and Tally Marks
34. Addition of Probabilities and Mutually Exclusive Events
35. Problem-Addition of Probabilities of Mutually Exclusive Events
36. Addition of Probabilities of Overlapping Events
37. Problem-Addition of Probabilities of Overlapping Events
38. Addition of Probabilities of Disjoint Events
39. Addition of Probabilities of Subset Events
40. Problem-Addition of Probabilities of Subset Events
41. Multiplication of Probabilities and Independent Events
42. More on Multiplication of Probabilities and Independent Events
43. Problem-Multiplication of Probabilities of Independent Events
44. Multiplication of Probabilities of n Independent Events
45. Problem-Multiplication of Probabilities of n Independent Events

Chapter # 08

Mathematical Inductions and Binomial The (41 Videos)

8.1 Introduction

1. Introduction to Mathematical Induction
2. Problem-Introduction to Mathematical Induction

8.2 Principle of Mathematical Induction

3. Principle of Mathematical Induction
4. More on Principle of Mathematical Induction
5. Problem1-Principle of Mathematical Induction

6. Problem2-Principle of Mathematical Induction
7. Sum of Positive Integral Powers of Natural Numbers

8.3 Principle of Extended Mathematical Induction

8. Principle of Extended Mathematical Induction
9. Problem1-Principle of Extended Mathematical Induction
10. Problem2-Principle of Extended Mathematical Induction

8.4 Binomial Theorem

11. Introduction to Binomial Theorem
12. Problem1-Introduction to Binomial Theorem
13. Problem2-Introduction to Binomial Theorem
14. Problem2-Introduction to Binomial Theorem
15. More on Proof of Binomial Theorem
16. Problem1-Proof of Binomial Theorem
17. Problem2-Proof of Binomial Theorem
18. Deductions From Binomial Theorem
19. Problem1-Deductions From Binomial Theorem
20. Problem2-Deductions From Binomial Theorem
21. Some Important Observations
22. Pascal's Triangle
23. Problem1-Pascal's Triangle
24. Problem2-Pascal's Triangle
25. The Middle Term in the Expansion of $(a + x)^2$
26. Problem1-The Middle Term in the Binomial Expansion
27. Problem2-The Middle Term in the Binomial Expansion
28. More on Problem2-The Middle Term in the Binomial Expansion
29. Problem3-The Middle Term in the Binomial Expansion
30. Some Deductions From the Binomial Expansion of $(a + x)^n$
31. Problem1-Some Deductions From the Binomial Expansion
32. Problem2-Some Deductions From the Binomial Expansion
33. Problem3-Some Deductions From the Binomial Expansion

8.5 The Binomial Theorem When the Index n is a Negative Integer

34. The Binomial Theorem When the Index n is a Negative Integer
35. Problem-The Binomial Theorem With Negative Integer Index
36. Some Particular Cases of the Expansion of $(1 + x)^n$, $n < 0$
37. Problem-Some Particular Cases of the Binomial Expansion

8.6 Applications of the Binomial Theorem

38. Applications of the Binomial Theorem
39. More on Applications of the Binomial Theorem
40. Problem1-Applications of the Binomial Theorem
41. Problem2-Applications of the Binomial Theorem

Chapter # 09

Fundamentals of Trigonometry (55 Videos)

9.1 Introduction

1. Introduction to Trigonometry
2. Problem1-Introduction to Trigonometry

9.2 Units of Measures of Angles

3. Introduction to an Angle
4. Measuring an Angle in Sexagesimal System
5. Problem1-Measuring an Angle in Sexagesimal System
6. Sexagesimal System into Decimal form & Vice Versa
7. Problem-Sexagesimal System into Decimal form & Vice Versa
8. Radian Measure of an Angle
9. Problem1-Radian Measure of an Angle
10. Problem2-Radian Measure of an Angle

9.3 Relation Between an Arc Length & Circul

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Introduction to Analytic Geometry (92 Videos)

18.1 Introduction

- 1. Cartesian Coordinate System & Cartesian Plane
- 2. Derivation of Distance formula
- 3. Use of Distance formula
- 4. Problem1-Use of Distance formula
- 5. Points Dividing the Join of Two Points in Given Ratio
- 6. More on Points Dividing Join of Two Points in Given Ratio
- 7. Problem1a-Points Dividing the Join of Two Points in Given Ratio
- 8. Problem1b-Points Dividing the Join of Two Points in Given Ratio

18.2 Translation and Rotation of Axes

- 9. Translation of Axes
- 10. Problem1-Translation of Axes
- 11. Problem2-Translation of Axes
- 12. Rotation of Axes
- 13. Problem1-Rotation of Axes
- 14. Problem2-Rotation of Axes

18.3 Equations of Straight Lines

- 15. Inclination of Line
- 16. Problem1-Inclination of Line
- 17. Slope or Gradient of a Line
- 18. Gradient of a Straight Line Joining Two Points
- 19. Slope of Collinear Line Segments
- 20. Slope of Parallel Lines
- 21. Problem-Slope of Parallel Lines
- 22. Problem2-Slope of Parallel Lines
- 23. Equations of a Straight Line
- 24. More on Equations of Straight Line
- 25. Problem-Equations of a Straight Line
- 26. Derivation of Slope Intercept form
- 27. Problem1-Derivation of Slope Intercept form
- 28. Deriving Point-slope Form of Equation of Straight Line
- 29. Problem1-Deriving Point-slope Form of Equation of Straight Line
- 30. Symmetric Form of Equation of Straight Line
- 31. Problem1-Symmetric Form of Equation of Straight Line
- 32. Two Point form of Equation of Straight Line
- 33. Problem1-Two Point form of Equation of Straight Line

34. Intercept Form of Equation of Straight Line
35. Problem1-Intercept Form of Equation of Straight Line
36. Normal Form of Equation of Straight Line
37. Problem1-Normal Form of Equation of Straight Line
38. How 2 Variabled Linear Equation Represent Straight Line
39. Problem1-How 2 Variabled Linear Equation Represent Straight Line
40. Transforming General Linear Equation to Standard Forms
41. Problem1-Transforming General Linear Equation to Standard Forms
42. Transforming General Equation to Slope Intercept Form
43. Problem1-Transforming General Equation to Slope Intercept Form
44. Transforming General Form of Equation to Intercept Form
45. Problem1-Transforming General Form of Equation to Intercept Form
46. Transforming General Form of Equation to Normal Form
47. Problem1-Transforming General Form of Equation to Normal Form
48. Transforming General Form of Equation to Point Slope Form
49. Problem1-Transforming General Form of Equation to Point Slope Form
50. Transforming General Form of Equation to Symmetric Form
51. Problem1-Transforming General Form of Equation to Symmetric Form
52. Position of Point with Respect to Line
53. More on Position of Point with Respect to Line
54. Problem1-Position of Point with Respect to Line

18.4 Two and Three Straight Lines

55. Relationship between Two and Three Straight Lines
56. The Point of Intersection of Straight Lines
57. Problem1-The Point of Intersection of Straight Lines
58. Condition of Concurrency of Three Straight Lines
59. More on Condition of Concurrency of Three Straight Lines
60. Problem1-Condition of Concurrency of Three Straight Lines
61. Equation of Lines Through Point of Intersecting 2 Lines
62. Problem1-Equation of Lines Through Point of Intersecting 2 Lines
63. Condition that Altitudes of Triangle are Concurrent
64. More on Condition that Altitudes of Triangle are Concurrent
65. Problem1-Condition that Altitudes of Triangle are Concurrent
66. Condition that Right Bisectors of Triangle are Concurrent
67. More on Condition that Right Bisectors of Triangle Concurrent
68. Problem1-Condition that Right Bisectors of Triangle are Concurrent
69. Distance of Point From Line
70. Problem1-Distance of Point From Line
71. Problem2-Distance of Point From Line
72. Problem1-Distance between Two Parallel Lines
73. Area of Triangular Region With Given Vertices
74. More on Area of Triangular Region With Given Vertices
75. Problem1-Area of Triangular Region With Given Vertices

18.5 Angles Between Two Lines

76. Angle Between Two Lines
77. Problem1-Angle Between Two Lines

- 78. Problem2-Angle Between Two Lines
- 79. Equation of a Straight Line in Matrix Form
- 80. More on Equation of Straight Line in Matrix Form
- 81. Problem1-Equation of a Straight Line in Matrix Form
- 82. Problem2-Equation of a Straight Line in Matrix Form

18.6 Homogeneous Equations-Second Degree in 2 Variables

- 83. Homogeneous Equation of Second Degree in Two Variables
- 84. More on Homogeneous Equation of 2nd Degree in 2 Variables
- 85. Homogeneous Equation of Degree 'n'
- 86. More on Homogeneous Equation of Degree 'n'
- 87. Problem1-Homogeneous Equation of Degree 'n'
- 88. Problem2-Homogeneous Equation of Degree 'n'
- 89. Problem2-More on Homogeneous Equation of Degree 'n'
- 90. Problem3-Homogeneous Equation of Degree 'n'
- 91. Condition For the Lines to be Coincident
- 92. More on Condition For the Lines to be Coincident

Chapter # 19

Linear Inequalities and Linear Programmi (29 Videos)

19.1 Introduction

- 1. Introduction to Linear Inequalities

19.2 Linear Inequalities

- 2. More on Introducing Linear Inequalities
- 3. Problem1-Introduction to Linear Inequalities
- 4. Graphing of Linear Inequality in Two Variables
- 5. Procedure for Graphing Linear Inequality in Two Variables
- 6. Problem1-Graphing of Linear Inequality in Two Variables
- 7. Problem2-Graphing of Linear Inequality in Two Variables

19.3 Region Bounded By 2 or 3 Simultaneous I

- 8. Graphing System of Inequalities
- 9. Graphing Solution for System of Inequalities
- 10. Problem1-Graphing System of Inequalities

19.4 Problem Constraints

- 11. Problem1-Introducing Problem Constraints in Inequality
- 12. P1a-More on Introducing Problem Constraints in Inequality

19.5 Feasible Solution Set

- 13. Feasible Solution in Inequality
- 14. Problem Solving in Feasible Solution of Inequality

15. Problem1-Feasible Solution in Inequality
16. Problem1a-More on Feasible Solution in Inequality

19.6 Linear Programming

17. Linear Programming

19.7 Linear Programming Problems

18. Procedure For Determining Optimal Solution
19. More on Procedure For Determining Optimal Solution
20. Problem Solving in Linear Programming
21. More on Problem Solving in Linear Programming
22. Problem1-Procedure For Determining Optimal Solution
23. Problem1-More on Procedure For Determining Optimal Solution
24. Problem2-Procedure For Determining Optimal Solution
25. Problem2-More on Procedure For Determining Optimal Solution
26. Problem3-Procedure For Determining Optimal Solution
27. Problem3-More on Procedure For Determining Optimal Solution
28. Problem4-Procedure For Determining Optimal Solution
29. Problem4-More on Procedure For Determining Optimal Solution

Chapter # 20

Conic Section (158 Videos)

20.1 Introduction

1. Introduction to Conic Section
2. More on Introduction to Conic Section
3. Standard Form of Equation of Circle
4. General Form of Equation of Circle
5. More on General Form of Equation of Circle
6. More on General Form of Equation of Circle
7. More on Equation of Circle Passing Through 3 Non-Collinear Points
8. Equation of Circle Passing Through 2 Points and its Centre on Line
9. Equation-Circle Passing Through 2 Points with 1 Tangential Point
10. Equation-Circle Passing Through 2 Points with 1 Tangential Point-1
11. Equation-Circle Passing Through 2 Points and Line
12. Equation-Circle Passing Through 2 Points and Line

20.2 Tangents and Normals

13. Equation of Tangent to Circle
14. More on Equation of Tangent to Circle
15. Problem1- Equation of Tangent to Circle
16. Problem2a-Equation of Tangent to Circle
17. Problem2b-Equation of Tangent to Circle
18. Equation of Normal to Circle

19. Problem-Points Lie Inside, Outside or on the Circle
20. Points Lie Inside, Outside or on the Circle
21. More on Points Lie Inside, Outside or on the Circle
22. Line Intersects Circle at Most 2 Points
23. Condition that Line may be Tangent to Circle

20.3 Analytical Proofs of Important Properti

24. Proof-2 Tangents can be Drawn to Circle from Point
25. More on Proof-2 Tangents can be Drawn to Circle from Point
26. Length of Tangent to Circle
27. To Prove Circles Diameter is 2 Times its Radius
28. Chords Perpendicular Passes Centre of Circle
29. More on Chords Perpendicular Passes Centre of Circle
30. Line From Centre and Midpoint of Chord is Perp to it
31. More on Line From Centre and Midpoint of Chord is Perp to it
32. Congruent Chords are Equidistance from Centre of Circle
33. More on Congruent Chords are Equidistance from Centre of Circle
34. Angle in Semi-Circle is Right Angle
35. More on Angle in Semi-Circle is Right Angle
36. Perpendicular Radial Segment is Tangent to Circle
37. More on Perpendicular Radial Segment is Tangent to Circle
38. Tangent to Circle is Perpendicular to Radial Segment

20.4 Parabola

39. Introduction to Parabola
40. More on Introduction to Parabola
41. Terms Related to Parabola
42. General Form of Equation of Parabola
43. Other Standard Parabola
44. Graph of Parabola Facing Upward
45. Graph of Parabola Facing Downward
46. Graph of Parabola Facing Rightward
47. Graph of Parabola Facing Leftward
48. Problem Related with Parabola
49. Parabola with Vertex not at Origin
50. More on Parabola with Vertex not at Origin
51. Problem-Parabola with Vertex not at Origin
52. Graphing Parabola with Vertex not at Origin
53. More on Graphing Parabola with Vertex not at Origin
54. Finding Equation of Parabola with Focus and Vertex
55. Finding Equation of Parabola with Directrix and Vertex
56. Problem1-Finding Equation of Parabola with Focus and Vertex
57. Problem2-Finding Equation of Parabola with Focus and Vertex
58. Problem3-Finding Equation of Parabola with Focus and Vertex

20.5 Ellipse and Its Elements

59. Obtaining Standard Equation of Ellipse
60. More on Obtaining Standard Equation of Ellipse-1

61. More on Obtaining Standard Equation of Ellipse-2
62. More on Obtaining Standard Equation of Ellipse-3
63. Circle as Special Case of Ellipse
64. Basic Terms Associated with Ellipse
65. More on Basic Terms Associated with Ellipse
66. Standard Form of Vertical and Horizontal Ellipses
67. Problem1-Standard Form of Vertical and Horizontal Ellipses
68. Translation of Horizontal Ellipse
69. More on Translation of Horizontal Ellipse
70. Translation of Vertical Ellipse
71. More on Translation of Vertical Ellipse
72. Equation of Ellipse with Foci and Vertices
73. Problem1-Equation of Ellipse with Foci and Vertices
74. Problem3-Equation of Ellipse with Foci and Vertices
75. Ellipse Equation with Centre and Length of Axes
76. Ellipse Equation with Centre and Given Point
77. More on Ellipse Equation with Centre and Given Point
78. Ellipse Equation with Vertices and Eccentricity
79. Ellipse Equation with Vertices & Length of Semi-minor Axis

20.6 Hyperbola and Its Elements

80. Defining Hyperbola
81. Standard Form of Equation of Hyperbola
82. More on Standard Form of Equation of Hyperbola
83. More on Standard Form of Equation of Hyperbola
84. Asymptotes of Hyperbola
85. Foci of Hyperbola
86. More on Foci of Hyperbola
87. Problem1-Foci of Hyperbola
88. Horizontal Hyperbola
89. Vertical Hyperbola
90. Rectangular Hyperbola
91. Graphing Hyperbola
92. More on Graphing Hyperbola
93. Problem1-Graphing Hyperbola
94. Problem2-Graphing Hyperbola
95. Hyperbola with Focus and Eccentricity
96. Graphing Hyperbola with Eccentricity and Latus Rectum
97. Graphing Hyperbola with Focus and Directrix
98. Translation of Hyperbola with Horizontally
99. More on Translation of Hyperbola with Horizontally
100. Translation of Hyperbola Vertically
101. More on Translation of Vertical Hyperbola

20.7 Tangents and Normals

102. Intersection of Line and Parabola
103. More on Intersection of Line and Parabola
104. Equation of Tangent Line to Parabola in Slope Form

- 105. Equation of Tangent Line to Parabola at Given Point
- 106. More on Equation of Tangent Line to Parabola at Given Point
- 107. Problem-Equation of Tangent Line to Parabola at Given Point
- 108. Equation of Normal Line to Parabola at Given Point
- 109. Problem1-Equation of Normal Line to Parabola at Given Point
- 110. Application of Parabola-Suspension Related Problem
- 111. Reflecting Property of Parabola
- 112. Use of Parabola on Everyday Life-Problem
- 113. Points of Intersection of Line and Ellipse
- 114. More on Points of Intersection of Line and Ellipse
- 115. Condition of Tangency of Line to Ellipse
- 116. Equation of Tangent to Ellipse at Point
- 117. More on Equation of Tangent to Ellipse at Point
- 118. Equation of Normal to Ellipse at Point
- 119. More on Equation of Normal to Ellipse at Point
- 120. Problem1a-Equation of Normal to Ellipse at Point
- 121. Problem1b-Equation of Normal to Ellipse at Point
- 122. Graph of Ellipse
- 123. More on Graph of Ellipse
- 124. Point of Intersection of Line with Hyperbola
- 125. Condition of Tangency of Line to Hyperbola
- 126. Problem- Condition of Tangency of Line to Hyperbola
- 127. Equation of Tangent Line to Hyperbola at Point
- 128. More on Equation of Tangent Line to Hyperbola at Point
- 129. Problem- Equation of Tangent Line to Hyperbola at Point
- 130. Equation of Normal Line to Hyperbola at Point
- 131. More on Equation of Normal Line to Hyperbola at Point
- 132. Intersection of Two Conics
- 133. More on Intersection of Two Conics
- 134. Problem1a-Intersection of Two Conics
- 135. Problem1b-Intersection of Two Conics

20.8 Translation and Rotation of Axes

- 136. Translation of Axes
- 137. Problem1-Translation of Axes
- 138. Problem2-Translation of Axes
- 139. Rotation of Axes
- 140. Problem1- Rotation of axis
- 141. More on Rotation of Axes
- 142. Rotation of Conic
- 143. More on Rotation of Conic
- 144. Problem1a-Rotation of Conic
- 145. Problem1b-Rotation of Conic
- 146. Problem1b-Rotation of Conic
- 147. Problem1d-Rotation of Conic
- 148. Problem2a-Rotation of Conic
- 149. Problem2b-Rotation of Conic

20.9 The General Equation of Second Degree

150. General Degree of 2nd Degree Equation-Circle
151. General Degree of 2nd Degree Equation-Ellipse
152. General Degree of 2nd Degree Equation-Hyperbola
153. General Degree of 2nd Degree Equation-Parabola
154. Classification of Conic by Discriminant
155. Finding Angle of Rotation in Conic
156. More on Finding Angle of Rotation in Conic
157. Further stuff on Finding Angle of Rotation in Conic
158. Problem1-Finding Angle of Rotation in Conic

Chapter # 21

Vectors (116 Videos)

21.1 Introduction

1. Scalar and Vector Quantities
2. Problem-Scalar and Vector Quantities
3. Terminologies and Notations of Vectors
4. Equal Vectors
5. Vectors which are Opposite
6. Problem-Vectors which are Opposite
7. Column Vectors
8. Addition of Vectors
9. Problem-Addition of Vectors
10. Vector Addition is Associative
11. Problem-Vector Addition is Associative
12. Zero Vectors
13. Subtraction of Vectors
14. Problem-Subtraction of Vectors
15. Scalar Multiple of a Vector
16. Problem-Scalar Multiple of a Vector
17. Expression of a Given Vector in Terms of two Vectors
18. Problem-Expression of a Given Vector in Terms of two Vectors
19. Position Vectors

20. Problem-Position Vectors
21. Properties of Magnitude of Vector
22. Problem-Properties of Magnitude of Vector
23. Notation for Representing Vectors in Plane
24. Problem-Notation for Representing Vectors in Plane
25. Components of a Vector
26. Properties of Vectors in Plane
27. More on Properties of Vectors in Plane
28. A Unit Vector in the Direction of Another Vector
29. Problem-A Unit Vector in the Direction of Another Vector
30. Notation for Vectors in Coordinate System
31. Problem-Notation for Vectors in Coordinate System
32. The Ratio Formula in Vector
33. Problem1-The Ratio Formula in Vector
34. Problem2-The Ratio Formula in Vector
35. Mid-Point Theorem By Vectors
36. Diagonals of Parallelogram Bisect Each Other by Vectors
37. Ratio Theorem By Vectors
38. Problem-Ratio Theorem By Vectors

21.2 Introduction of Vector in Space

39. Introducing Vector Geometry
40. Problem-Introducing Vector Geometry
41. Concept of Vector in Space
42. Problem1-Concept of Vector in Space
43. More on Vectors in Space
44. Properties of Vectors
45. Problem-Properties of Vectors
46. Vectors Addition in Space
47. Problem-Vectors Addition in Space
48. Scalar Multiplication in Space
49. Problem-Scalar Multiplication in Space
50. Notation of Vectors in Space
51. Problem-Notation of Vectors in Space
52. Distance Between Two Points in Space
53. Problem-Distance Between Two Points in Space
54. Direction Angles and Direction Cosines of Vector
55. Problem-Direction Angles and Direction Cosines of Vector

21.3 The Scalar Product of Two Vectors

56. Scalar Product of Two Vectors
57. Problem-Scalar Product of Two Vectors
58. Properties of Scalar Product
59. More on Properties of Scalar Product
60. Problem-Properties of Scalar Product
61. Perpendicular Vectors
62. Problem-Perpendicular Vectors
63. Parallel Vectors

64. Problem-Parallel Vectors
65. Scalar Product of Vectors in Their Component Form
66. Problem-Scalar Product of Vectors in Their Component Form
67. Angle Between Two Vectors
68. Problem-Angle Between Two Vectors
69. Projection of One Vector Upon Another Vector
70. Problem-Projection of One Vector Upon Another Vector
71. Application of Scalar Product
72. Problem-Application of Scalar Product
73. Application of Scalar Product on Geometry
74. Problem-Application of Scalar Product on Geometry
75. More on Application of Scalar Product on Geometry

21.4 Cross Product or Vector Product of Two

76. Cross Product of Two Vectors
77. Problem-Cross Product of Two Vectors
78. Derivation of Useful Results of Cross Product
79. Problem-Derivation of Useful Results of Cross Product
80. Expression of Cross Product in Terms of Components
81. Problem-Expression of Cross Product in Terms of Components
82. More on Cross Product of Two Vectors
83. Properties of Cross Product
84. Problem-Properties of Cross Product
85. More on Properties of Cross Product
86. More on Expression of Cross Product in Terms of Components
87. Direction Numbers or Direction Ratios
88. Problem-Direction Numbers or Direction Ratios
89. Collinear and Coplanar Vectors
90. Problem-Collinear and Coplanar Vectors
91. Vectors Application to Geometry
92. Problem1-Vectors Application to Geometry
93. Problem2-Vectors Application to Geometry
94. Moment of Force
95. Problem-Moment of Force
96. Condition of Parallel Vectors in Cross Product
97. Problem-Condition of Parallel Vectors in Cross Product
98. Area of Parallelogram by Vectors
99. Area of Triangle by Vectors
100. Vector Equation of Line in 3D
101. Problem-Vector Equation of Line in 3D
102. Application of Vector Equation
103. Problem1-Application of Vector Equation
104. Problem2-Application of Vector Equation

21.5 Scalar Triple Product of Vectors

105. Scalar Triple Product
106. Problem-Scalar Triple Product
107. Vector Triple Product

- 108. More on Vector Triple Product
- 109. Analytical Expression of Triple Product
- 110. Problem-Analytical Expression of Triple Product
- 111. Volume of Parallelepiped by Triple Product
- 112. Problem-Volume of Parallelepiped by Triple Product
- 113. Volume of Tetrahedron by Triple Product
- 114. Problem-Volume of Tetrahedron by Triple Product
- 115. Properties of Scalar Triple Product
- 116. Problem-Properties of Scalar Triple Product