PHYSICS

1) PHYSICAL WORLD: What is physics? Scope and excitement of Physics, Physics, technology and society, Fundamental forces in nature, Gravitational Force, Electromagnetic Force, Strong Nuclear Force, Weak Nuclear Force, Towards Unification of Forces, Nature of physical laws.

2) UNITS AND MEASUREMENTS: Introduction, The international system of units, Measurement of Length, Measurement of Large Distances, Estimation of Very Small Distances: Size of a Molecule, Range of Lengths, Measurement of Mass, Range of Masses, Measurement of time, Accuracy, precision of instruments and errors in measurement, Systematic errors, random errors, least count error, Absolute Error, Relative Error and Percentage Error, Combination of Errors, Significant figures, Rules for Arithmetic Operations with Significant Figures, Rounding off the Uncertain Digits, Rules for Determining the Uncertainty in the Results of Arithmetic Calculations, Dimensions of Physical Quantities, Dimensional Formulae and dimensional equations, Dimensional Analysis and its Applications, Checking the Dimensional Consistency of Equations, Deducing Relation among the Physical Quantities.

3) MOTION IN A STRAIGHT LINE: Introduction, Position, path length and displacement, Average velocity and average speed, Instantaneous velocity and speed, Acceleration, Kinematic equations for uniformly accelerated motion, Relative velocity.

4) MOTION IN A PLANE: Introduction, Scalars and vectors, Position and Displacement Vectors, Equality of Vectors, Multiplication of vectors by real numbers, Addition and subtraction of vectors - graphical method, Resolution of vectors, Vector addition - analytical method, Motion in a plane, Position Vector and Displacement, Velocity, Acceleration, Motion in a plane with constant acceleration, Relative velocity in two dimensions, Projectile motion, Equation of path of a projectile, Time of Maximum height, Maximum height of a projectile, Horizontal range of projectile, Uniform circular motion.

5) LAWS OF MOTION: Introduction, Aristotle's fallacy, The law of inertia, Newton's first law of motion, Newton's second law of motion, momentum, Impulse, Newton's third law of motion, Conservation of momentum, Equilibrium of a particle, Common forces in mechanics, friction, Circular motion, Motion of a car on a level road, Motion of a car on a Banked road, Solving problems in mechanics.

6) WORK, ENERGY AND POWER: Introduction, The Scalar Product, Notions of work and kinetic energy : The work-energy theorem, Work, Kinetic energy, Work done by a variable force, The work-energy theorem for a variable force, The concept of Potential Energy, The conservation of Mechanical Energy, The Potential Energy of a spring, Various forms of energy: the law of conservation of energy, Heat, Chemical Energy, Electrical Energy, The Equivalence of Mass and Energy, Nuclear Energy, The Principle of Conservation of Energy, Power, Collisions, Elastic and Inelastic Collisions, Collisions in one dimension, Coefficient of Restitution and its determination, Collisions in Two Dimensions.

7) SYSTEMS OF PARTICLES AND ROTATIONAL MOTION: Introduction, What kind of motion can a rigid body have?, Centre of mass, Centre of Gravity, Motion of centre of mass, Linear momentum of a system of particles, Vector product of two vectors, Angular velocity and its relation with linear velocity, Angular acceleration, Kinematics of rotational motion

about a fixed axis, Torque and angular momentum, Moment of force (Torque), Angular momentum of particle, Torque and angular momentum for a system of particles, conservation of angular momentum, Equilibrium of a rigid body, Principle of moments, Moment of inertia, Theorems of perpendicular and parallel axes, Theorem of perpendicular axes, Theorem of parallel axes, Dynamics of rotational motion about a fixed axis, Angular momentum in case of rotation about a fixed axis, Conservation of Angular Momentum, Rolling motion, Kinetic Energy of Rolling Motion.

8) OSCILLATIONS: Introduction, Periodic and oscillatory motions, Period and frequency, Displacement, Simple harmonic motion (S.H.M.), Simple harmonic motion and uniform circular motion, Velocity and acceleration in simple harmonic motion, Force law for Simple harmonic Motion, Energy in simple harmonic motion, some systems executing Simple Harmonic Motion, Oscillations due to a spring, The Simple Pendulum, Damped simple harmonic motion, Forced oscillations and resonance.

9) GRAVITATION: Introduction, Kepler's laws, Universal law of gravitation, The gravitational constant, Acceleration due to gravity of the earth, Acceleration due to gravity below and above the surface of earth, Gravitational potential energy, Escape speed, Earth satellite, Energy of an orbiting satellite, Geostationary and polar satellites, Weightlessness.

10) MECHANICAL PROPERTIES OF SOLIDS: Introduction, Elastic behaviour of solids, Stress and strain, Hooke's law, Stress-strain curve, Elastic moduli, Young's Modulus, Determination of Young's Modulus of the Material of a Wire, Shear Modulus, Bulk Modulus, Poisson's Ratio, Applications of elastic behaviour of materials.

11) MECHANICAL PROPERTIES OF FLUIDS: Introduction, Pressure, Pascal's Law, Variation of Pressure with Depth, Atmosphere Pressure and Gauge Pressure, Hydraulic Machines, Streamline flow, Bernoulli's principle, Speed of Efflux: Torricelli's Law, Venturi-meter, Blood Flow and Heart Attack, Dynamic Lift, Viscosity, Variation of Viscosity of fluids with temperature, Stokes' Law, Reynolds number, Surface tension, Surface Energy, Surface Energy and Surface Tension, Angle of Contact, Drops and Bubbles, Capillary Rise, Detergents and Surface Tension.

12) THERMAL PROPERTIES OF MATTER: Introduction, Temperature and heat, Measurement of temperature, Ideal-gas equation and absolute temperature, Thermal expansion, Specific heat capacity, Calorimetry, Change of state, Regelation, Latent Heat, Heat transfer, Conduction, thermal conductivity, Convection, Radiation, Black body Radiation, Greenhouse Effect, Newton's law of cooling.

13) THERMODYNAMICS: Introduction, Thermal equilibrium, Zeroth law of thermodynamics, Heat, Internal Energy and work, First law of thermodynamics, Specific heat capacity, Thermodynamic state variables and equation of State, Thermodynamic process, Quasi-static process, Isothermal Process, Adiabatic Process, Isochoric Process, Isobaric process, Cyclic process, Heat engines, Refrigerators and heat pumps, Second law of thermodynamics, Reversible and irreversible processes, Carnot engine, Carnot's theorem.

14) KINETIC THEORY: Introduction, Molecular nature of matter, Behaviour of gases, Boyle's Law, Charles' Law, Kinetic theory of an ideal gas, Pressure of an Ideal Gas, Law of equipartition of energy, Specific heat capacity, Monatomic Gases, Diatomic Gases, Polyatomic Gases, Specific Heat Capacity of Solids, Specific Heat Capacity of Water, Mean free path.

15) WAVES: Introduction, Transverse and longitudinal waves, Displacement relation in a progressive wave, The speed of a travelling wave, The principle of superposition of waves, Reflection of waves, Beats.

16) RAY OPTICS AND OPTICAL INSTRUMENTS: Introduction, Refraction, Total Internal Reflection, Refraction at Spherical Surfaces and by Lenses, Refraction through a Prism, Dispersion by a Prism, Some Natural Phenomena due to Sunlight, Optical Instruments.

17) WAVE OPTICS: Introduction, Huygens Principle, Refraction and reflection of plane waves using Huygens Principle, Coherent and Incoherent Addition of Waves, Interference of Light Waves and Young's Experiment, Diffraction - The single slit, seeing the single slit diffraction pattern. The validity of ray optics.

18) ELECTRIC CHARGES AND FIELDS: Introduction, Electric Charges, Conductors and Insulators, Charging by Induction, Basic Properties of Electric Charge, Coulomb's Law, Forces between Multiple Charges, Electric Field, Electric Field Lines, Electric Flux, Electric Dipole, Dipole in a Uniform External Field, Continuous Charge Distribution, Gauss's Law, Application of Gauss's Law - Field due to an infinitely long straight uniformly charged wire, Field due to a uniformly charged infinite plane sheet.

19) ELECTROSTATIC POTENTIAL AND CAPACITANCE: Introduction, Electrostatic Potential, Potential due to a Point Charge, Potential due to an Electric Dipole, Potential due to a System of Charges, Equipotential Surfaces, Potential Energy of a System of Charges, Potential Energy in an External Field, Electrostatics of Conductors, Dielectrics and Polarisation, Capacitors and Capacitance, The Parallel Plate Capacitor, Effect of Dielectric on Capacitance, Combination of Capacitors, Energy Stored in a Capacitor.

20) CURRENT ELECTRICITY: Introduction, Electric Current, Electric Currents in Conductors, Ohm's law, Drift of Electrons and the Origin of Resistivity, Limitations of Ohm's Law, Temperature Dependence of Resistivity, Electrical Energy, Power, Cells, emf, Internal Resistance, Cells in Series and in Parallel, Kirchhoff's rules, Wheatstone Bridge, Meter Bridge, Potentiometer.

21) MOVING CHARGES AND MAGNETISM: Introduction, Magnetic Force, Motion in a Magnetic Field, Magnetic Field due to a Current Element, Biot-Savart Law, Magnetic Field on the Axis of a Circular Current Loop, Ampere's Circuital Law, The Solenoid and the Toroid, Force between Two Parallel Currents, the Ampere, Torque on Current Loop, Magnetic Dipole, The Moving Coil Galvanometer.

22) MAGNETISM AND MATTER: Introduction, The Bar Magnet - The magnetic field lines, The Electrostatic analog, Magnetism and Gauss's Law, The Earth's Magnetism, Magnetisation and Magnetic Intensity.

23) ELECTROMAGNETIC INDUCTION: Introduction, The Experiments of Faraday and Henry, Magnetic Flux, Faraday's Law of Induction, Lenz's Law and Conservation of Energy, Motional Electromotive Force, Energy Consideration: A Quantitative Study, Eddy Currents, Inductance, AC Generator.

24) ALTERNATING CURRENT: Introduction, AC Voltage Applied to a Resistor, Representation of AC Current and Voltage by Rotating Vectors-Phasors, AC Voltage Applied

to an Inductor, AC Voltage Applied to a Capacitor, AC Voltage Applied to a Series LCR Circuit, LC Oscillations, Transformers.

25) ELECTROMAGNETIC WAVES: Introduction, Electromagnetic Waves, Electromagnetic Spectrum.

26) DUAL NATURE OF RADIATION AND MATTER: Introduction, Electron Emission, Photoelectric Effect, Experimental Study of Photoelectric Effect, Photoelectric Effect and Wave Theory of Light, Einstein's Photoelectric Equation: Energy Quantum of Radiation, Particle Nature of Light: The Photon, Wave Nature of Matter.

27) ATOMS: Introduction, Alpha-particle Scattering and Rutherford's Nuclear Model of Atom, Atomic Spectra, Bohr Model of the Hydrogen Atom, The Line Spectra of the Hydrogen Atom, DE Broglie's Explanation of Bohr's Second Postulate of Quantisation.

28) NUCLEI: Introduction, Atomic Masses and Composition of Nucleus, Size of the Nucleus, Mass-Energy, Nuclear Force, Nuclear Energy.

29) SEMICONDUCTOR ELECTRONICS: MATERIALS, DEVICES AND SIMPLE CIRCUITS: Introduction, Classification of Materials: Metals, Semiconductors and Insulators, Intrinsic Semiconductor, Extrinsic Semiconductor, p-n Junction, Semiconductor diode, Application of Junction Diode as a Rectifier, Special Purpose p-n Junction Diodes – optoelectronic junction devices, Junction Transistor – transistor - structure and action, basic transistor circuit configurations and transistor characteristics, Digital Electronics and Logic Gates, Integrated Circuits.

30) COMMUNICATION SYSTEMS: Introduction, Elements of a Communication System, Basic Terminology Used in Electronic Communication Systems, Bandwidth of Signals, Bandwidth of Transmission Medium, Propagation of Electromagnetic Waves, Modulation and its Necessity, Amplitude Modulation, Production of Amplitude Modulated Wave, Detection of Amplitude Modulated Wave.

The following topics are the deleted content of PHYSICS (30%) in the Intermediate Second Year for the Academic Year 2020-21 by the TSBIE as per Telugu Academy text Book. The same is deleted for the TS EAMCET-2021 Examination.

CHAPTER – 1: WAVES
1.8 Doppler Effect

CHAPTER– 2: RAY OPTICS AND OPTICAL INSTRUMENTS
2.2 Reflection of light by Spherical Mirrors
2.8.2 Scattering of light

CHAPTER – 3: WAVE OPTICS
3.6.3 Resolving power of optical instruments
3.7 Polarization

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CHAPTER – 4: ELECTRIC CHARGES AND FIELDS
4.15.3 Field due to a uniformly charged thin spherical shell

CHAPTER– 5: ELECTROSTATIC POTENTIAL AND CAPACITANCE
5.16 Van de Graaf generator

CHAPTER – 6: CURRENT ELECTRICITY
6.7 Resistivity of various Materials
6.10 Combination of resistors-series and parallel

CHAPTER – 7: MOVING CHARGES AND MAGNETISM
7.4 Motion in combined electric and magnetic fields

CHAPTER – 8: MAGNETISM AND MATTER
8.2.2 Bar Magnet as a equivalent solenoid
8.2.3 The dipole in a uniform magnetic field
8.6 Magnetic properties of materials
8.7 Permanent magnets and electromagnets

CHAPTER – 10: ALTERNATING CURRENT
10.7 Power in AC Circuit: The Power Factor

CHAPTER – 11: ELECTRO MAGNETIC WAVES
11.2 Displacement Current

CHAPTER–12: DUAL NATURE OF RADIATION AND MATTER
12.9 Davisson and Germer Experiment

CHAPTER–14: NUCLEI
14.4.2 Nuclear Binding energy
14.6 Radioactivity

CHAPTER–15
SEMICONDUCTOR ELECTRONICS: MATERIALS, DEVICES AND SIMPLE CIRCUITS
15.8.1 Zener diode
15.9.3 Transistor as a device
15.9.4 Transistor as an amplifier (CE configuration)
15.9.5 Feedback amplifier and transistor oscillator

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