

# GOVT COLLEGE SAFIDON      SESSION 2025-26

B.Sc. 3<sup>rd</sup> Sem Physics

TENTATIVE LESSON PLAN

Paper TD and Statistical Physics

Teacher: Ajay Parkash

| MONTH     | TOPICS   |
|-----------|--|
| August    | Thermodynamics-system, variables and equations of state, thermal equilibrium, zeroth law of thermodynamics   |
|           | Concept of heat, work and its path dependence, ( work done by the system, on the system), laws of thermodynamics, its significance and limitations,  |
| September | Internal energy as a state function, , different types of process- isochoric process, adiabatic process, isothermal process, cyclic process  |
|           | Reversible and irreversible process, first law and second law of thermodynamics and its significance, carnot theorem and absolute scale of temperature, , Absolute zero and magnitude of each division on thermodynamics scale and perfect gas scale,          |
|           | Joule's free expansion, Joule's Thomson's effect' Joule-Thomson) Porus plug experiment, conclusions and explanations,, Analytical treatment of Joule-Thomson effect, Entropy, calculation of entropy of reversible and irreversible process, diagram,          |
|           | Entropy of a perfect gas, Nernst Heat law(third law of thermodynamics, liquefaction of gases(oxygen, air, hydrogen and helium) solidification below 4K, Cooling by adiabatic demagnetization.  |
| October   | Introduction of Clausius-clapeyron and Clausius latent heat equations and significance, specific heat of saturated vapours, phase diagram and triple point of substance, development of Maxwell thermodynamical equations,                                     |
|           | Thermodynamical functions: Internal Energy, Helmholtz function, Enthalpy, Gibb's function(G) and the relation between derivation of Maxwell thermodynamical relations from thermodynamical functions. Application of Maxwell relations:                        |
|           | Relations between two specific heats of gas, Derivations of Clausius-Clapeyron equation, variation of intrinsic energy with volume for   |
|           | (1) Perfect and Vander-wall gas (ii) solids and liquids, derivation of Stefan's law, Adiabatic compression and expansion of gas and deduction of theory of Thomson effect.   |
| November  | Distribution of N( for N=2,3,4) distinguishable and indistinguishable particles in two boxes of equal size, microstates and macrostates, thermodynamical probability, constraints and accessible states, statistical fluctuations,                             |
|           | General distribution of distinguishable particles in compartments of different sizes, B-parameter, entropy and probability, concept of phase space, division of phase space into cells, postulates of statistical mechanics, classical and quantum statistics. |
|           | Basis approach to three statistics, Maxwell-Boltzmann statistics applied to an ideal gas in equilibrium energy distribution law, Maxwell's distribution of speed and velocity (derivations required)   |
|           | Most probable speed, average and r.m.s. speed, mean energy for Maxwellian distribution.<br>Dulong and Petit's law derivation of Dulong and Petit's law from Classical Physics,   |
| December  | Need of quantum statistics, Classical versus quantum statistics, Bose-Einstein energy distribution law,  |
|           | Application of B.E. statistics to Planck's radiation law, degeneracy and B.E. condensation, Fermi-Dirac-energy distribution law,   |
|           | F.D. gas and degeneracy, Fermi energy and Fermi temperature, FD energy distribution law for electron gas in metals, zero point energy, average speed ( at OK) of electron gas.   |

# GOVT COLLEGE SAFIDON      SESSION 2025-26

SEC    3<sup>rd</sup> SEM

TENTATIVE LESSON PLAN

Paper BASIC INSTRUMENTATION SKILL

Teacher: Ajay Parkash

| MONTH     | TOPICS  |
|-----------|---|
| August    | Instruments accuracy, precision, sensitivity, resolution range, etc. Errors in measurement and loading effects, multimeter, principles of measurement of DC voltage and dc current, ac voltage, ac current and resistance |
|           | Specifications of a multimeter and their significance. Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity,  |
| September | Principle of voltage measurement (Block Diagram) Specification of an electronic voltmeter and their significance AC millivoltmeter, Types of AC millivoltmeter.   |
|           | Block diagram of ac millivoltmeter, specifications and their significance.  |
|           | Oscilloscope: Block diagram of basic CRO, CRT, measurement of voltage (Dc and ac)   |
|           | And frequency and time period using CRO. Special features of dual trace, introduction to digital oscilloscope, probe  |
| October   | Digital storage Oscilloscope : Principle of working.  |
|           | DC power sources, AC/DC generators, inductance, capacitance and impedance   |
|           | Operation of transformer, Electric motor, Single phase, three phase & DC Motor.   |
|           | Basic Design, Interfacing DC or AC sources to control heaters and motors.   |
| November  | Speed and power of ac motor.  |
|           | Comparison of analog and digital instruments, characteristics of digital meter  |
|           | Working principle of digital voltmeter,   |
|           | Digital Multimeter: Block Diagram and working of a digital multimeter,  |
| December  | Working principle of time interval, frequency and period measurement using universal counter/frequency counter  |
|           | Time-base stability, accuracy and resolution.   |
|           |   |

# GOVT COLLEGE SAFIDON      SESSION 2025-26

. 1<sup>st</sup> MDC Physics

TENTATIVE LESSON PLAN

Paper MDC

Teacher: Ajay Parkash

| MONTH     | TOPICS   |
|-----------|--|
| August    | Physics: Nature, scope and excitement, Major discoveries in Physics, Major contribution by Indian Physicists, Physics in relation to other sciences, |
|           | Impact of Physics on society, latest developments in Science and Technology,   |
| September | System of measuring: Units, need for measurement, measuring process, concept of mass, length and time. Fundamental and derived units                 |
|           | System of units, and concept of errors types of error( only definion)..  |
|           | Accuracy and precision in measurement  |
|           |  |
| October   | Least count and applications of measuring instruments  |
|           | Vernier Calliper, Screw guage.   |
|           | Motion of objects in one dimension: position of the object,  |
|           | origin/reference point, frame of reference   |
| November  | Definion and examples of motion in one , wo and three dimension.   |
|           | Scalar and vector quantities , description of motion along a straight line.  |
|           | Distance and displacement, uniform and non uniform motion  |
|           | , average and instantaneous speed,   |
| Dec       | average and instantaneous velocity, acceleration , graphical analysis of straight line motion,   |
|           | Distance-time graph, velocity-time graph   |
|           | , equations of motion and their applications   |

## GOVT COLLEGE SAFIDON      SESSION 2025-26

B.Sc. 5<sup>th</sup> Sem Physics

LESSON PLAN

Paper Modern Physics (Only third unit)

Teacher: Ajay Parkash

| MONTH | TOPICS                                |
|-------|---------------------------------------|
|       |                                       |
| Aug   | Bohr's Model                          |
|       | Sommerfield theory (Qualitative only) |
| Sep   | Larmor's theorem (Qualitative only)   |
|       | Vector Atom Model                     |
| Oct   | Electron spin                         |
|       | Space Quantisation                    |
| Nov   | Spin-orbit interaction energy         |
|       | LS and JJ Coupling                    |
|       |                                       |
| Dec   | Zeeman Effect, Lande's g factor       |

# GOVT COLLEGE SAFIDON      SESSION 2025-26

B.A. 3<sup>rd</sup> Sem

TENTATIVE LESSON PLAN

Paper Waste Management Techniques

Teacher: Ajay Parkash

| MONTH     | TOPICS  |
|-----------|---|
| August    | Waste: Classification, generation and characteristic, Basic aspects of solid waste management generation: on-site handling, storage and processing: collection of solid wastes; transfer and transport, processing techniques; ultimate disposal. |
|           | Hazardous Waste:- Definition, sources, effects, disposal and management techniques, Physical, chemical, physio-chemical treatment, and thermal treatment: Solidification, chemical fixation, encapsulation, pyrolysis and incineration.           |
| September | Bio-medical waste: Definition, categories and management, E- Waste: Sources and management  |
|           | Disposal of Solid Waste: Sanitary land filling – site selection, design and operation of sanitary land fills- Leachate collection & treatment, Secure land filling.   |
|           | Incineration: Mass burn, Rotatory klin, Fluidized, Bed incinerator, Liquid injection incinerator  |
|           | Waste gas flare incinerator, fixed grate incinerators, Plasma Pyrolysis, Composting, vermicomposting.   |
| October   | Principles of Industrial Waste Treatment: sources of pollution, Physical, chemical and biological properties  |
|           | Manufacturing processes, flow sheets, characteristics and composition of wastes including waste reduction,  |
|           | Treatment and disposal methods for Food industries: Sugar, Fermentation, Material industries, Paper, Steel  |
|           | Steel, Metal+ Plating and petroleum refineries..  |
| November  | Role of Bio-Technology in Waste Management: Recovery of by products and raw material from waste water conversion,   |
|           | Waste recovery and re-use, reclamation by ground water recharge..   |
|           | Agriculture reuse of effluent: sludge as fertilizer, biomass for energy, metal recovery bioscrubbing  |
|           | Biological treatment, Biological methods for waste processing   |
| December  | Bio diesel, Biohydrogen   |
|           | Doubts, Exam preparation  |