Sub. Code – 103

1st Sem

CONTENTS: Theory

| CHAPTER | CONTENT | HOURS | MARKS |
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| 1. | UNITS AND MEASUREMENTS<br>1.1 Need of measurement and unit in engineering and science, definition of unit , requirements of standard unit, systems of units-CGS,MKS and SI, fundamental and derived quantities and their units<br>1.2 Definition of dimensions with examples, principle of homogeneity of dimensions, limitations of dimensions.<br>1.3 Definition of accuracy, precision and error, estimation of errors – absolute error, relative error and percentage error, rules and identification of significant figures.<br>(Numericals on percentage error and significant figures) | 04 | 06 |
| 2 | MECHANICS<br>2.1 Motion along a straight line and Force<br>Concept of scalar and vector quantities, Equations of motion with constant acceleration (derivation not required), Equations of motion of falling body under gravity, Newton's laws of motion, Force, inertia, Action and reaction, tension, , momentum, impulse and impulsive force with practical examples (basic Idea).Conservation of linear momentum.<br>(Simple problems on linear motion) | 04 | 10 |
| | 2.2Angular Motion<br>Definition of angular displacement, angular velocity and angular acceleration, relation between linear velocity and angular velocity, definition of simple harmonic motion (SHM), SHM as a projection of uniform circular motion on any diameter, equation of SHM, derivation of displacement, velocity and acceleration of a body executing SHM. | 05 | 08 |
| 3 | GRAVITATION<br>Newton's laws of gravitation,Newton's gravitational constant (G) and its SI unit, Acceleration due to gravity (g) and its relation with "G",Variation of g with altitude and latitude(deduction not required)<br>(Simple problems) | 03 | 06 |
| 4. | WORK , ENERGY & POWER<br>Definition of work, energy and power, equations for P.E. & K.E., Work-Energy principle, Representation of work by using graph, work done by a torque (no derivation)<br>(Numericals on work, potential and kinetic energy) | 02 | 06 |

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| 5. | GENERAL PROPERTIES OF MATTER<br>5.1 Elasticity<br>Deforming force, restoring force, elastic and plastic body, stress and strain with their types. elastic limit, Hooke's law, Young's modulus, bulk modulus, modulus of rigidity and relation between them (no derivation).<br>(Numerical on stress, strain and Young's modulus) | 04 | 08 |
| | 5.2 Surface Tension.<br>Molecular force, cohesive and adhesive force, Molecular range , sphere of influence, Laplace's molecular theory, Definition of surface tension and its S.I. unit, angle of contact, capillary action with examples, shape of meniscus for water and mercury, relation between surface tension , capillary rise and radius of capillary ( no derivation),effect of impurity and temperature on surface tension<br>(Numerical on relation between surface tension, capillary rise and radius) | 04 | 08 |
| | 5.3 Viscosity<br>Definition of viscosity, viscous force, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its S.I. unit, streamline and turbulent flow with examples, critical velocity, Reynolds's number and its significance, derivation of viscous force for free fall of spherical body through viscous medium, upthrust, terminal velocity, Stoke's law (statement and formula).<br>(Numerical on coefficient of viscosity, Reynolds number and Stoke's formula) | 04 | 08 |
| CHAPTER | CONTENT | HOURS | MARKS |
| 6 | HEAT<br>**Transmission of heat and expansion of solids:**<br>Three modes of transmission of heat -conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity and its S.I. unit, Definition of linear, aerial and cubical expansion and relation between them. (no derivation)<br>(Numericals on law of thermal conductivity, and coefficients of expansions) | 04 | 08 |
| 7 | ACOUSTICS<br>7.1 Sound<br>Definition of wave motion, amplitude, period, frequency, and wavelength, relation between velocity, frequency and wavelength , longitudinal and transverse wave, definition of stationary wave , node and antinode, forced and free vibrations, definition of resonance with examples, derivation of formula for velocity of sound with end correction.<br>(Numericals on relation $v = n\lambda$ and resonance) | 04 | 06 |

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| | 7.2 Acoustics of Building<br>Acoustics-concept and definition, Intensity and loudness of sound, echo, Reverberation standard reverberation time, Sabine's formula, Conditions for good acoustics, Factors affecting Acoustical planning of auditorium.<br><br>(Numericals on Sabine's formula) | 04 | 06 |
| | TOTAL | 42 | 80 |

Practical:

Skills to be developed

1) Intellectual skills-

Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.

Analyze properties of matter & their use for the selection of material.

To verify the principles, laws, using given instruments under different conditions.

To read and interpret the graph.

To interpret the results from observations and calculations.

To use these results for parallel problems.

2) Motor skills-

Proper handling of instruments.

Measuring physical quantities accurately.

To observe the phenomenon and to list the observations in proper tabular form.

To adopt proper procedure while performing the experiment.

To plot the graphs.

List of Experiments:

1. To know your Physics Laboratory.
2. To use Vernier Callipers for the measurement of dimensions of given object.
3. To use Micrometer Screw Gauge for the measurement of dimensions (Length, Thickness, Diameter) of given object.
4. To use spherometer for the measurement of thickness of a given glass piece.
5. To calculate Young's modulus of elasticity of steel wire by Vernier method
6. To study capillary phenomenon and to verify that the height of liquid in capillary is inversely proportional to the radius of capillary
7. To determine coefficient of viscosity of given liquid using Stoke's Method
8. To calculate the Linear Thermal coefficient of expansion for copper by using Pullinger's apparatus.
9. To determine refractive index of a glass using glass slab by pin method. ($\sin i/\sin r=\mu$).
10. To determine the velocity of sound by using resonance tube.