

**SHREE RAMKRISHNA INSTITUTE OF SCIENCE & TECHNOLOGY**

**LESSON PLAN FOR THE ACADEMIC SESSION 2015 – 2016**

**SUBJECT: BASIC PHYSICS. SEMESTER: FIRST. MAXIMUM MARKS: 100, CREDIT: 3, THEORY: 2 HRS/WEEK**

<b>UNIT</b>	<b>NAME OF THE CHAPTER</b>	<b>CONTENT IN DETAILS</b>	<b>LECTURES REQUIRED</b>
<b>1. UNITS, DIMENSIONS &amp; MEASUREMENTS</b>	<b>1.1 SYSTEM OF UNITS</b>	<b>NEED OF MEASUREMENT IN ENGINEERING AND SCIENCE. CGS, MKS AND SI. FUNDAMENTAL AND DERIVED UNITS (SI).</b>	<b>01</b>
	<b>1.2 DIMENSIONS</b>	<b>DIMENSIONS OF PHYSICAL QUANTITY. PRINCIPLE OF DIMENSIONAL HOMOGENEITY (EXPLANATION WITH EXAMPLES). APPLICATION – 1 OF DIMENSIONAL ANALYSIS</b>	<b>01</b>
		<b>APPLICATION – 2, 3 OF DIMENSIONAL ANALYSIS. LIMITATIONS OF DIMENSIONAL ANALYSIS. PROBLEMS</b>	<b>01</b>
	<b>1.3 ESTIMATION OF ERRORS</b>	<b>CONCEPT OF SIGNIFICANT FIGURE. ABSOLUTE ERROR, RELATIVE OR PROPORTIONAL ERROR AND PERCENTAGE ERROR (CONCEPT ONLY). ACCURACY &amp; PRECISION OF INSTRUMENTS (CONCEPT ONLY, EXAMPLES ONLY WITH SLIDE CALIPERS AND SCREW GAUGE).</b>	<b>01</b>
<b>2. GENERAL PROPERTIES OF MATTER</b>	<b>2.1 ELASTICITY</b>	<b>DEFORMING FORCE AND RESTORING FORCE. ELASTIC AND PLASTIC BODY. STRESS AND STRAIN. HOOKE'S LAW. STRESS – STRAIN DIAGRAM.</b>	<b>01</b>
		<b>YOUNG'S MODULUS, BULK MODULUS, RIGIDITY MODULUS AND POISSON'S RATIO (DEFINITION AND FORMULA) AND RELATION BETWEEN THEM (NO DERIVATION). (SIMPLE NUMERICAL PROBLEMS).</b>	<b>01</b>
	<b>2.2 SURFACE TENSION</b>	<b>COHESIVE AND ADHESIVE FORCES. DEFINITION, DIMENSION AND SI UNIT OF SURFACE TENSION. SURFACE ENERGY (CONCEPT ONLY). ANGLE OF CONTACT</b>	<b>01</b>
		<b>CAPILLARITY, SHAPE OF LIQUID MENISCUS IN A CAPILLARY TUBE, RISE OF LIQUID IN A CAPILLARY TUBE</b>	<b>01</b>
		<b>EFFECT OF IMPURITY AND TEMPERATURE ON SURFACE TENSION. SOME NATURAL EXAMPLES OF SURFACE TENSION.</b>	<b>01</b>
	<b>2.3 FLUID MECHANICS</b>	<b>PASCAL'S LAW. MULTIPLICATION OF FORCE. BUOYANCY. CONDITIONS OF EQUILIBRIUM OF FLOATING BODY. ARCHIMEDES' PRINCIPLE. [SIMPLE NUMERICAL PROBLEMS].</b>	<b>01</b>
		<b>STREAMLINE FLOW AND TURBULENT FLOW OF A FLUID (CONCEPT), CRITICAL VELOCITY (DEFINITION ONLY). EQUATION OF CONTINUITY AND BERNOULLI'S THEOREM (STATEMENT AND EQUATION ONLY, SIMPLE PROBLEMS).</b>	<b>01</b>
		<b>VISCOSITY, NEWTON'S FORMULA FOR VISCOUS FORCE, CO-EFFICIENT OF VISCOSITY (DEFINITION, DIMENSION AND SI UNIT).</b>	<b>01</b>

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<b>3. HEAT &amp; THERMODYNAMICS</b>	<b>3.1 THERMAL EXPANSION OF SOLID</b>	<b>LINEAR, AREAL AND CUBICAL EXPANSION AND THEIR COEFFICIENTS (DEFINITION AND FORMULA) AND THEIR RELATION (NO DERIVATION). CHANGE OF DENSITY WITH TEMPERATURE (FORMULA ONLY). (SIMPLE NUMERICAL PROBLEMS).</b>	<b>01</b>
	<b>3.2 TRANSMISSION OF HEAT</b>	<b>CONDUCTION, CONVECTION AND RADIATION (DIFFERENCES). THERMAL CONDUCTIVITY (FORMULA, DEFINITION, DIMENSIONS AND SI UNIT).</b>	<b>01</b>
		<b>SIMPLE FORMULA BASED NUMERICAL PROBLEMS INCLUDING COMPOSITE SLAB. EXAMPLES &amp; USE OF GOOD AND BAD CONDUCTOR OF HEAT.</b>	<b>01</b>
	<b>3.3 THERMODYNAMICS</b>	<b>ZEROTH LAW OF THERMODYNAMICS. TEMPERATURE AND INTERNAL ENERGY (CONCEPT ONLY). FIRST LAW OF THERMODYNAMICS (STATEMENT AND EQUATION ONLY).</b>	<b>01</b>
		<b>SPECIFIC HEATS OF GAS, THEIR RELATION (NO DERIVATION) AND THEIR RATIO. ISOTHERMAL, ISOBARIC, ISOCHORIC AND ADIABATIC PROCESS (DEFINITION ONLY).</b>	<b>01</b>
<b>4. LIGHT</b>	<b>4.1 PHOTOMETRY</b>	<b>LUMINOUS FLUX, LUMINOUS INTENSITY, ILLUMINATION AND THEIR S.I. UNITS — PRINCIPLE OF PHOTOMETRY (STATEMENT ONLY).</b>	<b>01</b>
	<b>4.2 REFRACTION OF LIGHT</b>	<b>REFRACTION OF LIGHT THROUGH PLANE SURFACE. LAWS OF REFRACTION. REFRACTIVE INDEX -- RELATIVE &amp; ABSOLUTE, ITS RELATION WITH THE VELOCITY OF LIGHT IN DIFFERENT MEDIA.</b>	<b>01</b>
		<b>TOTAL INTERNAL REFLECTION AND CRITICAL ANGLE. OPTICAL FIBRE (PRINCIPLE &amp; APPLICATIONS)</b>	<b>01</b>
	<b>4.3 OPTICAL LENS</b>	<b>LENS AND DEFINITION OF RELATED TERMS (RECAPITULATION). CARTESIAN SIGN CONVENTION. LENS MAKER'S FORMULA</b>	<b>01</b>
		<b>RELATION BETWEEN U, V, F (USUAL SYMBOLS) (NO DERIVATION). PRINCIPLE OF MAGNIFYING GLASS. POWER OF A LENS AND ITS UNIT. EQUIVALENT FOCAL LENGTH &amp; POWER OF TWO THIN LENSES IN CONTACT (FORMULA ONLY). (SIMPLE NUMERICAL PROBLEMS).</b>	<b>01</b>

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4. LIGHT	4.4 WAVE THEORY OF LIGHT & INTERFERENCE	<p>HUYGEN'S WAVE THEORY, WAVE FRONT – SPHERICAL, CYLINDRICAL AND PLANE WAVE FRONT (IDEA ONLY). HUYGEN'S PRINCIPLE OF PROPAGATION OF WAVE FRONT.</p>	01
		<p>ANALYTICAL EXPRESSION FOR 1D PLANE LIGHT WAVE. PRINCIPLE OF SUPERPOSITION OF WAVES. COHERENT SOURCES (IDEA ONLY). INTERFERENCE OF LIGHT WAVES.</p>	01
		<p>CONSTRUCTIVE AND DESTRUCTIVE INTERFERENCE. YOUNG'S DOUBLE SLIT EXPERIMENT – ANALYTICAL TREATMENT.</p>	01
5. MODERN PHYSICS	PHOTOELECTRIC EFFECT	<p>PHOTOEMISSION, WORK FUNCTION. PHOTOELECTRIC CURRENT, ITS VARIATION WITH INTENSITY AND FREQUENCY OF INCIDENT RADIATION.</p>	01
		<p>STOPPING POTENTIAL, THRESHOLD FREQUENCY. CONCEPT OF PHOTON. EINSTEIN'S PHOTOELECTRIC EQUATION. PRINCIPLE OF SOLAR PHOTO-VOLTAIC CELL AND ITS USES</p>	01