PaperCode: BS113	Paper: Engineering Physics - I	L	TIP	C
PaperID: 99113		3	-	3

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instruction for paoer setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1") question should be compulsory and cover the entire syllabus.This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts *I* sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course *I* paper.The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data - tables may be specified if required.

Course Objectives:

1:	To understand thermodynamic principles.
2:	To understand and model oscillations and waves.
3:	To understand and model interference diffraction and polarization phenomenon.
4:	To understand and appreciate relativistic svstems and Lasers.

Course Outcomes (CO):

CO1:	Ability to a□olv thermodynamic principles to solution of engineering problems.
CO2:	Abilitv to understand and model oscillations and waves.
C03:	Ability to understand and model interference, diffraction and polarization phenomenon.
C04:	Ability to understand and appreciate relativistic systems and Lasers.

Course Outcomes (CO to Programme Outcomes IPO) Mapoing (scale 1: low, 2: Medium, 3: High

CO/P 0	P001	P002	P003	P004	P005	P006	POO1	POOB	P009	P010	P0t1	P012
C01	2	2	3	3	2	-	-	-	1	1	-	2
CO2	2	2	3	3	2	-	-	-	1	1		2
C03	2	2	3	3	2	-	-	-	1	1	-	2
C04	2	2	3	3	2	-	-	-	1	1	-	2

Unit I

Introduction to Thermodynamics: Fundamental Ideas of Thermodynamics, The Continuum Model, The Concept of a "System"', "State", "Equilibrium", "Process"'. Equations of state, Heat, Zeroth Law of Thermodynamics, Work, first and second laws of thermodynamics, entropy [8Hrs)

Unit II

Waves and Oscillations: Wave motion, simple harmonic motion, wave equation, superposition principle. Introduction to Electromagnetic Theory: Maxwell's equations. work done by the electromagnetic field, Poynting's theorem, Momentum, Angular momentum in electromagnetic fields, Electromagnetic waves: the wave equation, plane electromagnetic waves, energy carried by electromagnetic waves [8Hrs]

Unit III

Interference: Interference by division of wave front (Young's double slit experiment, Fresnel's biprism), interference by division of amplitude (thin films, Newton's rings, Michelson's interferometer), Coherence and coherent sources

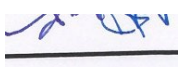
Diffraction: Fraunhofer and Fresnel diffraction; Fraunhofer diffraction for Single slit, double slit, and N-slit (diffraction grating), Fraunhofer diffraction from a circular aperture, resolving power and dispersive power of a grating, Rayleigh criterion, resolving power of optical instruments

Polarization: Introduction to polarization, Brewster's law, Malu's law, Nicol prism, double refraction, quarter-wave and half-wave plates, optical activity, specific rotation, Laurent half shade polarimeter. [12Hrs]

Unit IV

Theory of relativity: The Michelson-Morley Experiment and the speed of light; Absolute and Inertial frames of reference, Galilean transformations, the postulates of the special theory of relativity, Lorentz transformations, time dilation, length contraction, velocity addition, mass energy equivalence. Invariance of Maxwell's equations under Lorentz Transformation.

Introduction to Laser Physics: Introduction, coherence, Einstein A a d7coeffici nts, polf\llation in'frsion, basic principle and operation of a laser, the He-Ne laser and the Ruby lase ..



Textbooks:

Concepts of Modern Physics (SIE)by Arthur Beiser, Shobhit Mahajan, and S. Rai Choudhury,McGraw-Hill, 2017.
Physics for Scientists and Engineers by Raymond A. Serway and John W. Jewett, 9th Edition, Cengage, 2017

References:

1. *Modern Physics* by Kenneth S. Krane, Wiley, 2020.
2. *Principles of Physics* by Robert Resnick, Jearl Walker and David Halliday, Wiley, 2015.
3. *Optics* by Ajoy Ghatak, McGraw Hill, 2020.