

ANNEXURE

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS M-SCHEME

(Implements from the Academic year 2015-2016 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film & TV.

Subject Code : 30013

Semester : I Semester

Subject Title : **ENGINEERING PHYSICS –I**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 15 weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examination	Total	
ENGINEERING PHYSICS I	5 Hrs	75Hrs	25	75	100	3Hrs

Topics and Allocation of Hours:

Sl.No	Topic	Time(Hrs)
1	S I UNITS AND STATICS	13 Hours
2	PROPERTIES OF MATTER	13 Hours
3	DYNAMICS- I	13 Hours
4	DYNAMICS–II	13 Hours
5	SOUND AND MAGNETISM	13 Hours
	REVISION + TEST + MODEL EXAM	10 Hours
	Total	75 Hours

RATIONALE:

The exponential growth of Engineering and Technology has benefited the mankind with extreme sophistication and comfort. To sustain this development, continuous research and development should take place not only in Engineering and Technology but also in Basic Science such as Physics.

The various divisions of Physics like Statics, Dynamics, Elasticity, Rotational Motion, Sound, Magnetism etc provide the Foundation by enlightening the Fundamental facts, Principles, Laws and Correct sequence of events to develop the Engineering and Technology field for the prosperity of human beings.

OBJECTIVES:

At the end of the study of I Semester the student will be able to

- Understand the importance of SI units and dimensional formulae.
- Acquire broad ideas about resultant, moment of a force and torque of a couple.
- Understand the elastic property and the types of Modulus of elasticity.
- Explain the surface tension of liquids and viscosity of fluids.
- Understand Newton's laws of motion and equations of different types of motion.
- Acquire knowledge about projectile motion, circular motion and its application.
- Understand the concepts of simple harmonic motion
- Gain knowledge about rotational kinetic energy and angular momentum.
- Acquire broader ideas about variation of acceleration with respect to height and its importance in launching satellites.
- Understand the propagation of sound and acoustics of buildings.
- Explain the importance of hysteresis of magnetic materials and its uses.
- Solve simple problems involving expressions derived in all the above topics.

30013 ENGINEERING PHYSICS – I

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	SI UNITS AND STATICS <u>1.1 UNITS AND MEASUREMENTS:-</u> Unit-Definition-Fundamental Quantities-Definition-Seven fundamental quantities; their SI units and symbol for the units- Supplementary quantities-plane angle and solid angle; their SI units and symbol for the units Derived physical quantities. Dimensional formula for length, mass and time-derivation of dimensional formula for area, volume, density, velocity, momentum, acceleration, force, impulse, work or energy and power. Uses of Dimensional formula. Conventions followed in SI –Units Multiples & sub-multiples and prefixes of units.	4Hrs
	<u>1.2 STATICS:-</u> Scalar and vector quantities–Definitions and examples–Concurrent forces and coplanar forces–Definition-Resolution of a vector into two perpendicular components-Resultant and equilibrant–Definitions-Parallelogram law of forces-statement-Expressions for magnitude and direction of the resultant of two forces acting at a point with an acute angle between them-Lami’s theorem-Statement and explanation-Experimental verification of parallelogram law of forces and Lami’s theorem. Simple problems based on expressions for magnitude and direction of resultant. Moment of a force-Clockwise and anti-clockwise moments-Principle of moments-Couple–Torque acting due to a Couple–Experimental determination of mass of the given body using principle of moments.	9 Hrs
II	PROPERTIES OF MATTER <u>2.1 ELASTICITY:-</u> Elastic and plastic bodies–Definition-stress, strain-Definitions–Hooke’s law – statement-three types of strain–Elastic and plastic limit–Young’s modulus, Bulkmodulus, Rigidity modulus and Poisson’s ratio–Definitions-Uniform and non-uniform bending of beams-Experimental determination of the Young’s modulus of the material of a beam by uniform bending method. Simple problems based on stress, strain and Young’s modulus.	4 Hrs
	<u>2.2 VISCOSITY:-</u> Viscosity–Definition-Coefficient of viscosity-Definition, Slunit and dimensional formula-Stream line flow, turbulent flow-Explanation-Critical velocity–Definition-Reynolds number-Experimental comparison of coefficient of viscosity of two low viscous liquids–Terminal velocity–Definition-Experimental determination of coefficient of viscosity of a highly viscous liquid by Stokes method–Practical applications of viscosity.	5Hrs

	<p><u>2.3 SURFACE TENSION:-</u> Surface tension & angle of contact-Definitions-Expression for surface tension of a liquid by capillary rise method-Experimental determination of surface tension of water by capillary rise method-Practical applications of capillarity. Simple problems based on expression for surface tension.</p>	4Hrs
III	<p>DYNAMICS-I</p>	
	<p><u>3.1.STRAIGHTLINE MOTION:-</u> Introduction-Newton's Laws of motion-Fundamental Equations of motion for objects- horizontal motion-falling freely-thrown vertically upwards.</p>	2 Hrs.
	<p><u>3.2 PROJECTILE MOTION:-</u> Projectile motion, angle of projection, trajectory, maximum height, time of flight, and horizontal range-Definitions-Expressions for maximum height, time of flight and horizontal range-Condition for getting the maximum range of the projectile-Derivation of the equation to show that the trajectory of the projectile is a parabola.Simple problems based on expressions for maximum height, time of flight and horizontal range.</p>	4Hrs.
	<p><u>3.3 CIRCULAR MOTION:-</u> Circular motion, angular velocity, period and frequency of revolutions-Definitions-Relation between linear velocity and angular velocity-Relation between angular velocity, period and frequency-Normal acceleration, centripetal force and centrifugal force-Definitions-Expressions for normal acceleration and centripetal force. Banking of curved paths-Angle of banking-Definition-Expression for the angle of banking of a curved path. { $\tan\theta = \frac{v^2}{r g}$ }Simple problems based on the expressions for centripetal force and angle of banking.Simple harmonic motion, amplitude, frequency and period-Definitions.</p>	7Hrs.
IV	<p>DYNAMICS-II</p>	
	<p><u>4.1 ROTATIONAL MOTION OF RIGID BODIES:-</u> Rigid body-Definition-Moment of inertia of a particle about an axis, moment of inertia of a rigid body about an axis-expressions-Radius of gyration-Definition-Expression for the kinetic energy of a rotating rigid body about an axis-Angular momentum-Definition-Expression for the angular momentum of a rotating rigid body about an axis-Law of conservation of angular momentum-Examples.</p>	6Hrs
	<p><u>4.2 GRAVITATION:-</u> Newton's laws of gravitation-Acceleration due to gravity on the surface of earth-Expression for variation of acceleration due to gravity with altitude</p>	3Hrs
	<p><u>4.3 SATELLITES:-</u> Satellites-Natural and artificial-Escape velocity and orbital velocity-Definitions-Expression for escape velocity-Expression for orbital velocity -Uses of artificial satellites. Simple problems based on the expressions for escape velocity and orbital velocity.</p>	4Hrs
V	<p>SOUND AND MAGNETISM</p>	
	<p><u>5.1 SOUND:-</u> Wave motion-Introduction and definition-Audible range-Infrasonic-Ultrasonics-Progressive waves, longitudinal and transverse waves-Examples- Amplitude, wave length, period and frequency of a wave-Definitions-Relation between</p>	8Hrs

<p>wave length, frequency and velocity of a wave-Stationary or standing waves. Vibrations-Free & forced vibrations and resonance-definitions and examples-Laws of transverse vibrations of a stretched string-Sonometer-Experimental determination of frequency of a tuning fork.Acoustics of buildings-Echo-Reverberation, reverberation time, Sabine's formula for reverberation time (no derivation) -Coefficient of absorption of sound energy-Noise pollution.Simple problems based on expression for frequency of vibration.</p> <p><u>5.2 MAGNETISM:-</u></p> <p>Pole strength -Definitions-Magnetic moment, intensity of magnetisation, magnetising field intensity, magnetic induction, permeability, hysteresis, saturation, retentivity and coercivity - Definitions - Method of drawing hysteresis loop of a specimen using a solenoid-Uses of Hysteresis loop simple problem based on intensity of magnetization.</p>	5Hrs
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Text Book:

1. Published by DOTE-Govt of Tamil Nadu
2. Physics-Higher secondary-First year-Volume I & II TamilNaduTextbook Corporation 2004

Reference Book :

1. Physics-Resnick and Haliday-Wisley Toppan publishers-England
2. Engineering Physics-B.L.Theraja-S. Chand Publishers
3. A text book of sound-R.L. Saighal & H.R. Sarna-S.Chand & Co.
4. Mechanics-Narayana Kurup-S. Chand Publishers.

Board Examination - Question paper pattern

Time: 3 Hrs.

Max.Marks: 75

PART A - 5 Questions to be answered out of 8 for 2 marks each.

PART B - 5 Questions to be answered out of 8 for 3 marks each.

PART C - All the 5 Questions to be answered

Each question in PART C will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.

PART A	5 x 2 marks	10 Marks
PART B Short answer type questions	5 x 3 marks	15 Marks
PART C Descriptive answer type questions Each question in PART C will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.	5 x 2 x 5 marks	50 Marks
Total		75 Marks

Out of the 3 Sub questions in PART C, one sub question must be on problem based to test the analytical ability/logical ability /diagnostic ability/conceptual ability relevant to that subject content. Equal weightage is to be given to whole syllabus.

Clarks table will not be permitted for the Board Examinations.