0.1 INTRODUCTION		7
0.2 HOW TO DIVIDE PHYSICS		7
0.3 INTERACTIONS		8
0.4 MODELS, THEORIES, LAWS, PRINCIPLES		8
1.0 PHYSICAL QUANTITIES		8
1.1 SYSTEM OF UNITS		8
1.2 MEASUREMENTS. ERRORS, UNCERTAINTY		9
1.3 SCALAR AND VECTOR PHYSICAL QUANTITIES		9
1.4 VECTORS		9
1.4.1 Rules for Calculation with Vector Quantities		9
2.0 KINEMATICS OF A PARTICLE MOTION		12
2.1 MOTION IN ONE DIMENSION		12
2.1.1 Uniform Straight-line Motion of a Particle		14
2.1.2 Uniformly Accelerated Straight-line Motion of a particle		14
2.1.3 Free Fall of a Particle		15
2.1.4 Vertical Throw of a Particle		16
2.2 MOTION IN A DI ANIE		16
2.2.1 Circular Motion of a Particle		16
2.2.2 Uniform Circular Motion of a Particle		18
3.0 REFERENCE FRAME. GALILEI TRANSFORMATION		18
4.0 DYNAMICS		19
4.1 NEWTON'S LAWS OF MOTION		20
4.2 EQUATION OF MOTION		21
4.3 FORCES IN A CIRCULAR MOTION		24
5.0 FRICTION		25
6.0 PERIODIC MOTION		26
		26
7.0 WORK AND ENERGY		28
7.0.1 Potential Energy		29
7.1 WORK-ENERGY THEOREM		30
7.2 ELASTIC POTENTIAL ENERGY		30
7.3 CONSERVATIVE AND DISSIPATIVE FORCES		32
7.4 POWER		32
7.5 IMPULSE		33
8.0 SYSTEM OF PARTICLES		34
8.1 INTERNAL FORCES, EXTERNAL FORCES, ISOLATED SYTSEM		34
8.2 TORQUE		34
8.3 CENTER OF MASS		35
8.4 EQUATIONS OF MOTION FOR A SYSTEM OF PARTICLES		36
8.4.1 Translation		36
8.4.2 Collisions		37
8.4.3 Rotation of a System of Particles		39
9.0 RIGID BODY		39
9.1 TRANSLATION MOTION OF A RIGID BODY		39
9.2 ROTATION OF A RIGID BODY		39
9.2.1 Kinetic Energy of Rotation		40
9.2.2 Parallel Axis Theorem		40
9.2.3 Equation of Motion for Rotation of a Rigid body		41
9.2.4 The Simple Pendulum		41
9.2.5 The Physical Pendulum		42
9.2.6 Rotation about a Moving Axis		43
9.2.7 Moment of Inertia of Some Bodies		44
9.2.8 Analogy between Translation and Rotation		44
10.0 GRAVITATIONAL FIELD	45	
10.1 NEWTON'S LAW OF HINIVERSAL CRAVITATION	10	15

OF GRAVITATIONAL FILED	46
10.2 INTENSITY OF GRAVITATIONAL FILED	47
10.2.1 Gravitational Field of a Official Sphere 10.3.1 Gravitational Field of a Official Sphere 10.3 EFFECTS OF THE EARTH'S ROTATION 10.3 EFFECTS OF THE EARTH'S ROTATION	48
103 EFFECTO 0.	49
10.3 EFF LOVING TO THE GRAVITATIONAL CONSTANT 10.5 MEASUREMENT OF THE GRAVITATIONAL FIELD	49
10.5 MEASUREMENT OF THE GRAVITATIONAL CONSTAINT	
	50
= DI ANIE IO. OA I LLLI	51
10.7 PLAIVE 16, 00 10.7.1 Artificial Satellites	53
	54
10.7.2 Black Holes 10.7.2 Black Holes 11.0 MECHANICAL PROPERTIES OF MATTER 11.0 MECHANICAL PROPERTIES BY A NORMAL FORCE	54
	54
DEFORMATION CAUSES DI A TANGENTI OTICE	57
Destoring Toronte On a Tilli Will	57
11.2.1 Restoring Forque of a 11.3 ELASTICITY AND PLASTICITY	58
12.0 FLUID MECHANICS	59
12.0 FLUID MEON WATER	59
12.1 HYDROSTATICS	60
12.1.1 Pressure in a Fluid in a Gravitational Field	
12.2 Pascal's Law	62
12 1 3 Euler's Equation	62
12.1.4 Archimedes' Principle	63
12.5 Surface Tension	64
12.2 HYDRODYNAMICS	65
12.2 HTDRODTNAMICO	66
12.2.1 Continuity Equation	
12.2.2 Bernoulli's Equation	66
12.3 REAL FLUID	68
13.0 THERMAL PROPERTIES OF MATTER	70
13.1 TEMPERATURE	70
13.2 THERMAL EXPANSION	71
13.2.1 Linear Expansion of Solids	71
13.2.2 Volume Expansion of Solids and Liquids	72
13.2.3 Volume Expansion of Gases	73
13.3 THERMAL STRESS	73
13.3.1 One-Dimensional Case	73
13.3.2 Three-Dimensional Case	73
13.4 HEAT	74
13.4.1 Heat and Temperature	74
13.5 KINETIC-MOLECULAR THEORY OF MATTER	
13.5.1 Quantities Marille in 164 The	75
13.5.1 Quantities We Use in KMTM	77
13.3.2 Statistical Laws	78
13.6 IDEAL GAS	79
13.7 MAXWELL-BOLTZMANN DISTRIBUTION OF MOLECULAR SPEEDS	80
13.8 IDEAL GAS EQUATION	81
13.8.1 Van der Waals Equation of State	
13.9 THERMODYNAMICS	82
13.9.1 The Zereth L	83
13.9.1 The Zeroth Law of Thermodynamics	84
13.9.2 The First Law of Thermodynamics	84
OF ECIAL KINING OF THE DIMODYNIANIC DECOREC	85
	88
13.12 HEAT ENGINES	90
13.12.1 The Stirling Frank	
The state of the s	92
13.12.3 The Discott (engine)	93
	93
13.12.4 The Carnot Cycle 13.12.5 Post:	94
- ' L.U DEITIOOVOLI-	94
13.13. THE SECOND LAW OF THERMODYNAMICS	95
EATH OF THERIVIOL TIVAIVIICS	95

13.13.1 Entropy. Mathematical Formulation of the Second Law	
of Thermodynamics 13.13.2 Change in Entropy in Some Special Thermodynamic Processes	96
13.13.3 Thermodynamic Processes in <i>T-S</i> diagrams	97 98
13.13.4 Natural Processes and Entropy	98
13.13.5 Entropy, Probability, Order, Disorder, Information	99
13.14 THE THIRD LAW OF THERMODYNAMICS	101
14.0 PERIODIC MOTION	101
14.1 SIMPLE HARMONIC MOTION	101
14.2 SUPERPOSITION OF TWO)OR MORE) SIMPLE HARMONIC MOTIONS	103
14.2.1 Superposition of SHMs in One Direction	103
14.2.2 Superposition of Two SHMs in Two Perpendicular Direction	105
14.3 DAMPED OSCILLATIONS	106
14.4 FORCED OSCILLATIONS 15.0 WAVES	108
15.1 MECHANICAL WAVES	110 110
15.2 POLARIZATION	111
15.3 HARMONIC WAVES	111
15.4 WAVE EQUATION	113
15.5 WAVE PROPAGATION IN A THIN ROD	113
15.5.1 Longitudinal Waves	113
15.5.2 Transverse Waves in a Thin Rod (string)	114
15.6 PROPAGATION OF LONGITUDINAL WAVES IN FLUID	115
15.7 PROPAGATION OF LONGITUDINAL WAVES IN GASES	115
16.0 VIBRATING BODIES	116
16.1 STANDING WAVES	116
16.1.1 Normal Modes of a String 17.0 ACOUSTIC	116 117
17.1 PRESSURE VARIATIONS	118
17.2 SOUND INTENSITY	119
17.3 THE DOPPLER EFFECT	120
18.0 ELECTRIC CHARGE	121
18.1 ELECTRIC FIELD	122
18.1.1 Coulomb's Law	
18.1.2 Description of the Electric Field	123
18.2.1 Electric Dipole	126
18.1.4 Gauss' Law	126
18.1.5 Intensity of the Electric Field of a Positively Charged Sphere	127 128
18.1.6 Electric Field of an Infinite Sheet of Charge	128
18.1.7 Electric Field of a Uniformly Charged Cylinder	129
18.1.8 Electric Potential 18.1.9 Potential Difference	130
18.1.10 Electric Potential of a Charged Metallic Sphere	130
18.2 CAPACITORS, CAPACITANCE	131
18.2.1 Parallel-plate Capacitor	132
18.2.2 Cylindrical Capacitor	132
18.2.3 Capacitance of a Spherical Capacitor	133
PARTITION OF EVERGY WOLAR MEAN TARREST AND VOICE OF THE PARTITION OF EVER PARTITION OF EVER PARTITION OF THE	