



SRM
UNIVERSITY
(Under section 3 of UGC Act 1956)

DEPARTMENT OF PHYSICS AND NANOTECHNOLOGY

LESSON PLAN

**B.Sc - FIRST YEAR
(2015-2016 REGULATION)**

FIRST SEMESTER

SRM UNIVERSITY

SRM NAGAR, KATTANKULATHUR – 603 203

SRM UNIVERSITY
DEPARTMENT OF PHYSICS AND NANOTECHNOLOGY
First Year B.Sc Physics (2015-2016 Regulation)

Course Code: UPY15101

Course Title: PROPERTIES OF MATTER AND ACOUSTICS

Semester : I

Course Time: JULY – NOVEMBER-2017

Location: S.R.M.UNIVERSITY

OBJECTIVES

1. To understand the different kinds of moduli via experimental methods.
2. To understand the surface tension i.e.boundary property and viscosity.
3. To understand the wave phenomena, in general and sound wave in particular.
4. To understand ultrasonics and acoustics.

Assessment Details:

Cycle Test – I	:	10 Marks
Cycle Test – II	:	10 Marks
Model Exam	:	20 Marks
Assignment	:	5 Marks
Attendance	:	5 Marks

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DEPARTMENT OF PHYSICS AND NANOTECHNOLOGY
First Year B.Sc Physics (2015-2016 Regulation)

Semester	Course Code	Course Title	L	T	P	Total of LTP	C
I	UPY15101	PROPERTIES OF MATTER AND ACOUSTICS	4	1	-	5	4

SYLLABUS

UNIT I - ELASTICITY AND MODULI

Elasticity - Three types of elastic moduli and relation among them - Poisson's ratio and Poisson's ratio for rubber band- Bending of beams - Expression for bending moment - Depression of the loaded end of a Cantilever - Uniform - Non uniform bending - Theory - Experiment pin and microscope method - Work done in uniform bending – Koenig's method – Non-uniform bending - Theory - Expression for couple per unit twist - Determination of rigidity modulus - Static torsion method with scale and telescope – Rigidity modulus by torsion pendulum with mass.

UNIT II - FLUID MOTION

Viscosity - Coefficient of critical velocity – Poiseulli's formula for coefficient of viscosity and its correction - Determination of coefficient of viscosity by capillary flow method - comparison of viscosities Oswald's viscometer - Viscosity of a highly viscous liquid - Stoke's method for the Coefficient of a highly viscous liquid - Variations of viscosity with temperature and pressure - Viscosity of gases - Mayer's formula for the rate of flow of a gas through a capillary tube - Rankine's method for the determination of viscosity of a gas.

UNIT III – SURFACE TENSION

Surface tension and Osmosis - Surface energy - Angle of contact and its determination - Excess of pressure inside curved surface - Formation of drops - Experimental study of variation of Surface tension with temperature - Drop weight method of determining surface tension and interfacial surface tension - Angle of contact of mercury - Quincke's method - Surface tension and vapour pressure osmosis - Experimental determination of osmotic pressure - Laws of osmosis pressure - Osmotic and vapour pressure of a solution.

UNIT IV - SOUND

Sound - Definition of free, damped and forced vibrations – Theory of forced vibrations - Resonance - Sharpness of resonance - Fourier's theorem - Application for Saw- tooth wave and square wave -Sonometer - Determination of A.C. frequency using sonometer - Determination of frequency using Melde's apparatus.

UNIT V - ULTRASOUND AND ACOUSTICS

Ultrasonics - Production - Piezo electric method – Magnetostriction method - detection - Properties - Applications. Acoustics : Intensity Level, Loudness - Acoustics of buildings - Reveberation - Reverberation time - Derivation of Sabine's formula - determination of absorption coefficient - Optimum reverberation time - Factors affecting Acoustics of buildings - Sources of noises and its control - Sound level meter.

TEXT BOOKS

1. Brijlal and Subramaniam N., *Properties of Matter* , Revised Edition, S.Chand and Company,2005.
2. Murugesan R., *Properties of Matter and Acoustics*, Revised Edition, S.Chand and Company, 2005.

REFERENCES

1. Landau L. D., Pitaevskii L P, Kosevich A M and Lifshitz E M, *Theory of Elasticity*, Revised Edition, Butterworth-Heinemann, 2014.
2. Landau L. D., Pitaevskii L P, Kosevich A M and Lifshitz E M, *Fluid Mechanics*, Revised Edition, Butterworth-Heinemann, 2014.
3. Saighal R. L, *A Text Book of Sound* , 5th Edition, S. Chand and Company, 2010.
4. Mathur D. S, *Elements of Properties of Matter*, 3rd Edition, S. Chand and Company, 2005.
5. Satyaprakash and Akash Saluja, *Oscillations and Waves*, Pragati Prakashan, 2002.

Lesson Plan

Subject Name:
Subject Code:

PROPERTIES OF MATTER AND ACOUSTICS
UPY15101

Lecture Hour	Description	Reference
1	UNIT-I Elasticity - Three types of elastic moduli	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
2	Relation among the three moduli of elasticity	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
3	Poisson's ratio and Poisson's ratio for rubber band	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
4	Bending of beams - Expression for bending moment	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
5	Depression of the loaded end of a Cantilever	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
6	Uniform - Non uniform bending – Theory - Experiment	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
7	Pin and microscope method - Work done in uniform bending	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
8	Koenig's method	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
9	Expression for couple per unit twist -	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
10	Determination of rigidity modulus - Static torsion method with scale and telescope	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.

11	Rigidity modulus by torsion pendulum with mass.	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
12	Applications of Torsional Pendulum	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
13	Revision of Unit I	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
14	Solving problems related to the unit	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
15	Solving problems related to the unit	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
16	UNIT-II: Viscosity - Coefficient of critical velocity	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
17	Poiseulli's formula for coefficient of viscosity and its correction -	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
18	Determination of coefficient of viscosity by capillary flow method	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
19-20	Cycle Test I – Portions – Unit I, Unit II up to Capillary flow method	
21	Comparison of viscosities Oswald's viscometer - Viscosity of a highly viscous liquid	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
22	Stoke's method for the Coefficient of a highly viscous liquid	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
23	Variations of viscosity with temperature and pressure	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
24	Viscosity of gases	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.

25	Mayer's formula for the rate of flow of a gas through a capillary tube-	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
26	Rankine's method for the determination of viscosity of a gas.	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
27	Revision	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
26	Solving problems related to the unit	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
27	Solving problems related to the unit	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
28	Solving problems related to the unit	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
29	Surface tension and Osmosis	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
30	Surface energy - Angle of contact and its determination	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
31	Excess of pressure inside curved surface - Formation of drops	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
32	Experimental study of variation of Surface tension with temperature	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
33	Drop weight method of determining surface tension and interfacial surface tension	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
34	Angle of contact of mercury - Quincke's method	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
35	Surface tension and vapour pressure.	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company,

		2005.
36-37	Cycle Test I – Portions – Unit II(Ostwalds Viscometer to Unit III(Surface tension and Vapour Pressure)	
38	Osmosis - Experimental determination of osmotic pressure	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
39	Laws of osmosis pressure - Osmotic and vapour pressure of a solution	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
40	Revision	
41	Problems	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
42	Problems	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
43	Definition of free, damped and forced vibrations	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
44	Theory of forced vibrations	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
45	Resonance - Sharpness of resonance	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
46	Fourier's theorem - Application for Saw- tooth wave	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
47	Application for square wave	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
48	Sonometer	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
49	Determination of A.C. frequency using sonometer	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company,

		2005.
50	Determination of frequency using Melde's apparatus.	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
51	Problems	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
52	Problems	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
53	Problems	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
54	Ultrasonics	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
55	Production - Piezo electric method –	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
56	Magnetostriction method	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
57	Detection - Properties	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
58	Applications.	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
59	Acoustics : Intensity Level, Loudness -	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company,

		2005.
60	Acoustics of buildings - Reveberation - Reverberation time	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
61	Derivation of Sabine's formula - determination of absorption coefficient	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
62	Optimum reverberation time - Factors affecting Acoustics of buildings .	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
63	Factors affecting Acoustics of buildings	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
64	Sources of noises and its control	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
65	Sound level meter	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
66	Problems	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
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69	Revision	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
70	Solving problems related to above topics	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
71	Solving problems related to above topics	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.

72	Revision and Instructions for preparation of University examination	Murugesan R., <i>Properties of Matter and Acoustics</i> , Revised Edition, S.Chand and Company, 2005.
72-75	MODEL EXAMINATION	Unit I-V

Prepared by: Dr. M.KRISHNA MOHAN

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