

PROVIDENCE COLLEGE

Department of Physics

PHYSICS BE I ASTP

Text: PHYSICS—Hausmann-Slack 2nd Edition.

Time: Two lecture demonstrations per week.

Two problem sections per week.

One laboratory section per week, 3 hours.

Problems: Problems assigned are due on the second quiz section of the following week.

FIRST WEEK

1st Lecture: *Fundamental Units and Measurements*

Study: Sections 1, 2, 3, 4, 5, 7, 9, 10, 12.

Problems: Pages 19-20. Nos. 2, 10, 12, 18, 20, 22.

2nd Lecture: *General Considerations of Vector Quantities*

Vector Methods. Addition and Subtraction of Vectors. Resultants and Equilibrants.

Study: Sections 13, 17, 18, 19, 20. Read: Remainder.

Problems: Pages 32-33. Nos. 2, 4, 8, 10, 14, 16, 18.

SECOND WEEK

1st Lecture: *Uniform Linear Motion*

Linear and Angular Motion. Velocity.

Study: All of Chapter 3.

Problems: Pages 44-55. Nos. 2, 4, 6, 10, 12, 14, 18.

2nd Lecture: *Uniformly Accelerated Motion*

Acceleration Defined. General Equations of Accelerated Motion.

Study: Sections 28 to 32 inclusive.

Problems: Page 61. Nos. 2, 4, 6, 8, 10, 12, 14.

THIRD WEEK

1st Lecture: *Uniformly Accelerated Motion continued*

The Motion of Projectiles. Range of a Projectile. Elementary Bomb Sight.

Come to this lecture prepared to take notes, as the material in the text will be expanded.

Problems: Page 62. Nos. 16, 20, 22, 24, 26.

Second Lecture: *Uniformly Accelerated Angular Motion*

General Ideas of Force. Newton's Laws of Motion.

Study: Sections 34, 35, 36, 37.

FOURTH WEEK

- 1st Lecture: *Newton's Second Law of Motion*
Absolute Units of Force. Dyne and Poundal.
Study: Sections 38, 39, 40, 41, 42, 43.
Problems: Page 89. Nos. 2, 4, 6, 8, 14, 16, 18, 20.
- 2nd Lecture: *Friction*
Coefficient of Friction.
Study: Section 45.
Problems: Page 90-91. Nos. 24, 26, 28, 30, 32.

FIFTH WEEK

- 1st Lecture: *Uniform Circular Motion, UCM*
Definition. Derivation of Equations of UCM.
Study: Sections 46, 47, 48.
Problems: Page 91. Nos. 34, 36, 38, 42.
- 2nd Lecture: Reserved for Examination.

SIXTH WEEK

- 1st Lecture: *Rotational Motion*
Newton's Laws as Applied to Rotational Motion. Moment of Inertia.
Study: Sections 51, 52, 53, 54, 56. For ref., 57.
Problems: Page 106. Nos. 2, 4, 8, 10, 12.
- 2nd Lecture: *Statics*
Conditions of Equilibrium. The Balance.
Study: Sections 61-67.
Problems: Pages 123, 124. Nos. 2, 4, 8, 10, 12; 14.

SEVENTH WEEK

- 1st Lecture: *Work and Energy*
Kinetic and Potential Energies. Total Energy. Principle of Work as Applied to the Solution of Problems. Power and Units.
Study: Sections 68 through 75.
Problems: Pages 147-148. Nos. 2, 4, 6, 12, 14, 16, 18.
- 2nd Lecture: *Machines*
Mechanical Advantage, Efficiency, Pulleys, Levers and Inclined Planes.
Study: Sections 78, 79, 80, 81.
Problems: Page 149. Nos. 24, 26.

EIGHTH WEEK

- 1st Lecture: *Simple Harmonic Motion, SHM*
Definitions. Derivation of the Equations of SHM. Simple Pendulum. Linear Harmonic Motion.
Study: Sections 82 through 90.
Problems: Pages 161-162. Nos. 2, 4, 6, 8, 10, 14.

- 2nd Lecture: *Elasticity*
Hooke's Law. Young's Modulus. Bulk Modulus. Shear Modulus. Poisson's Ratio. Compressibilities.
Study: Sections 93 through 99.
Problems: Pages 179-180. Nos. 2, 4, 6, 10, 12.

NINTH WEEK

- 1st Lecture: *Momentum and Impact*
Measurement of Speeds of Projectiles. Angular Momentum. Comparison of Equations of Angular Motion with those of Linear Motion.
Study: Sections 102-103.
Problems: Cfr. Supplementary problem sheet.
- 2nd Lecture: *Liquids at Rest*
Liquid Pressure. Paschal's Principle. Archimede's Principle. Density and Specific Gravity.
Study: Sections 104 through 112.
Read: Sections 113, 114.
Problems: Page 201. Nos. 2, 4, 10, 12, 14.

TENTH WEEK

- 1st Lecture: Surface Tension
Capillarity. Liquids in Motion. Bernoulli's Principle. Applications: Venturi Meter, Flow Through an Orifice.
Study: Sections 116 through 123.
Problems: Pages 212-213. Nos. 2, 3, 6, 8.
- 2nd Lecture: *Viscosity of Liquids*
Coefficient of Viscosity.
Study: Sections 124 and 93 to 97.
Problems: Cfr. supplementary problem sheet.

ELEVENTH WEEK

- 1st Lecture: *Kinetic Theory of Gases*
Review matter on Momentum and Energy. Derivation of Boyle's and Charles' Laws on the basis of the assumptions of the nature of a gas. Agreement with observed behavior. Dalton's Law. Avagadro's Number.
Study: Sections 125 through 131.
Problems: Pages 229-230. Nos. 2, 4, 6, 8, 14, 16, 18.
- 2nd Lecture: *Density of Gases*
Effusiometer. Viscosity of Gases. Physics of High Vacuua.
Study: Sections 134 through 136.
Problems: Cfr. supplementary problem sheet.