PHY 121

VIBRATIONS, WAVES and OPTICS

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Contents

1 VIBRATIONS

1.1 Vibrations

A vibration is a to and fro movement of an object over the same path. Examples where such motions can be observed are

(A) Pendulum

(B) Mass suspended at the end of the stpring

2 Stroboscope

- `Definition`: A stroboscope is an instrument used for studying periodic motion or determining speeds of rotation by shining a bright light at intervals so that a moving or rotating object appears stationary
- Normally, it consists of a lamp which produces brief repetitive flashes of light at a particular frequency
- Normally, a stroboscope consists of a lamp which produces brief repetitive flashes of light at a frequency
- The rate of the stroboscope is adjustable to different frequencies Thus, when a vibrating object is observed with the stroboscope at a frequency of its vibration (or multiple of it) it appears stationery
- Therefore, stroboscope is also used to measure frequency of vibrating or oscillating objects

3 SUPERPOSITION OF WAVES

3.1 Superposition of waves

3.2 properties of wave motion

4 Stationary waves

5 Properties of wave motions

5.1 Reflection of water waves

5.2 Diffraction of water waves

5.3 Interference of water waves

6 Interference of waves

7 Optics

7.1 Reflection of light – laws of reflection

7.2 Formation of Image due to reflection

7.3 Plane mirrors

7.4 Curved mirrors – mirror formula

7.5 Concave mirrors

7.6 Convex mirrors

7.7 Refraction of light

7.8 Laws of refraction

7.9 Formulation images due to refraction lens –lens formula

7.10 Convex lenses

7.11 Concave lenses

7.12 Dispersion of light – prisms

8 Images in spherical mirrors

9 Refraction air plane surface

10 Recommended Reading

1. Fundamentals of Physics 7th Edition Halliday Resnick Walker -Chapter 16, 17, 18: page 495

2. College Physics Serway 7th Edition - Chapter 13, 14