



# UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Second Semester – 2019

Paper: Physics-II (Waves & Oscillation)

Course Code: PHY-113 / PHY-12307 Part – I (Compulsory) Time: 15 Min. Marks: 10

Roll No. in Fig. ....

Roll No. in Words. ....

Signature of Supdt.: .....

**ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.**

**Division of marks is given in front of each question.**

**This Paper will be collected back after expiry of time limit mentioned above.**

**Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1=10)**

i. A body with frequency  $f$ . would complete one vibration in:

- (a)  $f \cdot \text{sec}$                       (b)  $(1/f) \text{ sec}$                       (c) 1 sec                      (d)  $f^2$

ii. The vibratory or oscillatory motion of a body is:

- (a) Translatory Motion                      (b) Back and forth motion about mean position                      (c) Free fall Motion                      (d) Circulatory Motion

iii. The distance between two consecutive anti nodes is

- (a)  $2\lambda$                       (b)  $\lambda$                       (c)  $\lambda/2$                       (d)  $\lambda/4$

iv. Conversion of water in to ice in refrigerator is an example of:

- (a) Adiabatic Process                      (b) Isothermal Process                      (c) Isochoric Process                      (d) None of these

v. The steam engine is:

- (a) An Optical System                      (b) A Thermal System                      (c) Thermodynamic System                      (d) None of these

vi. The equation  $PV = nRT$  is called:

- (a) Boyles law                      (b) Charles law                      (c) Ideal gas law                      (d) None of these

vii. When two objects come to common temperature, the objects are said to be in:

- (a) Static Equilibrium                      (b) Dynamic Equilibrium                      (c) Thermal Equilibrium                      (d) None of these

viii. In all irreversible processes the entropy:

- (a) Remains Constant                      (b) Increases                      (c) Decreases                      (d) None of these

ix. The wave motion setup in any medium depends upon:

- (a) Elasticity                      (b) Inertia                      (c) Density                      (d) All of these

x. Wavelength, ( $\lambda$ ) frequency( $f$ ) and velocity of wave ( $v$ ) are related as:

- (a)  $V = f\lambda$                       (b)  $\lambda \approx v f$                       (c)  $f = V\lambda$                       (d) None of these



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

**Q.2. Write short answers of the following.**

**(2 x 10) = 20**

- i. What is time period of second's pendulum.
- ii. Define Wave length  $\lambda$  and write its unit.
- iii. Define Kinetic Energy write its formula.
- iv. State Vander Waals equation briefly.
- v. Define pressure of gas and write its formula.
- vi. What is reversible process, give its example.
- vii. What is Brownian Motion.
- viii. What are travelling waves.
- ix. Define simple Harmonic Motion (SHM).
- x. Why sound of woman is more shrill as compared to man?

**Q.3. (a) State and explain Doppler effect. Write its at least four cases.**

- (b) A train sounds its horn before it sets off from the station and observer waiting on the plate farm, its frequency at 1200 Hz. Then train moves steadily and after 50 seconds driver sounds horn again, the observer standing on the plate farm estimates the frequency 1140Hz calculate the speed of train after 50 seconds.(speed of sound =  $340 \text{ ms}^{-1}$ ).

**(7+3)**

**Q.4. (a) Define and explain the 2nd law of the thermodynamics.**

- (b) Prove that  $PV^\gamma = \text{constant}$  for an adiabatic process.

**(7+3)**

**Q.5. (a) What is damped harmonic motion. Find its equation and drive its solution, also define damped Harmonic oscillator.**

- (b) Prove for simple Harmonic motion, the acceleration (a) depends upon the amplitude(x).

**(7+3)**