



PBL-003-0491004

Seat No. _____

B. Sc. / M. Sc. (Sem. I) (CBCS) Examination

November / December - 2018

Applied Physics - I : Paper - III

(New Course)

Faculty Code : 003

Subject Code : 0491004

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.
(2) Numbers in the right margin indicate marks.

- 1** Attempt any seven short questions : (Two marks each) **14**
- (1) Define 'Impulse of a Force'.
 - (2) Define elasticity. What is meant by perfect elastic body?
 - (3) Define Simple Harmonic Motion.
 - (4) Define inertial and noninertial frames.
 - (5) Write down the Pascal's principle.
 - (6) Define Viscosity and Coefficient of Viscosity.
 - (7) Define Centripetal and Centrifugal force.
 - (8) Write Dimensional Formula of (a) Pressure, (b) Surface tension, (c) Force, (d) Power
 - (9) Define Angle of Contact and Capillarity.
 - (10) Define Intensity of Wave.
- 2** (a) Write answers of any two : (five marks each) **10**
- (1) Describe various practical units for the measurement of distance, area, mass, time.
 - (2) Describe Projectile motion and Trajectory. What is meant by Time of Flight (T) ? Derive equation for T.
 - (3) What are the limitations of dimensional analysis ?
 - (4) Explain Newton's 2nd law of motions using suitable examples.
- (b) Write answer of any **one** : (four marks each) **4**
- (1) State and prove the triangle law of forces.
 - (2) Write down the rules of writing the units.

- 3 (a) Write answers of any **two** : (five marks each) 10
- (1) Derive an expression for Young's Modulus Y of a material.
 - (2) Write down the experimental determination of surface tension.
 - (3) (a) Calculate the force required to stretch a wire of cross section 1 cm^2 to double its length. Given $Y = 2 \times 10^{11} \text{ NM}^{-2}$.
 - (b) Calculate the Pressure experienced by the swimmer 10 m below the surface of a lake ($g = 9.8 \text{ ms}^{-2}$, $\rho(\text{water}) = 1000 \text{ kgm}^{-3}$)
 - (4) Define Atmospheric Pressure, Absolute Pressure and Gauge Pressure.
- (b) Write answer of any **one** : (four marks each) 4
- (1) Derive the Equation of Continuity of the incompressible liquid.
 - (2) Define Y , k and η .
- 4 (a) Write answers of any **two** : (Five marks each) 10
- (1) State and derive Newton's law of cooling, $T - T_0 = e^{(-kt+C)}$.
 - (2) Define Convection and Radiation.
 - (3) Explain construction and working of a constant volume hydrogen thermometer.
 - (4) State and explain Kirchoff's law of heat radiation with example.
- (b) Write answer of any **one** : (Four marks each) 4
- (1) Describe the concept of Perfect Black Body. Explain Prevost's theory of heat exchange.
 - (2) State and explain the Stefan-Boltzmann law of black body radiation.
- 5 (a) Write answers of any **two** : (five marks each) 10
- (1) Describe free vibration and resonance vibration (forced vibration) with suitable examples.
 - (2) Give the difference between progressive wave and stationary wave.
 - (3) Define S.H.M. and derive an expression for time period of S.H.M.
 - (4) Define sound and Light waves.
- (b) Write answer of any **one** : (four marks each) 4
- (1) Write down the differences between transverse wave and longitudinal wave.
 - (2) Write the General Characteristics of waves.