

Anjuman Islam Janjira Degree College of Science Murud-Janjira, Raigad-402401 Affiliated to University of Mumbai	
Class: -F.Y.B.Sc.	Subject: - Physics Major
Semester: - I	Course code: -USPH101
Exam Event: - (SH) Winter 2025	Marks: - 30
Date: - 08/11/2025	Duration: - 01:00 Hours

- N.B :-**
1. All questions are compulsory.
 2. Figures to the right indicate full marks.
 3. Draw neat labelled diagrams wherever necessary.



Q: 1 A) Attempt any TWO of the following.

10

- 1) State and Explain Newton's Second Law of Motion.
- 2) Write the advantage and disadvantage of friction in daily life.
- 3) Explain the concept of static friction.
- 4) State and Explain Work - Energy Theorem.

Q: 1 B) Attempt any ONE of the following.

05

- 1) The momentum of the body is given by the equation $p(t) = 3t^2 + 4t + 5$ kgm/s. Find the force acting on the body at $t = 5$ s.
- 2) A person lifts suitcase of 20 kg from platform and put it on his head 2 m above the platform calculate the work done by person on the suitcase (given $g = 9.8 \text{ m/s}^2$)

Q: 2 A) Attempt any ONE of the following.

10

- 1) Explain the concept of Angular Momentum.
- 2) What is forced oscillation and Resonance? Explain with Example.
- 3) Derive the differential equation of Motion of Torsional Pendulum
- 4) Derive Differential equation of Coupled Oscillator.

Q: 2 B) Attempt any ONE of the following.

05

- 1) A 10kg object initially at rest explodes into two fragments. One fragment has mass 4 kg and moves with velocity of 8 m/s to the right what is velocity of second fragment?
- 2) A spring of force constant 400 N/m is mounted on a horizontal table. Mass of 2 kg is attached to the free end of the spring then it is pulled away to a distance of 2 cm and released. Calculate time period of oscillation of the mass and acceleration of mass.