

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: - Winter 2024 (SH)	Marks: - 30

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 ONE of the following.

10

- 1) Solve the following questions
 - i) Describe the concepts of coefficient of friction and law of friction.
 - ii) Write the difference between conservative and non-conservative forces.
- 2) Solve the following questions
 - i) Explain the concept of Newton's third law of motion with examples.
 - ii) Compare the inertial and non-inertial frame of reference.

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

05

- 1) The coefficient of static friction between the block of mass 1 kg is 0.4. calculate the applied force so that the block does not slide on the plane. (given $g = 9.8 \text{ m/s}^2$)
- 2) The force $10 + \frac{1}{2}x \text{ N}$ is applied on particle in given direction, find a work done by force during a displacement from $x_1 = 0 \text{ m}$ to $x_2 = 2\text{m}$.

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

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- 1) Discuss the concept of angular momentum and its conservation.
- 2) Derive the differential equation of simple harmonic motion.

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

05

- 1) A 2 kg object moving with a velocity of 4 m/s and collided with 3 kg object at stationary. After the collision both objects stick together. Then calculate the final velocity.
- 2) Two blocks of masses, 0.5 kg and 0.2 kg are connected with a massless spring of force constant 20 N/m. calculate the frequency of oscillation of system.