K21U 6807

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CBCSS-OBE – Regular/Supplementary/ Improvement) Examination, November 2021
(2019 Admission Onwards)
CORE COURSE IN PHYSICS
1B01PHY : Mechanics – I

Time : 3 Hours Max. Marks : 40

PART – A

All questions are **compulsory**. **Each** question carries **1** mark.

1. Meter is defined in terms of distance traveled by _____ in a fixed time interval.
2. Define inertial mass.
3. Resistance to fluid flow is called _____
4. Write the differential equation for simple harmonic motion.
5. Rotational motion is caused by _____
6. Give two properties of a central force. **(6×1=6)**

PART – B

Answer **any 6**. **Each** question carries **2** marks.

7. What are fictitious forces ? Illustrate with example.
8. Show graphically the variation of intermolecular force with distance.
9. Why are attractive forces, represented by potential wells ?
10. Define power. In what unit do you measure it ?
11. When a body has a free fall how does the energy of the system change ?
12. Define escape velocity.
13. Show that when the force is central angular momentum is conserved.
14. What are the factors that decide the magnitude of angular momentum ? **(6×2=12)**

P.T.O.

PART – C

Answer **any 4**. **Each** question carries **3** marks.

15. A person weighing 60 kg is standing on a weighing scale inside a lift. Find the reading on the weighing scale when it is moving (a) down with uniform velocity (b) up with acceleration 4 m/s^{-2}.

16. Find the coefficient of friction of an inclined plane along which a body just starts sliding when the angle is 30°. Find the acceleration when the angle is increased to 60°.

17. A body of mass 10 kg falls through a height of 2.10 m. Find the work done when it reaches the ground.

18. A body is moving in a vertical circle of radius R. Find the velocity at the highest point if the body has mass M.

19. Moment of inertia of a thin rod about its axis is $ML^2/3$. Calculate the MI about its end. Mass = 0.1 kg, 1 = 20 cm.

20. Determine the moment of inertia of a circular disc. **(4×3=12)**

PART – D

Answer **any 2**. **Each** question carries **5** marks.

21. Explain how Newton's laws can be applied to a connected body system using train as an example. Can a body have constant speed and yet be accelerating ?

22. Discuss the motion of a simple pendulum and illustrate with graphs the variation of energies during one oscillation. Obtain expression for velocity and acceleration.

23. Define conservative force and give examples. Prove that work done by it along a closed path is zero.

24. Show that acceleration in an Atwood's machine is proportional to the difference in masses suspended. Show that in the absence of friction total energy of the two masses is conserved. **(2×5=10)**
