D1BPH1901 (S4) **Reg.No.....**

Name: .....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2023

(Supplementary - 2019 Admission)

PHYSICS

GPHY1B01T: METHODOLOGY OF SCIENCE AND BASIC MECHANICS

Time: 2 Hours **Maximum Marks: 60**

SECTION A: Answer the following questions. Each carries *two* marks.
(Ceiling 20 Marks)

1. What is a hypothesis?
2. Explain S.I. system of units with example.
3. Define non conservative force. Give an example.
4. State work energy theorem.
5. Write down the expression for escape velocity and explain the terms.
6. Explain the term potential energy. How is it related to force?
7. What is a rigid body?
8. Explain elasticity.
9. What is a cantilever?
10. State the law of conservation of angular momentum.
11. State parallel axis theorem.
12. What are the forces acting on the masses in an Atwood's machine?

SECTION B: Answer the following questions. Each carries *five* marks.
(Ceiling 30 Marks)

13. Explain rationality, causality and description.
14. What are some examples of scientific revolution, and what paradigms were replaced in each case?
15. What are the limitations of Newton's laws?
16. Consider a block A of mass m_A is placed on a table and another block B of mass m_B is placed on block A. Draw the force diagram. Write the equations of motion.
17. A 100g of stone is revolving at the end of a 1m long string at the rate of 2 revolutions per second. Determine its angular momentum. If after 25 sec., it is making only one revolution per second. Find the torque.
18. Obtain the angular momentum of a conical pendulum about: i) the centre of the circle in which the bob moves and to the pivot.
19. Derive an expression for bending moment.

SECTION C: Answer any *one* question. Each carries *ten* marks.

20. Discuss the general steps involved in applying Newton's laws to a system. Apply Newton's laws to find the accelerations of two astronauts of mass m_A and m_B pulling on either ends of rope of negligible mass.
21. What is potential energy? Using potential energy curve, explain bound state and binding energy. Give graphical representation of potential energy of a particle in a conservative field.

(1 x 10 = 10 Marks)