

24U119S

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Name:

Reg.No:

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2024

(CBCSS - UG)

CC20U PHY1 B01 - MECHANICS - I

(Physics - Core Course)

(2020 to 2023 Admissions - Supplementary/Improvement)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 2

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. State Newton's laws of motion.
2. Define one Newton.
3. What are constraints of motion?
4. What is meant by contact forces? Give examples.
5. Explain friction with examples.
6. Define work. Give its unit.
7. Find the work done by a central force
8. Define potential energy in a conservative force field.
9. State the general law of conservation of energy
10. Give mathematical expression for areal velocity, explain the terms.
11. Find moment of inertia of uniform thin stick of mass M , length L , in an axis through the midpoint and perpendicular to the stick
12. Give the relation connecting linear velocity and angular velocity. Explain terms.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. Two blocks of mass 2kg and 1kg are in contact and kept on a horizontal table. A horizontal force $F= 3N$ is applied to one of the blocks. Find the force of contact between the two blocks.
14. Explain fundamental forces in nature and its properties.
15. When a ball is shot from a spring gun at angle Q with a velocity V , find the recoil velocity of the gun.
16. A pendulum bob has a speed 3m/s while passing through its lowest position. What is its speed when it makes an angle of 60 degrees with the vertical? The length of the pendulum is 0.5m. Take $g=10m/s^2$

17. Obtain the expression for law of equal areas.
18. Obtain an expression for the acceleration for an Atwoods machine.
19. Illustrate the law of conservation of angular momentum by suitable examples.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any *one* question. The question carries 10 marks.

20. Describe simple harmonic motion. Form its equation of motion and solve it.
21. a) State work energy theorem.
b) Find the equation of motion of simple harmonic motion using work energy theorem.

(1 × 10 = 10 Marks)
