

21U114

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Name:

Reg.No:

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC20U PHY1 B01 - MECHANICS-I

(Physics - Core Course)

(2020 Admission onwards)

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 second law with an example.
2. State the principle of superposition.
3. Write the vertical equation of motion of a conical pendulum with force diagram.
4. State Coulomb's law of electrostatic forces.
5. Explain various types of friction. Suggest a few methods to reduce friction.
6. Give any two properties of conservative force.
7. What are energy diagrams?
8. Define angular momentum. Give its SI unit.
9. What are the parameters on which the period of a simple pendulum depends?
10. What is a rigid body?
11. Give the relation connecting linear velocity and angular velocity. Explain terms.
12. Explain the law of conservation of angular momentum.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. What are the fundamental forces in nature? Compare their nature and magnitudes.
14. Find the centre of mass of a triangular sheet.

15. Using work energy theorem, find the height reached by a mass 'm', when it is thrown vertically upwards with initial velocity 'u'.
16. Find the work done by a force $F = f_0 + Kx$ acting parallel to x-axis on an object which moves along x-axis from x_1 to x_2 .
17. Derive the law of conservation of energy for the systems where non-conservative forces come into play.
18. Derive the relation connecting torque and angular momentum.
19. State and prove parallel axis theorem.

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. Describe the spring gun example as an initial value problem.
21. Integrate the equation of motion of a particle. Explain the result.

(1 × 10 = 10 Marks)
