

20U112

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Name:

Reg.No:

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2020

(CBCSS - UG)

CC19U PHY1 B01 - METHODOLOGY OF SCIENCE AND BASIC MECHANICS

(Physics - Core Course)

(2019 Admission - Supplementary/Improvement)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 2

Part A (Short answer questions)

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

1. Using body diagram, show that it is easy to pull an object than to push it.
2. What are the fundamental forces in nature?
3. What do you mean by contact forces . Write two examples.
4. What is the meaning by 'fictitious force' ?
5. State Hooke's law and define linear restoring force.
6. Explain time dependent and time independent forces.
7. What are the differences between conservative and non- conservative forces?
8. Define potential energy in a conservative force field.
9. What is power? Write its expression with unit.
10. Expand the angular momentum interms of cross product.
11. How we can have force with zero net torque?
12. Define moment of inertia.

(Ceiling: 20 Marks)

Part B (Short essay questions)

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

13. State Newton's three laws of motion. What are the limitations of Newtons laws ?

14. 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.
15. Describe the working principle of the throwing weapon Bola.
16. A force $F = 2i + 5j + 3k$ acting on a particle located at $(1, -1, -3)$ displaces it to $(2, 1, 1)$. Find the work done by the force.
17. Derive an expression of potential energy based on the concept of small oscillations.
18. Obtain work- energy theorem for a rigid body, from that of a particle.
19. Illustrate the law of conservation of angular momentum by suitable examples.

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. Derive an expression for acceleration of a whirling block on the table with suitable force diagram.
21. Define physical pendulum. Derive time period of simple pendulum. Find the expression for radius of gyration.

(1 × 10 = 10 Marks)
