

22U112

(Pages: 2)

Name:

Reg.No:

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2022

(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. When walking on ice one should take short steps. Why?
2. Consider a sliding block on moving wedge. Draw the force diagram.
3. State Newton's law of gravitation.
4. There is a limit beyond which the polishing of a surface increases frictional resistance rather than decreasing it. Why?
5. State Hooke's law and define linear restoring force.
6. Explain time dependent and time independent forces.
7. State work energy theorem in one dimension.
8. Find the work done by a central force.
9. Define power. Give its unit.
10. Find moment of inertia of uniform thin stick of mass M , length L , in an axis through the midpoint and perpendicular to the stick.
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. Discuss the tug of war by astronauts in space using Newton's third law. Draw the force diagram
14. Consider two masses m_1 and m_2 are connected by an inextensible string, which passes over a pulley. Pulley is accelerating upward at rate of A . Derive the equation of constraint.

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. What are conservative forces? Show that the line integral of a conservative force around a closed curve vanishes.
17. Discuss the energy diagram for a typical attractive two atom system.
18. Obtain an expression for the acceleration for an Atwoods machine.
19. Obtain work- energy theorem for a rigid body, from that of a particle.

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. Consider three compartments of a freight train with equal masses are pulled by an engine with force F . Draw the force diagram of each compartments. What are the forces on each compartments? Generalise the results in the case of many compartments.
21. Describe the motion of particle in a central force field. Obtain the expression for law of equal areas.

(1 × 10 = 10 Marks)
