U7512

Reg. No.: .....

Name:.....

University of Kerala

First Semester Degree Examination, November 2024

Four Year Under Graduate Programme

Discipline Specific Core Course

PHYSICS

UK1DSCPHY101- Principles of Dynamics

Academic Level: 100-199

Time: 1½ hours Max.Marks: 42

Part A.
Answer All Questions, Objective Type. 1 Mark Each.
(Cognitive Level: Remember/Understand) 6 Marks. Time: 6Minutes

Qn.No.	Question	Cognitive Level	Course Outcome (CO)
1.	Identify the result of a cross product between two parallel vectors.	Remember	1
2.	Define Work-Energy theorem.	Remember	4
3.	Describe the role of angular momentum in planetary motion.	Understand	4
4.	Describe centripetal acceleration.	Understand	4
5.	Explain what happens to the rod if the force is applied at the point on the rod (a) below the centre of mass (b) above the centre of mass.	Understand	2
6.	Explain linear momentum.	Understand	3

Part B.
Answer All Questions, Short Answer. 2 Marks Each.
(Cognitive Level: Understand/Apply) 8 Marks. Time: 24 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
7.	Discuss any one distinguishing features of conservative and non-conservative forces giving examples for each.	Understand	4
8.	Discuss about the magnitude of radial and tangential acceleration	Understand	3
9.	Explain with example why centripetal force is necessary for circular motion	Understand	4
10.	Describe a freely falling object? Write down the equations of motions for a freely falling object.	Understand	2

Part C.

Answer all 4 questions, choosing among options within each question.

Long Answer. 7 Marks Each.

(Cognitive Level: Apply/Analyse/Evaluate/Create) 28 Marks. Time: 60 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
11.	A. (i) Demonstrate the independence of horizontal and vertical motions in projectile motion. (ii) Describe how gravity affects vertical motion while horizontal motion remains constant. **OR** B. Describe the Second Law of Motion explaining its significance and mathematical representation, and provide examples illustrating its application.	Understand	2
12.	A. (i) Describe the relationship between impulse and momentum (ii) Discuss impulse-momentum theorem. (iii) Provide an example demonstrating the practical application of this theorem **OR** B. (i) Explain how the principle of conservation of linear momentum applies in a perfectly inelastic collision. (ii) Use an example where two objects stick together after the collision to illustrate your explanation.	Understand	3
13.	A. Explain the principle of conservation of angular momentum with reference to elastic collisions in one and two dimensions. **OR** B. Compare and contrast work done by constant and varying forces, explaining the implications for energy transfer. Provide examples.	Understand	4
14.	A. (i) Explain how Newton's Second Law applies to a particle in uniform circular motion. (ii) Discuss the relationship between the net force, acceleration, and velocity of the particle. **OR** B. Describe how torque affects angular momentum, and discuss the implications of this relationship for the conservation of angular momentum	Understand	4