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| **University of Kerala** | | |
| Discipline: Physics |  | Time: 1 Hour 30 Minutes (90 Mins.) |
| Course Code: UK1DSCPHY101 |  | Total Marks: 42 |
| Course Title: Principles of Dynamics |  |  |
| Type of Course: **DSC** |  |  |
| Semester: 1 |  |  |
| Academic Level: 100-199 |  |  |
| Total Credit: 3, Theory: 3 Credit  (Applicable for 4 Credit Course with 1 Credit Practical Also) |  |  |

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

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| **Qn.**  **No.** | **Question** | **Cognitive Level** | **Course Outcome (CO)** |
| 1. | State the law of conservation of linear momentum | Remember | 3 |
| 2. | List Properties of vectors | Remember | 1 |
| 3. | Discuss the type of acceleration experienced by a body moving along a circular path with variable speed | Understand | 4 |
| 4. | Give another name for the first law of motion. Explain the reason for giving so | Understand | 2 |
| 5. | Describe the term impulse | Understand | 3 |
| 6. | Explain centripetal acceleration | Understand | 4 |

Part B.

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

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| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course Outcome (CO)** |
| 7. | Describe motion in one and two dimensions with examples | Understand | 2 |
| 8. | Discuss the conservation of angular momentum | Understand | 4 |
| 9. | Explain with example why centripetal force is necessary for circular motion | Understand | 4 |
| 10. | Explain the concept of centre of mass | Understand | 3 |

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

Long Answer. 7 marks each. Answer all 4 Questions, choosing among options\* within each question.

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| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course Outcome (CO)** |
| 11. | A. (i) State Newton’s laws of motion.  (ii) Explain the condition of particles to be in equilibrium (iii) Differentiate between static friction and kinetic friction.  OR  B. Discuss in detail the horizontal range and maximum  height of a projectile | Understand | 2 |
| 12. | A. (i) Describe the differences between elastic and inelastic  collisions with examples  (ii) explain how the initial and the final momenta are calculated  OR  B. (i) Discuss the role of impulse in changing the  momentum of an object.  (ii) How does applying a greater force over a shorter  time period affects the change in momentum compared  to apply a smaller force over a longer time period?  (iii) Provide an example to illustrate your explanation | Understand | 3 |
| 13. | A. (i) Discuss the characteristics of non-uniform circular motion.  (ii) Explain how it differs from uniform circular motion in terms of speed, acceleration and net force  (iii) Provide examples to illustrate your explanation and describe the factors that contribute to the changes in speed during non-uniform circular motion  OR  B. (i) Discuss the concept of precession and its relationship with angular momentum.  (ii) Explain the significance of precision in gyroscope motion. | Understand | 4 |
| 14. | A. (i) Define angular momentum.  (ii) Discuss the angular momentum of a rotating rigid object.  OR  B. Compare and contrast work done by constant and varying forces, explaining the implications for energy transfer. Provide examples. | Understand | 4 |