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| **University of Kerala** | | |
| Discipline: Physics |  | Time: 1 Hour 30 Minutes (90 Mins.) |
| Course Code: UK1DSCPHY100 |  | Total Marks: 42 |
| Course Title: Foundation Course in Physics 1 |  |  |
| 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. | Mention the equation for Gauss divergence theorem. | Remember | 1 |
| 2. | Define momentum. | Remember | 2 |
| 3. | Illustrate how impulse can be applied to stop a moving object, such as a car. | Understand | 2 |
| 4. | Express power in terms of force and velocity. | Understand | 3 |
| 5. | Describe the influence of direction of applied force on the torque on an object. | Understand | 4 |
| 6. | Write the relationship between angular momentum and torque. | 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. | Express the use of curl of a vector. | Understand | 1 |
| 8. | Differentiate mass from weight. | Understand | 2 |
| 9. | Calculate the work done in stretching a spring. | Apply | 3 |
| 10. | A 2.45 x 104 N truck travelling in the positive X direction makes an emergency stop. The x-component of net external force acting on it is -2.54 x 104 N, calculate the acceleration. | Apply | 5 |

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. Describe the concepts of line integrals, surface integrals, and volume integrals. Provide examples to illustrate how each is applied in practical scenarios.  OR  B. For any three vectors A, B and C prove that  [A × (B × C)] + [B × (C × A)] + [C × (A × B)] = 0. | Apply | 1 |
| 12. | A. State Newton’s laws of motion and hence demonstrate with necessary steps, how force is defined and derived.  OR  B. A block of mass 10 Kg starts sliding down a rough inclined plane with angle of inclination 300 with an acceleration 2m/s2. Find the force acting on the block. | Apply | 2 |
| 13. | A. i) Derive expression for gravitational potential energy?  ii) Deduce relation connecting Force and Potential Energy in Three dimensions  OR  B. i) Explain gravitational mass and inertial mass.  ii) A watermelon weighs 44.0 N at the surface of the earth. Calculate its mass and weight on the surface of earth and on another planet where g = 1.81 m/s2. | Apply | 3 |
| 14. | A. Discuss the movement of a rigid body undergoing combined translational and rotational motion and hence determine the relation for its kinetic energy.  OR  B. i) Explain moment of inertia.      ii) Calculate moment of inertia of a rod about an axis passing through one end and perpendicular to its length. | Apply | 4 |