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| **University of Kerala** | | |
| Discipline: Physics |  | Time: 1 Hour 30 Minutes (90 Mins.) |
| Course Code: UK1DSCPHY103 |  | Total Marks: 42 |
| Course Title: INTRODUCTION TO MECHANICS AND ENERGY RESOURCES |  |  |
| 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. | Define unit | Remember | 1 |
| 2. | List the base quantities in terms of which speed is defined | Remember | 1 |
| 3. | Write down any two conventional energy sources | Understand | 3 |
| 4. | Restate Newton’s law of gravitation | Understand | 2 |
| 5. | Discuss the factors on which moment of inertia depends | Understand | 4 |
| 6. | Restate equation for torque based on Newton’s second law of rotation | 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. | Explain measurement of a physical quantity | Understand | 1 |
| 8. | Discuss the effect of shape of earth on acceleration due to gravity | Understand | 2 |
| 9. | Discuss advantages of wind energy | Understand | 3 |
| 10. | Summarize the relation between linear and angular variables of the following physical quantities   1. Position 2. Speed | Understand | 4 |

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. A small air plane leaves an airport on an overcast day and is later sighted 215 km away in a direction making an angle 220 east of north.  a. Illustrate the calculation of components of the displacement vector along east and north directions.  b. Calculate how far east and north is the airplane from the airport when sighted  OR  B. Determine the angle between **a**=3**i**-4**j** and **b**=-2**i+**3**k** | Apply | 1 |
| 12. | A. Discuss gravitation near earth’s surface  OR  B. a. Explain gravitational potential energy, deriving an equation for it  b. Interpret the path independence of gravitational force | Understand | 2 |
| 13. | A. Discuss about the following renewable energy sources – solar energy and wind energy  OR  B. Describe a nuclear reactor | Understand | 3 |
| 14. | A. Describe the following rotational variables – angular position, angular displacement, angular velocity and angular acceleration  OR  B. Explain kinetic energy of rotation and torque | Understand | 4 |