Reg. No.: .....

Name: .....

University of Kerala

W7927

First Semester FYUGP Degree Examination, December 2025

Discipline Specific Core Course

PHYSICS

UK1DSCPHY103 - Introduction to Mechanics and Energy resources

Academic Level: 100-199

2025-Admission

Time: 1 Hour 30 Minutes(90 Mins.) **Max. Marks: 42**

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark Each.Answer all questions

Qn No.	Question	CL	CO
1	Recall Kepler’s second law.	RE	2
2	Name any two fundamental SI units	RE	1
3	Interpret gravitational potential energy.	UN	2
4	Outline at least two sources of biomass energy	UN	3
5	Interpret angular acceleration	UN	4
6	Describe triangle law of vector addition	UN	1

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Show that rotational kinetic energy depends on both moment of inertia and angular velocity.	UN	4
8	Explain how the cross product of two parallel vectors becomes zero.	UN	1
9	A remote village has no access to electricity. Illustrate how solar panels can be used to meet their daily energy needs.	AP	3
10	Calculate the separation between a 5.2 kg particle and a 2.4 kg particle for their gravitational attraction to have a magnitude of 2.3×10^{-12} N.	AP	2

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer.7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A) a) A wheel starts from rest and attains an angular velocity of 20 rad/s in 5 seconds under constant angular acceleration. Solve to find (i) The angular acceleration. (ii) The angular displacement. b) Demonstrate, how this problem is analogous to linear motion with constant acceleration. OR B) a) Illustrate Newton's second law of rotation b)The width of a door is 40 cm. If it is released by exerting a force of 2 N at its edge (away from the hinges). Solve to find the torque produced which causes the door to open.	AP	4, 4
12	A) Analyze the principle and working of a nuclear reactor with a schematic diagram. OR B) Analyse solar energy and wind energy as sustainable sources of energy, giving their merits and demerits.	AN	3, 3
13	A) Evaluate the total mechanical energy E of a satellite of mass m orbiting a body of mass M in a circular orbit. Defend why must E always be negative for a gravitationally bound orbit. OR B) Deduct the idea of gravitation based on Newton's law of gravitation.	EV	2, 2
14	A) Design and elaborate a unit vector that lies along a line joining the points P(3,−1,2) and Q(−2,5,7) OR B) A student measures the masses of five small objects using a digital balance and records: 0.0523 kg, 1.2 kg, 3.450 kg, 0.0067 kg, 20.0 kg i) Create a table indicating each mass with the correct number of significant figures. ii) Create a short table showing all five measurements rounded to 3 significant figures and explain why this is important in reporting experimental data	CR	1, 1

Qn No.	Question	CL	CO