U7516

Reg. No.: ……..……..……..

Name:……..……..……...

University of Kerala

First Semester Degree Examination, November 2024

Four Year Under Graduate Programme

Discipline Specific Core Course

PHYSICS

UK1DSCPHY103- INTRODUCTION TO MECHANICS AND ENERGY RESOURCES

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.	List any two conventional energy sources.	Remember	3
2.	Define a vector.	Remember	1
3.	Restate the equation for gravitational force between two bodies separated by a distance.	Understand	2
4.	Explain why is coal labelled as a non-renewable source	Understand	3
5.	Discuss the number of significant figures in 5.020	Understand	1
6.	Explain torque	Understand	4

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.	List any two conventional energy sources.	Remember	3
8.	Determine the angle between the vectors 3i-2j+5k and 2i-2j-2k	Apply	1
9.	Discuss the factors that affect the force of gravitation near earth’s surface.	Understand	2
10.	Explain how to determine the rotational inertia of a 30 kg object rotating around a circular path of radius 6 m.	Understand	4

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. Describe the challenges related to the storage and transportation of biomass fuel compared to other renewable energy sources. **OR** B. Explain how tidal energy system affect marine ecosystems and demonstrate the mitigation strategies used to minimize environmental impact.	Understand	3
12.	A. Restate and explain parallel axis theorem used for calculating the rotational inertia of rigid bodies. **OR** B. Discuss Newton's second law of rotation.	Understand	4
13.	A. Explain Kepler's laws of motion **OR** B. Discuss how to obtain the equation for escape velocity and use it to calculate the escape velocity of the earth's moon which has a mass 7.36×10^6 kg and mass 1.74×10^6 m.	Understand	2
14.	A. a. Determine a vector with magnitude 10 and points in the direction of the vector p=4i + 3k. b. Consider a second vector q = 3i + 2j -k and calculate the unit vector perpendicular to both vectors p and q. **OR** B. Consider two displacements, one of magnitude 3 m and another of magnitude 4 m. Illustrate how the displacement vectors may be combined to get a resultant displacement of magnitude (a) 7 m, (b) 1 m, and (c) 5 m	Apply	1