Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.

(For those admitted in June 2023 and later)

PROGRAMME AND BRANCH: B.Sc., PHYSICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
III	PART – III	CORE - 3	U23PH303	MECHANICS

Date & Session:23.04.2025/FN **Time : 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer ALL Questions.
CO1	K1	1.	Which of the following is NOT a type of force in Newton's laws of motion? a) Gravitational force b) Frictional force c) Centripetal force d) Electrostatic force
CO1	K2	2.	The escape velocity from Earth is independent of___. a) Mass of the object b) Radius of the Earth c) Gravitational constant d) All of the above
CO2	K1	3.	The total linear momentum of a system is conserved when_____. a) The net external force is zero b) The system is at rest c) The external torque is infinity d) The internal forces are zero
CO2	K2	4.	The centre of mass of a system of particles moves as if_____. a) It were a rigid body b) It were a point mass under the influence of the external force c) It were stationary d) It were subject to a non-conservative force
CO3	K1	5.	The work-energy theorem states that the work done on a body is equal to ___. a) The change in potential energy of the body b) The change in total mechanical energy of the body c) The velocity of the body d) The change in kinetic energy of the body
CO3	K2	6.	A conservative force is defined as a force for which the work done is_____. a) Path-dependent b) Independent of the path c) Zero for all motions d) Dependent only on velocity
CO4	K1	7.	The moment of inertia of a rigid body depends on_____. a) The mass of the body b) The shape and mass distribution of the body c) The angular velocity of the body d) The linear velocity of the body
CO4	K2	8.	The kinetic energy of a body rolling along a horizontal plane is the sum of ___. a) incidence b) reflection c) refraction d) transmission
CO5	K1	9.	The condition which restrict motion of an object is called_____. a) constraints b) degrees of freedom c) generalised co ordinates d) number of freedom
CO5	K2	10.	Lagrange's equations of motion are derived from. a) Newton's second law b) D'Alembert's principle c) Conservation of energy d) Conservation of momentum

Course Outcome	Bloom's K-level	Q. No.	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	Explain Newton's Law of Gravitation. **(OR)**
CO1	K3	11b.	State and explain Kepler's laws of planetary motion.
CO2	K3	12a.	Discuss the relation between torque and angular momentum. **(OR)**
CO2	K3	12b.	Obtain an expression for location of centre of mass.
CO3	K4	13a.	Compare Conservative and Non-conservative Forces. **(OR)**
CO3	K4	13b.	State and explain the work-energy theorem.
CO4	K4	14a.	Find an expression for Moment of inertia of a thin uniform bar. **(OR)**
CO4	K4	14b.	Analyse the kinetic energy of a body falling on a horizontal plane.
CO5	K5	15a.	Discuss about the principle of Virtual work. **(OR)**
CO5	K5	15b.	Discuss D'Alembert's Principle and obtain its expression.

Course Outcome	Bloom's K-level	Q. No.	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Arrive at the resultant of two forces on a particle f1 and f2 are perpendicular to each other. **(OR)**
CO1	K3	16b.	Derive an expression for the gravitational potential and field due to a uniform solid sphere at a point outside the sphere.
CO2	K4	17a.	Analyse the Newton's second law of motion for the system of particles. **(OR)**
CO2	K4	17b.	Derive an expression for angular momentum of a particle in terms of position and momentum. Discuss conservation of angular momentum.
CO3	K4	18a.	State and prove law of conservation of energy. **(OR)**
CO3	K4	18b.	Explain the concept of potential energy and derive the equation for potential energy in a gravitational field.
CO4	K5	19a.	Discuss about the Parallel and Perpendicular axes theorem. **(OR)**
CO4	K5	19b.	Derive the moment of inertia for a thin uniform bar about its centre of mass and discuss its significance.
CO5	K5	20a.	Obtain Lagrangian equation from D'Alembert's Principle. Explain **(OR)**
CO5	K5	20b.	Solve and obtain the equation of motion of a Simple pendulum using Lagrangian method.