K25FY3263 Pages: 2 Reg No:.....
Name:.....

Third Semester FYUGP Degree (Reg) Examination November 2025

KU3DSCPHY202 - MECHANICS

2024 Admission onwards

Time : 1.5 hours Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. A simple pendulum has a period of 1s and an amplitude of 10units. After 10 oscillations, its amplitude has been reduced to 5units. What is the damping time?

2. What are the positions at which the velocity becomes maximum and minimum in simple harmonic motion? Write down the maximum and minimum values of velocity.

3. Write down the expression for total energy of a particle moving under central force. What will be the trajectory of the particle if E>0

4. Give two examples for inverse square law forces and write their expressions

5. What do you mean by fictitious force? Discuss its properties.

6. Write down the formula for velocity and acceleration in a rotating coordinate systems.

7. What do you mean by a space time diagram?

8. Define rest energy of a particle. Give the value of rest energy of electron

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Section B

Answer any 4 questions. Each carry 6 marks.

9. How will you differentiate gravitational field from accelerating coordinate system? Explain.

10. Obtain the expression for fictitious force experienced in a uniformly accelerating system.

11. A bead slides without friction on a rigid wire rotating at constant angular speed . Find the force exerted by the wire on the bead.

12. Two space ships A and B approach earth from opposite directions with speed 0.826 and 0.635 respectively with respect to the earth. What is the speed of (a)ship as observed from B(b)ship B as observed from A?

13. Compute the kinetic energy and total energy of an electron moving with velocity 0.98c.

14. Find the momentum of a proton moving at a speed of 0.86c in SI units Express the answer in MeV/c also(rest mass of proton = 938 MeV/c^2.)

Section C

Answer any 1 questions. Each carry 14 marks.

15. Set up the differential equation for a damped harmonic oscillator and solve it. Discuss the three cases of damping.

16. Two non interacting particles m_1 and m_2 move toward each other with velocities v_1 and v_2. Their paths are offset by distance b. Find the equivalent one body problem of this system.

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