24803753

QP CODE: 24803753

Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, JUNE 2024

Second Semester

INTEGRATED MSC BASIC SCIENCE-CHEMISTRY

COMPLEMENTARY - ICH2CM06 - PHYSICS II - MECHANICS AND RELATIVITY

2020 Admission Onwards

B0B05394

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What you mean by equivalent simple pendulum?
2. What is a compound pendulum?
3. Define angular velocity. What is its unit?
4. State law of conservation of angular momentum.
5. Write a note on Beats.
6. What are the conditions for an oscillatory motion to be simple harmonic ?
7. Plot the acceleration versus time graph of a simple harmonic oscillator.
8. What is the difference between inertial frame of reference and non-inertial frame of reference?
9. What is the difference between Galilean transformation and Lorentz transformation?
10. What is minkowski matric?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. An object moves around a circular track of radius 4m. The object makes one revolution in ten seconds. Determine (i) speed of the car and(ii) its centripetal acceleration.
12. State and explain parallel axis theorem and perpendicular axis theorem.

13. Derive the expression for moment of inertia of a straight rod about an axis passing through its centre and perpendicular to the length of the rod.

14. Distinguish between longitudinal and transverse wave and obtain general wave equation

15. Prove that energy density of plane progressive wave is half kinetic and half potential .

16. Write a note on superposition of waves.

17. What is the mean lifetime of a burst of π^+ mesons travelling with a velocity 0.7c .The proper life time is $2.5X10^{-8}$.

18. Explain length contraction.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Derive expressions for moment of inertia of a solid sphere(1)about its diameter,(2)about a tangent.

20. What is a flywheel? Explain the working and theory of a flywheel.

21. Discuss the orgin of damping. Set up the differential equation for damped harmonic oscillator. Discuss different terms involved. Obtain the condition for over damped, under damped and critically damped cases

22. Explain the consequences of Lorentz transformation equations.

(2×5=10 weightage)