



QP CODE: 26802008



Reg No :

Name :

INTEGRATED M Sc DEGREE EXAMINATION APRIL 2026

Second Semester

INTEGRATED M Sc BASIC SCIENCES - CHEMISTRY

COMPLEMENTARY - ICH2CM06 - PHYSICS II - MECHANICS AND RELATIVITY

2020 Admission Onwards

7C6052AB

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. What do you mean by centre of suspension of a compound pendulum?
2. Define translatory motion.
3. Radius of gyration for a given body depends upon which factor?
4. Give the expression for moment of inertia of a ring about an axis passing through its centre and perpendicular to its plane.
5. What are longitudinal waves? Give examples.
6. Define the term energy flux of a wave.
7. Give expression for the velocity and acceleration of a simple harmonic oscillator. Explain different terms.
8. What are the fundamental postulates of special theory of relativity?
9. Give Lorentz transformation of the system moving in y axis.
10. Using Four vector give the expression for momentum.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Explain the variation of the value of g at poles & equator.
12. Derive the expression for torque acting on a single particle.
13. Explain the theory of a flywheel.





14. Derive the expression for time period and frequency of a simple harmonic oscillator.
15. A particle executes SHM of amplitude 25cm and time period 6s. What is the minimum time required for the particle to move between two points 12.5cm on either sides of the main position ?
16. Amplitude of a damped harmonic oscillator is reduced to one by tenth of the initial value after 100 oscillations. If the time period of oscillation is 2s , calculate the damping constant.
17. Derive relativistic energy and momentum relation.
18. Two lumps of clay each of mass m , collide head on at $\frac{3}{5}c$. They stick together then what is the mass M of composite lump?.

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any **two** questions.

Weight **5** each.

19. Explain about the uniform circular motion and centripetal acceleration.
20. Derive expressions for moment of inertia of a solid cylinder- (1)about its own axis,(2)about an axis passing through its centre and perpendicular to its own axis of cylinder,(3)about a diameter of one of its faces.
21. Set up the differential equation of a simple harmonic oscillator. Solve the equation to get expression for acceleration, velocity and displacement
22. What are four vectors? Explain proper time 4-vector.

(2×5=10 weightage)

