

BSCphMJ202x-1C
B.Sc. Semester - 1 (NEP-2020) Examination
OCT/NOV-2025
PHY: Mechanics and Optics (Major-2)

Seat No : _____

Time: 2:00 Hours

Marks:50

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que.1 Answer the following question (any two). (10)
- (1) Explain Newton's laws of motion.
 - (2) Explain conservative and non-conservative force.
 - (3) Explain centre of mass of two particle.
- Que.2 Answer the following question (any two). (10)
- (1) Describe length contraction.
 - (2) Describe relativity of simultaneity.
 - (3) Explain addition of velocities.
- Que.3 Answer the following question (any two). (10)
- (1) Give the theory of Fraunhofer diffraction at single slit.
 - (2) Explain action of zone plate.
 - (3) Explain zone plate.
- Que.4 Answer the following question (any five). (10)
- (1) Explain potential energy.
 - (2) Describe angular velocity.
 - (3) Explain torque.
 - (4) Explain ether hypothesis.
 - (5) Write and explain Einstein's postulates of special theory of relativity.
 - (6) A certain process requires 10^{-8} sec to occur in an atom at rest in laboratory. How much will this process required to an observer in laboratory, when the atom is moving with a speed of 6×10^7 m/s.
 - (7) Discuss types of diffraction.
 - (8) Compare the zone plate and convex lens.
 - (9) What is the radius at the first half period zone in a zone plate behaving like a convex lens of focal length 50 cm for light of wavelength $7000 \text{ \AA}$.
- Que.5 Answer the following question (any two). (10)
- (1) Prove that $\tau = I\alpha$.
 - (2) Deduce Einstein mass-energy relation $E = mc^2$.
 - (3) Write a short note on plain diffraction grating.
