



RAN-2603000506021001

B.Sc. (Sem. VI) Examination March - 2026

Physics : Major - 2 (Paper-VII) : PH-MJ2-602 - Relativity & Solid State Physics

Time: 1 Hour]

[Total Marks: 25

સૂચના : / Instructions

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book.
- (2) Symbols used in the question paper have their usual meanings.
- (3) Students are permitted to use non-programmable scientific calculator.
- (4) Figures on the right indicate the total marks carried by the question.

Seat No.:

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Student's Signature

Q. 1 Answer the following questions in brief: (Attempt any five) (5)

- (1) What is meant by a non-inertial frame of reference?
- (2) What is meant by the term 'Ether'?
- (3) What 'rest mass' means?
- (4) What is Fermi energy?
- (5) Write the Bragg condition for scattering.
- (6) Write the full form of SQUID.

Q. 2 (A) Attempt any one of the following in detail: (7)

- (1) Describe the Michelson-Morley experiment in detail.
- (2) Derive the relation between mass and energy and obtain the expression $E_0 = mc^2$.

(B) Attempt any one of the following. (3)

- (1) Derive the relativistic length contraction using the Lorents transformation.
- (2) What will be the mass of an electron moving with a velocity of $0.98c$?

Q. 3 (A) Attempt any one of the following in detail: (7)

- (1) Derive the expression for the binding energy B of an ion in the crystal.
- (2) On the basis of energy level diagram, discuss the working of a diode laser.

(B) Attempt any one of the following. (3)

- (1) If the energy gap of a superconductor is $2 \times 10^{-23} J$. How much frequency is required to break a Cooper pair?
- (2) Discuss any three properties of ionic solids.