

RAN-2503000505011001
B. Sc. (NEP) (Sem. - V) Examination October - 2025
Physics (Paper - PH-MJ-501-TH)
Contributions of Indian Physicists and Magnetic Fields in Matter
Time: 2 Hours]
[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 any five in brief. (05)

1. For what work was Sir C. V. Raman awarded the Nobel Prize?
2. The abbreviation MHD stands for _____.
3. In which field of physics, Meghnad Saha has significantly contributed?
4. What are the sources of magnetic field?
5. What are diamagnetic materials?
6. Can vacuum be magnetized? Justify your answer in brief.

Q. 2. A. Write short note on any two of the following. (10)

1. J. C. Bose and his pioneering research on microwaves.
2. Legacy of Satyendra Nath Bose.
3. Father of Indian Atomic Energy: Dr. Homi Bhabha.

Q. 3. A. Attempt any one of the following. (07)

1. Derive an expression for Ampere's law in a magnetized material.
2. Obtain an expression for torque acting on a current carrying loop placed in a uniform magnetic field.

B. Solve any one of the following. (03)

1. Assume that the electron in a hydrogen atom moves on a circular path of radius $0.529 \text{ \AA}$ at a speed of $2.2 \times 10^6 \text{ m/s}$. Calculate the magnetic moment produced by it as a result. ($e = 1.6 \times 10^{-19} \text{ C}$)
2. A circular loop of diameter 1.2 cm is placed in a uniform magnetic field of 25 mT such that its plane remains parallel to the field. If a current of 5 A is flowing through it, what will be the value of (i) its magnetic moment and (ii) torque acting on it?