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PHY-501

Mathematical Physics and Classical Mechanics

M.Sc. Physics (MSCPHY)

1st Year Examination, 2023 (June)

Time : 2 Hours]   **[Max. Marks : 70**

Note : This paper is of Seventy (70) marks divided into two
(02) Sections A and B. Attempt the questions contained
in these sections according to the detailed instructions
given therein. Candidates should limit their answer to
the questions on the given answer sheet. No additional
(B) answer sheet will be issued.

SECTION–A
(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type
questions of Nineteen (19) marks each. Learners are
required to answer any Two (02) questions only.

$(2\times19=38)$

1. Write Legendre equation. Give series solution of it and derive Legendre polynomial.

2. Explain Christoffel's 3-index symbol. Establish relation among them.

3. Derive Lagrange Equation of Motion.

4. What do you understand by Canonical transform? Discuss Hamilton - Jacoby theory.

5. Write Hermite differential equation and establish Rodrique Formula for Hermite Polynomial.

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only.   (4×8=32)

1. Explain Poisson Bracket in details.

2. Establish numerical interpolation formula.

3. Show that tensor of same rank and order can only be added or subtracted.

4. Explain concept of metric tensor.

5. Find Laplace transform of Cos at.

6. Define Contra- variant and Co -variant Tensor.

7. State and explain D' Alembert principle.

8. Explain Fourier series for solving complex periodic motion.

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