Total No. of Questions: 11]

[Total No. of Printed Pages : 3

APF-2176

M.A./M.Sc. (Final) Examination, 2022 MATHEMATICS

Paper - Opt.-IX

(Relativity and Cosmology)

Time: 3 Hours [Maximum Marks: 100

Section-A (Marks : $2 \times 10 = 20$)

Note: Answer all ten questions (Answer limit 50 words). Each question carries2 marks.

Section–B (Marks : $4 \times 5 = 20$)

Note: Answer all five questions. Each question has internal choice (Answer limit200 words). Each question carries 4 marks.

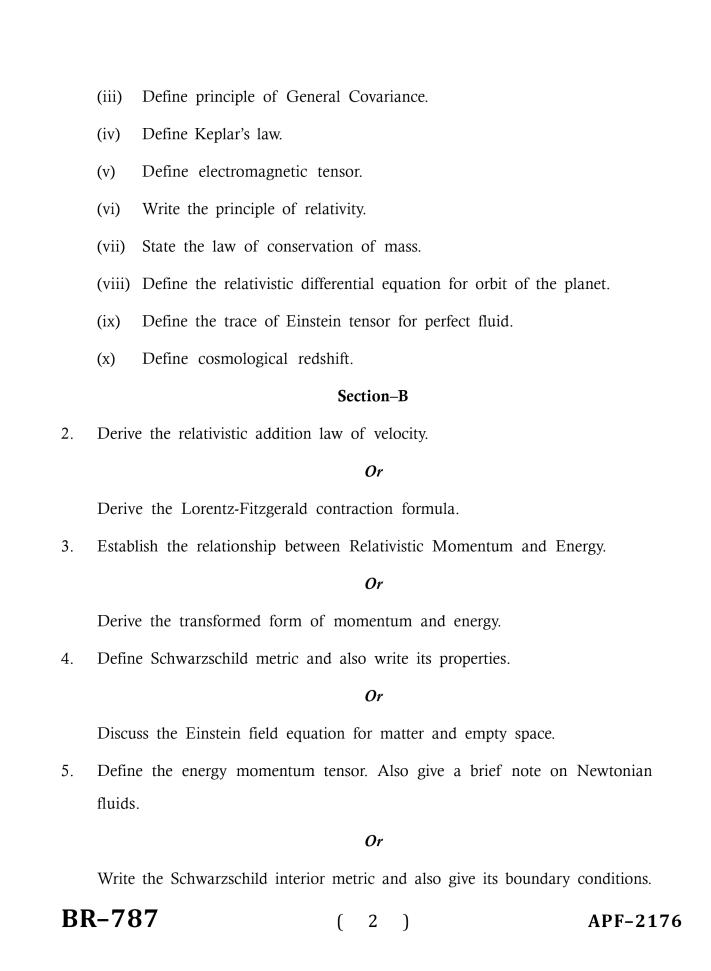
Section–C (Marks: $20 \times 3 = 60$)

Note: Answer any *three* questions out of five (Answer limit **500** words). Each question carries **20** marks.

Section-A

- 1. (i) Define Time Dilation.
 - (ii) State the conservation law of momentum.

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6. Describe positively and negatively charged particles.

Or

Write the general properties of the energy momentum tensor.

Section-C

7. Prove that Maxwell's field on equations are invarient under Lorentz transformation.

Or

Derive the Reissner-Nordstrom metric for spherically charged particle from Eisntein's field equation together with Maxwell's equation.

- 8. Derive the special Lorentz transformation equations.
- 9. Derive the Lagrangian approach of general relativity.
- 10. Reduce the Einstein's field equations in Poisson equation.
- 11. Describe the three crucial tests in general relativity.