Part – II

Answer ***any two*** from the following. 8×2=16

1. What do you mean by particle horizon and event horizon? Calculate event horizon for De-Sitter universe. 5+3
2. Discuss the considerations that led to the formulations of the steady state cosmology. Show that the deceleration parameter for the steady state universe is equal to –1 for all epochs. 3+5
3. What is flatness problem in cosmology? How it is resolved by inflationary model? 4+4

M. Sc. Mathematics Examination, 2022

(2nd Year, 2nd Semester)

Relativistic Cosmology

Paper – DSE - 07 (B28)

Time : 2 hours Full Marks : 40

Notations and symbols have their usual meanings.

Use separate answer script for each part.

Part – I

Answer ***any three*** questions. 8×3=24

1. a) What is Olber paradox? How the expanding Universe hypothesis resolves it?

   b) Why Einstein introduced Cosmological constant in his field equation?

2. a) Derive cosmological redshift from FRW metric.

   b) Rewrite de Sitter metric in Schwarzschild coordinates.

3. Discuss open model of the Universe for dust case.

4. a) Derive Hubbles law from FRW metric.

   b) Show that Newtonian cosmology rules out a static universe.

5. State Weyl postulate and Cosmological principle. Using these derive FRW metric.