

M.Sc. (Mathematics) (New CBCS Pattern) Semester-IV
PSCMTH19B - Cosmology

P. Pages : 2

Time : Three Hours



GUG/S/25/13771

Max. Marks : 100

- Notes : 1. Solve all the questions.
2. Each question carry equal marks.

UNIT - I

1. a) Discuss the De Sitter Universe. 10
b) Explain Doppler shift in Einstein Universe. 10

OR

- c) Discuss geometry of Einsteins Universe. 10
d) Explain the velocity and acceleration of a particle in the De Sitter Universe. 10

UNIT - II

2. a) Derive the Robert Son Walker time element. 10
b) Discuss the radial motion of the particle. 10

OR

- c) Write short notes on the 'cosmological principle' 10
d) Discuss the Doppler Shift in R-W Model. 10

UNIT - III

3. a) Discuss the fundamental equations of dynamical cosmology. 10
b) Show that the matter dominated era of the universe is governed by- 10
$$\frac{\dot{R}^2}{R_0^2} = H_0^2 \left[1 - 2q_0 + \frac{2q_0 R_0}{R} \right]$$

OR

- c) Discuss Friedemann closed model $K=1$. 10
d) Explain age of Universe and show that the inverse of Hubble's constant gives the age of the Universe. 10

UNIT - IV

4. a) Define the term parallax and the parallax distances. 10
- b) Write short notes on 'steady state cosmology' 10

OR

- c) Define the proper motion and discuss the proper motion distance. 10
- d) Define co-moving and proper distance. 10
5. a) Write comparison between Einstein and De-Sitter Model. 5
- b) State the Weyl's Postulate. 5
- c) Find the relation between K , ρ_0 and H_0 5
- d) Discuss the galaxy count in cosmology. 5
