

M.Sc. (Mathematics) (NEP Pattern) Semester-IV
04NEPMATH04.3 - Elective - Cosmology

P. Pages : 1

Time : Three Hours



GUG/S/25/16363

Max. Marks : 80

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

UNIT – I

1. a) Discuss the de-sitter universe. 8
b) Explain the three types of static universe. 8

OR

- c) Explain Doppler shift in Einstein universe. 8
d) Explain the velocity and acceleration of a particle in the de sitter universe. 8

UNIT – II

2. a) Derive the Robert son- Walker time element. 8
b) Discuss the radial motion of the particle. 8

OR

- c) Write short notes on the ‘cosmological principle’ 8
d) Discuss the Doppler shift in R-W model. 8

UNIT – III

3. a) Obtain the fundamental equation of dynamical cosmology. 8
b) Explain age of universe and show that the inverse of Hubble’s constant gives the age of the universe. 8

OR

- c) Discuss Friedmann closed model $k = 1$ 8
d) Show that the matter dominated era of the universe is governed by 8

$$\left[\frac{\dot{R}}{R_0} \right]^2 = H_0^2 \left[1 - 2q_0 + \frac{2q_0 R_0}{R} \right]$$

UNIT – IV

4. a) Define the term Parallax and the Parallax distance. 8
b) Write short notes on ‘Steady state Cosmology’. 8

OR

- c) Define the proper motion and discuss the proper motion distance. 8
d) Define co-moving and proper distance. 8

5. a) Explain special relativity universe. 4
b) Write a short notes on Hubble’s Law. 4
c) Find the relation between k, ρ_0 and H_0 . 4
d) Discuss the light paths. 4
