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SIXTH SEMESTER

B.TECH

Mid SEMESTER EXAMINATION

MARCH 2019

Subject: EP 316

Cosmology and Astrophysics

Time: 1:30 Hours

Max. Marks: 30

Note: Answer all questions. Assume suitable missing data, if any.

1 Answer the following questions:

[2×5]

[a] What is 21 cm radiation? What can be learned from it?

[b] What are the declination and right ascension of Sun in the equatorial coordinates on Winter Solstice (Dec 22)? Explain your answer with the help of diagram.

[c] Sirius A and B form a binary star system. The apparent magnitude of Sirius A and Sirius B are -1.4 and +8.6, respectively. Both have same surface temperature. How much smaller is Sirius B compared to Sirius A?

[d] The Crab nebula has declination  $\delta=22^\circ$ . Draw its diurnal trajectory in the local equatorial coordinate system of an observer located  $20^\circ$  N on earth. What is the minimum zenith distance?

[e] Derive the change in the wavelength of the photon when it comes out from the strong gravitational field of the star.

P.T.O.

2 Answer all the following questions:

[a] Use Stefan Boltzman law to derive the relationship between absolute magnitudes, temperatures, and radii of two stars. [5]

[b] Explain the composite H-R diagram showing the various parameters of the stars. [5]

3 Answer all the following questions:

[a] What is stellar nucleosynthesis? Explain the PP chain, triple alpha reactions, s- and r- process during the stellar evolution. [5]

[b] Derive the Jean criterion for self-collapsing of the star. Also explain the fragmentation of the collapsing star. [5]

END