LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – PHYSICS
SECOND SEMESTER – NOVEMBER 2016
PH 2955 - ASTROPHYSICS

Date: 16-11-2016   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART A
Answer ALL questions   (2x10 = 20 marks)

1. Define the fundamental great circle, the fundamental secondary circle and poles of the altazimuth system.
2. State and explain the relation between the magnitudes of two stars with their luminosities.
3. Define various surface temperatures for stars.
4. The trigonometric parallax of α Centauri is $\pi'' = 0.752$ and m=0.00, determine the distance in parsecs and in light years.
5. Explain the mass luminosity relation.
6. Explain free free transition in the mechanism of opacity in stellar atmosphere.
7. With a neat diagram explain the depletion of hydrogen in stars with convective core.
8. What is ZAMS?
9. State the differences between the upper main sequence stars and lower main sequence stars in Schwarzschild's model of real stars.
10. What is cosmic mixture? Give the percentage of contents present in the cosmic mixture.

PART B
Answer any FOUR questions   (4 x 7.5 = 30 marks)

11. Describe the local equatorial system of coordinates for a star.
12. How the observed magnitude of star is corrected for atmospheric extinction.
13. Obtain the relation between the spectrophotometric gradient and the colour temperatures of two stars.
14. Obtain the fundamental equations of stellar structure.
15. Explain briefly the homologous model of stars.
16. Outline the comprehensive theory of nucleosynthesis with specific reference to first and second generation stars.

PART C
Answer any FOUR questions   (4 x 12.5 = 50 marks)

17. a. Show how Saha's equation leads to the determination of T_{ion} for stars in thermodynamic equilibrium
    b. Explain how the kinetic or electron temperature of a star can be determined from Maxwell's law of distribution of velocities.
18. Write short notes on (i) photoelectric method to determine the apparent luminosity of stars (ii) trigonometric parallax.
19. What are binary stars? Explain in detail the different types of binary stars.
20. Discuss the Eddington's standard model for the main sequence stars and obtain the mass luminosity relation.
21. Obtain the Schoenberg Chandrasekhar limit from virial theorem.
22. Obtain an expression for the rate of reaction in stellar structure with specific reference to CN cycle.

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