LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **PHYSICS**

SECONDSEMESTER – APRIL 2018

17/16PPH2ES01/PH2955- ASTROPHYSICS

Date: 25-04-2018 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

PART A

Answer **ALL** Questions (10x2 = 20)

1. Explain the features of Altazimuth system.
2. What is called as right ascension in universal equatorial system?
3. State Wein's displacement law.
4. Give the relation connecting the effective temperature and total luminosity of a star.
5. What is the chemical composition of stars?
6. Explain free free transition and how does it contribute to stellar opacity?
7. Explain the effect of hydrogen depletion in massive stars.
8. Give the Schoenberg Chandrasekhar limit of an isothermal core.
9. What is the mechanism of energy production in massive and less massive stars?
10. Draw and explain the structure of the star at the time of leaving the main sequence.

PART B

Answer any **FOUR** Questions (4x7.5 = 30)

11. With a neat diagram explain the photoelectric method to determine the apparent luminosity of star.
12. How is the colour temperature of stars determined from Planck's law?
13. State and explain Russell Vogt theorem.
14. Write short notes on a) nuclear time scale b) ages of star clusters.
15. Explain how neutron capture influences stellar evolution.
16. How is the distance of star measured using trigonometric parallax?

PART C

Answer any **FOUR** Questions (4x12.5 = 50)

17. a) What is atmospheric extinction? How is atmospheric extinction corrected for observed magnitudes? (6 marks)

    b) How is the distance of a star located from its absolute magnitude? Determine the distance of Sirius B given m=+8.6 and M=+11.4. (6.5 marks)

18. Write short notes on a) HR diagram b) HD classification c) MK system. (4.5 + 4+4)

19. Derive the mass luminosity relation from Eddington's standard model.
20. a) How are stars formed? Arrive at the Jean's criteria for star formation. (8 marks)

    b) Discuss the evolution of stars in the main sequence as the hydrogen in the stars is depleted. (4.5 marks)
21. Derive an expression for the rate of thermonuclear reactions and hence determine the energy produced in CN cycle.
22. Discuss in detail, the two methods of determining stellar radii.

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