LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – APRIL 2017

16PPH2ES01 - ASTROPHYSICS

Date: 28-04-2017 Dept. No. Max. : 100 Marks
01:00-04:00

PART A

Answer ALL questions (10x2 = 20 marks)

1. Which coordinate system is used for terrestrial map making? Why?
2. Given $\pi'' = 0.077$ and $m = +2.13$ for β Leonis, determine the distance in light years.
3. State the Kirchhoff's law of spectra of objects.
4. Give the mass luminosity relation for main sequence stars and low mass stars.
5. How does free free transition contribute to the opacity in stellar atmosphere?
6. State Russell Vogt theorem.
7. What is Schoenberg Chandrasekhar limit?
8. Give the values for solar mass and solar luminosity.
9. Write the equations for pp chain reaction that takes place in stars.
10. What happens when a star contracts very rapidly after the formation of iron peak elements?

PART B

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

11. What is atmospheric extinction? Explain its influence on the observed magnitude of a star.
12. Write short notes on a) HD classification b) HR diagram
13. Obtain the fundamental equations of stellar structure.
14. How stars are formed? Obtain the criteria for star formation.
15. Explain in detail about first generation and second generation stars.
16. Determine the electron temperature of stars from Maxwell's law of distribution of velocities.

PART C

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

17. a) Describe the universal equatorial system of coordinates of a star. [6.5+6]
    b) Explain the photoelectric method to determine the luminosity of stars.
18. a) Determine the colour temperature of star from Planck's law
    b) How is the stellar radii measured by interferometric method? [6.5+6]
19. Using Schwarchild's dimensionless variables obtain the necessary relations for the homologous model of stars.

20. Derive the virial theorem and apply it to an isothermal gas core.
21. Obtain an expression for the rate of thermonuclear reaction using Maxwell's law of distribution of velocities.
22. a) Explain with a neat diagram how the two coordinates of a star are determined in an ecliptic system.

    b) How is the luminosity of a star is determined from period luminosity law? [6.5+6]