 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **PHYSICS**

SECOND SEMESTER – **APRIL 2012**

# PH 2953 - ASTROPHYSICS

Date : 24-04-2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**PART - A**

**Answer ALL questions: (10x2=20)**

01. What are the coordinates of the Altazimuth system and state its demerits?

02. Find the distance in a.u of α-canis majoris which has π = 0.″375 and m = -1.44.

03. Show F+ν = πBν in an axissymmetric radiation from one hemisphere of a black body.

04. What is the significance of HR diagram?

05. How are binary stars classified?

06. State the causes of opacity in the stellar interior

07. Express Eddington’s mass-luminosity law. What is its defect?

08. What is meant by ZAMS?

09. What is a protostar?

10. Oultine the study of helioseismology.

**PART - B**

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

11. Describe the local equatorial system of coordinates for a star. Give the merits of the system.

12. Explain the method of determining the distance of stellar objects by cluster parallax method. Calculate the distance of Sirius B with magnitudes m = +8.6 and M = +11.4

13. Explain the following i) Russel-Vogt theorem ii) Modified Kramer’s law of opacity.

14. Derive all the basic equations of stellar structure

15. Apply the Virial theorem to an isothermal gas sphere and hence deduce the condition for Schoenberg - Chandrasekar limit.

**PART - C**

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

16 a. How is the observed magnitude of a star corrected for atmospheric extinction and color? (8)

b. Show how Saha’s equation leads to the determination of Tion for stars in thermodynamic equilibrium (4.5)

17 a.Apply Planck’s law of radiation to obtain an expression for the relative spectro-photometric gradient (Δφ) of two stars at temperatures T1 and T2 respectively (7)

b. Discuss the relationships between stellar parameters for main sequence stars. (5.5)

18. Obtain expressions for the gravitational time scale both for convective and radiative equilibrium in the pre-main sequence contraction of stars. Draw the HR diagram and discuss the evolution of stars near the main sequence in star clusters.

19 a. Explain the neutrino problem. (4)

b. Discuss the theories of nucleosynthesis to account for the abundance of elements in the Universe. (8.5)

20. Write notes on any **TWO** of the following.

i) Methods for determining the stellar radii ii) Jean’s criterion for star formation

iii) Post main sequence evolution of stars

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