LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – **APRIL 2016**

PH 2955 – ASTROPHYSICS

Date: 27-04-2016   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART A

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

1. Distinguish between apparent and absolute magnitude of stars.
2. Define the Fundamental Great Circle, Fundamental Secondary circle and poles in a spherical coordinate system.
3. State and explain Wein's displacement law of black body radiation.
4. Distinguish between effective temperature and colour temperature of stars.
5. What are the different causes of stellar opacity?
6. Bring out the differences between the upper main sequence stars and lower main sequence stars in Schwarzschild's model of real stars.
7. Explain the variation of pressure in massive stars.
8. What is nuclear time scale?
9. What is nucleosynthesis?
10. Write down the pp chain reaction inside a star.

PART B

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

11. With a neat sketch explain the measurement of apparent luminosity of a star by photoelectric method.
12. Obtain the electron temperature of star from Maxwell's law of distribution of velocities.
13. State and explain Russel Vogt theorem.
14. Obtain the Schoenberg Chandrasekhar limit of an isothermal core.
15. Explain the neutron capture process in stellar process.
16. Show how Saha's equation leads to the determination of T_{ion} for stars in thermodynamic equilibrium.

PART C

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

17. Explain with neat diagrams the method of determining the coordinates of a star by (i) ecliptic (ii) galactic systems.   (6.5+6)
18. What is a binary star? Explain in detail its classification.
19. What is homologous models of stars? Apply Schwarzchild's dimensionless variables and obtain the differential equations for homologous model.
20. State and prove the virial theorem and apply it to an isothermal gas sphere.
21. Obtain an expression for the rate of reaction in stellar structure with specific reference to CN cycle.
22. a) Explain the method of determining the excitation temperature using Boltzmann's equation
    b) How is the stellar radii measured by interferometric method?   (6+6.5)

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