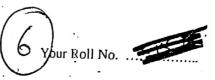
[This question paper contains 3 printed pages.]



## UNIVERSITY OF DELHI

Department of Physics & Astrophysics
M. Sc. (Physics), III Semester, November - December, 2012

PHYS-555 (Astronomy & Astrophysics-I)

(N36) JA

Maximum Marks: 70

Time: 3 hrs.

(Write your Roll No. on the top immediately on receipt of this question paper)

(Attempt any four questions. All symbols have their usual meanings)

## Some useful constants:

1 AU= 1.496 x 10<sup>13</sup>cm

1 light year =  $9.463 \times 10^{17}$ cm

1 Parsec= 3.26 light yrs

 $G = 6.67 \times 10^{-6} \text{cm}^3 \text{g}^{-1} \text{sec}^{-2}$ 

 $M_{\odot}$ = 2 x 10<sup>33</sup> gm

 $L_{\odot} = 3.9 \times 10^{33} ergs sec^{-1}$ 

 $R_{\odot} = 6.96 \times 10^{10} cm$ 

1. Describe the Horizontal Coordinate system. What are the advantages and 7-disadvantages of this coordinate system?

Describe Universal Equatorial coordinate system. How it is superior than other 7

(c) In Delhi at LST=20hrs, the altitude and azimuth of Moon are given as $31.5^{\circ}$ and $62$
respectively. Find its Right ascension and Declination. The latitude of Delhi is 28°.

- 2. (a) What is spectroscopic parallax? Where it is used?
  - (b) Find the expression for "Distance Modulus". M = 5 log d/10
  - (g) The total magnitude of a triple star is 0.0. Two of its components have magnitudes 1.0 5 and 2.0. What is the magnitude of the third star?
  - (d) The Sun has an apparent magnitude of (-26.81) Find its absolute magnitude.

- ★ 3. (a) What is the difference between a Type-I and a Type-II supernova?
  - (b) Describe how a  $10M_{\odot}$  protostar evolves with time.
  - (c) Use HR diagram to describe the evolution of a 1M<sub>☉</sub> star.
  - (d) How are the stars classified in-terms of their temperature and color?

- 4. (a) What is "Optical thickness"? How it is related to the magnitude of a star?
  - (b) What is "Extinction coefficient"? How one can find the extinction coefficient of a site?
    - (c) If the Sun seen through a fog, appears as bright as the full Moon in a cloudless sky, find the optical thickness of the fog. (Apparent magnitude of Sun and Full moon are -26.81 and -12.5 respectively)
  - (d) What are Sunspots? How is their formation explained by Bob Cock's model?

5+4+5+3 1/2

- 5. (a) Describe the working of a CCD.
  - (b) Show that the error in the signal received from a star is same as the error in the magnitude of the star.
  - (c) Describe how one can improve the signal to noise ratio during observation of Astronomical objects.
- (d) What is the pulsation mechanism of Pulsating Variables? What is the difference between pulsating variables and cataclysmic variables?

4+4+5+4 1/2