



K17P 0399

Reg. No. :

Name :

Fourth Semester M.Sc. Degree (Reg./Suppl./Imp.)

Examination, March 2017

PHYSICS (2014 Admission Onwards)

PHY4E07 : Astrophysics

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **both** questions (Either **a** or **b**).

1. a) Write a note on the celestial sphere. Discuss the celestial co-ordinate systems used to find the position of a heavenly object.

OR

- b) Discuss the energy generation in stars.

2. a) Distinguish between optical double stars and binary stars. Write a note on the classification of binary stars. Discuss visual binary stars with examples.

OR

- b) Give the general structure of a galaxy. Write a note on different types of galaxies. (2×12=24)

SECTION – B

Answer **any four**. (One mark for Part – a, 3 marks for Part – b, 5 marks for Part – c)

3. a) Define luminosity of a star.

- b) Show that the brightness of two stars whose apparent magnitudes differ by unity will differ by a factor of 2.512 when ratio of brightness of stars of first and sixth magnitude is 100.

- c) Define bolometric correction, absolute magnitude and distance modulus.

4. a) Give the Harvard system of spectral classification.

- b) What is H-R diagram ? Give its importance.

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- c) What is Hertzsprung gap ? Draw a neat sketch of the HR diagram showing the position of :
- Cepheid variables
 - Red giants and subdwarfs
 - The white dwarfs.
5. a) Define Schwartzchild radius.
- b) Calculate the rotational energy of a neutron star of $1 M_{\text{sun}}$ and 10 km radius, having a period of 100 milliseconds. If the observed slow-down rate of this pulsar is 10^{-13} , calculate the rate of rotational-energy loss by this pulsar.
- c) Write a note on pulsars.
6. a) Name the theory which explain the aspects of origin of binary stars.
- b) Discuss the light curve of an eclipsing binary.
- c) A star has a luminosity equal to that of the sun. Its surface temperature is 2500 K. Compute the radius of the star in terms of the radius of the sun.
7. a) Where in the universe do we find strong radiation in X-rays ?
- b) Write a note on red shift of quasars.
- c) Describe the morphological classification for clusters of galaxies.
8. a) Distinguish between closed and open universe.
- b) What are bumbs seen in the early universe ?
- c) Show that at any given epoch the curvature of space is related to the energy content of the Universe as defined by its total density and pressure. **(4×9=36)**