

6. (a) What is Cepheid variable star and Type-Ia supernovae. Explain how are Cepheid Variables used to estimate the astronomical distances.

(b) With the help of a labelled Diagram, explain the basic structural components of a galaxy? Discuss the characteristics of each component. (12,6)

Some important physical constants:

Mass of Sun	$M_{\odot} = 2 \times 10^{30} kg$
Radius of Sun	$R_{\odot} = 7 \times 10^8 m$
Temperature of Sun	$T_{\odot} = 5800 K$
Luminosity of Sun	$L_{\odot} = 4 \times 10^{26} W$
Solar Constant	$S = 1400 m/m^2$
Boltzmann Constant	$k_B = 1.38 \times 10^{-23} J/K$
Wein's Constant	$b = 0.00289 m K$
Gravitational Constant	$G = 6.6 \times 10^{-11} Nm^2 Kg^{-2}$
Hubble Constant	$H_0 = 70 Km / s / Mpc$
One Astronomical Unit	$1AU = 1.5 \times 10^{11} m$
One Light year	$1Ly = 9.46 \times 10^{15} m$
One parsec	$1pc = 3 \times 10^{16} m$

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4808

J

Unique Paper Code : 2224001001

Name of the Paper : Introductory Astronomy

Name of the Course : **B.Sc. Hons. - (Physics)_NEP:
UGCF-2022**

Semester : IV / VI (GE)

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all, including Question No. 1 which is compulsory.
3. All questions carry equal marks.

1. Answer the following questions (Attempt Any Six)

- (a) Explain diurnal and annual motion of the Sun.
- (b) Solar corona can be observed only during total solar eclipse. Explain.
- (c) Explain why a sidereal day is shorter than the solar day.
- (d) What is Citizen Science? Name three Citizen Science Projects.
- (e) Describe Olber's Paradox and how it is resolved?
- (f) Explain the Saha ionization formula and its astrophysical significance.
- (g) Describe the key features of spiral galaxies.

(6×3=18)

2. (a) Explain with the help of a labelled diagram the Horizon coordinate system used to find position of an astronomical object.

- (b) What are the declination and right ascension of Sun in equatorial coordinate system on summer solstice (June 21)? Explain with the help of a diagram.

(12,6)

3. (a) Explain how the observations of a visual binary star system can be used to estimate the masses of two stars.

- (b) Define resolving power of a telescope. Calculate the resolving power of a telescope when light of wavelength 540 nm is used. Diameter of the objective lens is 6 cm.

(12,6)

4. (a) Draw a labelled Hertzsprung-Russell (HR) diagram. Explain the evolution of $3M_{\odot}$ on the HR diagram.

- (b) Compute the size of a star in terms of $R_{\odot}$ if its temperature is 5000 K and its Absolute magnitude is -10 . Absolute magnitude of the Sun is $+4.83$.

(12,6)

5. (a) Describe the nebular model of the origin of the solar system and explain the three stages of formation of planets.

- (b) Why the temperature of the sunspots is lower than the surroundings? Sketch the structure of a sunspot.

(12,6)