



**PG CBCS**  
**M.Sc. Semester-III Examination, 2022**  
**PHYSICS**  
PAPER: PHS 303D  
(ASTRONOMICAL METHODS & STELLER STRUCTURE AND EVOLUTION)  
**Full Marks: 40** **Time: 2 Hours**

Write the answer for each unit in separate sheet

**UNIT-PHS 303D.1**  
**ASTRONOMICAL METHODS**

**GROUP-A**

**1. Answer any TWO from the following questions:** **2×2=4**

- a) What is distance modulus of a star?
- b) What is zenith and nadir?
- c) What is azimuth and altitude?
- d) What do you mean by atmospheric window?

**GROUP-B**

**2. Answer any TWO from the following questions:** **2×4=8**

- a) An object has an albedo of 0.7 and receives a flux of 100 W/m<sup>2</sup>. What is the reflected flux of the object?
- b) If a star emits the same intensity of radiation at all visible wavelengths, what will be the apparent color at the Earth's surface. Why?
- c) Why moon rises about 50 minutes late than the previous day?
- d) An asteroid's closest approach to the Sun (perihelion) is 2 AU, and farthest distance from the Sun (aphelion) is 4 AU. What is the semi-major axis of its orbit? What is the period of the asteroid? What is the eccentricity?

**GROUP-C**

**3. Answer any ONE from the following questions:** **1×8=8**

- a) How one can measure the masses of an eclipsing binary stars? The apparent magnitude of the Sun is - 26.8. Find its absolute magnitude. Remember that the distance between the Sun & the Earth is  $1.5 \times 10^{13}$  cm. (4+4)
- b) What is local sidereal time (LST)? What is apparent and mean solar time? What will the local time of Shillong be when the local time of Ahmedabad is 6 p.m.? (2+2+2+2)

**P.T.O.**

**UNIT- PHS 303D.2**  
**STELLER STRUCTURE AND EVOLUTION**

**GROUP-A**

1. Answer any **TWO** of the following questions:

- a) What is helio-seismology?
- b) Why Giant and supergiant stars are rare?
- c) What is meant by variable star?
- d) What is Chandrasekhar limit?



2×2=4

**GROUP-B**

2. Answer any **TWO** of the following questions:

- a) No radiation can escape a Black hole. Then how can one detect a blackhole?
- b) Describe butterfly diagram of sun-spot cycle.
- c) Write down the basic equations of the p-p chain that provides the Sun's nuclear power.
- d) Write down the four basic equations of stellar structure.

2×4=8

**GROUP-C**

3. Answer any **ONE** of the following questions:

- a) Briefly explain the following terms in relation to the star formation: Protostar, Main sequence star, red giants, white dwarfs.
- b) A star's mass is one of the most significant factors affecting the life of the star. Explain how mass affects the life of a star. Two stars are observed to have the same color and brightness. One of them is a giant at a greater distance than the other, which is a main sequence star. How could these be distinguished from spectroscopic measurements?

1×8=8

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