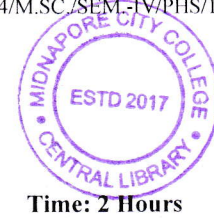


PG (CBCS)
M.SC. Semester- IV Examination, 2026
PHYSICS
 PAPER: PHS 407D
(ASTROPHYSICS – II)



Full Marks: 40

Time: 2 Hours

The figures in the right-hand margin indicate full marks.
 Candidates are required to give their answers in their own words as far as practicable.

Galactic Astronomy

GROUP-A

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

2×2=4

1. How far is the solar system from the center of the milky way galaxy?
2. What are the main components of a galaxy?
3. What is adaptive optics?
4. What is magnification of a telescope?

GROUP-B

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

2×4=8

5. From Virial theorem, how can you get rough estimate of the mass of the central black hole of Milkyway?
6. Compare the Milky way and Andromeda galaxy.
7. Describe Newtonian reflecting telescope and Cassegrain reflecting telescope.
2+2
8. With relevant diagram, describe atmospheric windows at different wavelengths.

GROUP-C

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

1×8=8

9. Describe the equatorial mounting and the Alt-Azimuth mounting of telescope.
Name one popular telescope with each kind of mounting. 6+2
10. Describe the rotational curve of the milky way. How one gets the idea of dark matter from the rotational curve of the milky way.

(P.T.O.)

(2)

Extra-galactic Astronomy and CosmologyGROUP-A— Answer any **TWO** of the following questions: $2 \times 2 = 4$

11. A galaxy of absolute magnitude $M = -20$ is at a distance of 700 kpc. Would it be visible to the naked eye?
12. Explain why stars towards the centre of our galaxy appear fainter and redder.
13. What is active galactic nucleus (AGN)?
14. If $H = 70 \text{ km s}^{-1}/\text{Mpc}^{-1}$, estimate the age of the universe.

GROUP-BAnswer any **TWO** of the following questions: $2 \times 4 = 8$

15. Explain how Cepheid variables have been used to measure astronomical distances.
16. State de Vaucouleurs law and define the effective radius of an elliptical galaxy. $3+1$
17. What is Hubble's law? How will you get the concept of bigbang from the Hubbles's law?
18. For $k = 0$, solve Friedmann equation for $\rho \propto a^{-n}$.

GROUP-CAnswer any **ONE** of the following questions: $1 \times 8 = 8$

19. How do we determine that the disk of the spiral galaxy comprises spiral arms? In view of the differential rotation of the galactic disk, how do the spiral structures persist for so long? $4+4$
20. Explain the concept of active galaxies. Describe its structure and main features. $4+4$

