

D 140217

(Pages : 2)

Name.....

Reg. No.....

**SIXTH SEMESTER (CBCSS—U.G.) DEGREE EXAMINATION
APRIL 2026**

Physics/Applied Physics

PHY6B13/APH6B13—RELATIVISTIC MECHANICS AND ASTROPHYSICS

(2020 Admission onwards)

Time : Two Hours

Maximum : 60 Marks

*The symbols used in this question paper have their usual meanings.***Section A (Short Answer Type)***Answer **all** questions in two **or** three sentences, each correct answer carries a maximum of 2 marks.*

1. State the postulates of special theory of relativity.
2. Distinguish between inertial and non-inertial frame of reference.
3. Distinguish between time like and space like intervals.
4. Discuss the outcome of Michelson-Morley experiment.
5. State the principle of equivalence in general theory of relativity.
6. What are neutron stars ?
7. State the Cosmological principle.
8. What is the significance of Chandrasekhar limit ?
9. Describe gravitational lensing.
10. State Hubble's law.
11. Define gravitational redshift.
12. What are galactic clusters ?

(Ceiling - 20)

Turn over

Section B (Paragraph/Problem Type)

Answer **all** questions in a paragraph of about **half a page to one page**, each correct answer carries a maximum of 5 marks.

13. A rod of length L_0 moves with speed v along the horizontal direction. The rod makes an angle θ_0 with respect to the x -axis.
 - (a) Determine the length of the rod as measured by a stationary observer.
 - (b) Determine the angle θ the rod makes with the x -axis.
14. Derive the law of addition of velocities using Lorentz transformation equation.
15. Write a short note about Big Bang theory of the universe.
16. Sirius is at a distance of 2.63pc and has an apparent magnitude of -1.44. Calculate its absolute magnitude.
17. Canis Majoris has a temperature of 9200K. What is the peak wavelength of light emitted by it? Which region of spectrum it belongs to?
18. Discuss stellar parallax. What is its limitation? Write the relationship between the distance of a star and its parallax.
19. Briefly describe : (a) Globular clusters ; and (b) Planetary nebulae.

(Ceiling - 30)

Section C (Essay Type)

*Essays - Answer in about **two pages**, any **one** question.*

The question carries 10 marks.

20. Describe Michelson-Morley experiment and explain the results.
21. Describe the various mechanisms possible in the death of a star.

(1 × 10 = 10 marks)