C 40628

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Name.....

Reg. No.....

# SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2023

(CBCSS—UG)

Physics/Applied Physics

PHY 6B 13/APH 6B 13—RELATIVISTIC MECHANICS AND ASTROPHYSICS

(2019 Admission onwards)

Time : Two Hours

Maximum : 60 Marks

*The symbols used in 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. Define the term proper length.
2. Explain why the theory of relativity is so called ?
3. What can be used as a standard candle in Astronomy ?
4. Describe the features of T Tauri stars.
5. At which velocity would the mass of an electron become double of its rest mass ?
6. List the classification of stars based on the surface temperature.
7. Pulsars do not pulsate. Explain the statement.
8. State the principle of equivalence.
9. The larger the parallax, the smaller the distance to the star. Is the Statement true or false ? Illustrate with a figure.
10. Give the relationship between distance, brightness and luminosity.
11. Define Chandrasekhar limit.
12. What are the features of Population I stars ?

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**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. Explain the concept of the radiation pressure of light. Mention one example.

14. Do the muon experiments verify time dilation ? How ?

15. Briefly discuss Hubble's classification of Galaxies.

16. With what velocity should a rocket fly so that every year spent on it may correspond Earth's surface ?

17. (a) Even light cannot come out of a Black Hole. Why ?

    (b) Determine the Schwarzchild radius of a black hole with 5 solar mass.

18. Draw the H-R diagram.

19. Briefly describe the internal structure of Sun.

## Section C (Essay Type)

*Answer in about* **two pages,** *any* **one** *question.*
*Answer carries* 10 *marks.*

20. Discuss the relativistic energy and momentum in an inelastic collision.

21. Which are the three discoveries that fundamentally altered our concept of the univer discuss.

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