Total pages: 1

PG CBCS
M.Sc. Semester-IV Examination, 2021
PHYSICS
PAPER: PHS 404D

Full Marks: 40 **Time: 2 Hours**

Write the answer for each unit in separate sheet

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

404D.1: GALACTIC ASTRONOMY

Marks: 20

Answer any TWO questions of the following: **10×2=20**

1. Explain how the spiral arms of Milkyway can persist for a long time. Describe the rotation curve of our galaxy and explain how it lead the the idea of dark matter. 4+2+2
2. Distinguish between stars of population I and II. Where are they found in Milkyway? How many times would the Sun have revolved around the centre of the Galaxy if it is rotating with a velocity of 250 kms^{-1} at a distance of 8.5 kpc from the galactic centre? Assume the age of the Sun to be 4.6×10^9 years. 3+2+3
3. What do you mean by resolving power of a telescope? What is the resolving power of a 20 cm telescope if observations are made at λ=550nm? Compare the light gathering powers of the 5 m telescope and a 0.5 m telescope. 2+3+3
4. Find the magnitude of the faintest object that the 4.5 metre Telescope at the Devasthal in India can detect. Discuss different mountings of an optical telescope. 3+5

404D.2: EXTRA-GALACTIC ASTRONOMY AND COSMOLOGY

Marks: 20

Answer any TWO questions of the following: **10×2=20**

1. Explain how Cepheid variables have been used to measure astronomical distances. If the value of Hubble's constant is 70 km s^{-1} /Mpc^{-1}, find the age of the Universe in the unit of year. 5+3

(P.T.O.)

2. Describe the Friedmann equation and discuss how its solution leads to expansion of Universe. Describe the virial theorem in the context of Universe and how it leads to the presence of dark matter in the Universe. 5+3
3. Describe de Vaucouleurs Law for an Elliptical galaxy. What do you mean by dwarf galaxies? Explain in your own words why older galaxies should be redder. 3+2+3
4. Briefly describe Hubble's classification of galaxies. Describe how surface brightness changes with distance from the center and hight of the disks for a spiral galaxy. 5+3

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