M.Sc. 3rd Semester Examination, 2024

PHYSICS

PAPER — C-PHS-304(CBCS)

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

GROUP — A

Answer any **four** questions :   2 × 4

1. Different stars are observed at different time throughout each year—Why ?

2. Write down the composition of comets.

3. If the mass of our sun is 2×10^{30} kg, calculate the time for a star that stays as a main sequence star.

4. How do you classify the stars according to their temperature range ?

5. What do you mean by Neutron star ?

6. What is absolute magnitude ? What is the value of it for Sun ?

GROUP – B

Answer any **four** questions : 4×4

7. Describe how the stars appear to change their position from night to night and from month to month.

8. (*i*) What is solar activity ?

    (*ii*) The masses of $_1^1H$ and $_2^4He$ atoms are respectively $1.00813 \ u$ and $4.00386 \ u$.

How much amount of hydrogen must be converted to helium. Given, the solar constant is 1.35 kW/m^2 and the earth is 1.5×10^{11} m from the sun. $1 + 3$

9. (*i*) What happens when less-massive stars leave the main sequence ?

   (*ii*) Write some phenomena observed naturally in the Sun's chromosphere. $2 + 2$

10. Draw the Hertzsprung-Russell diagram and show the position of (*i*) Sun-like stars (*ii*) super red giant (*iii*) white dwarf.

11. What is meant by binary starts ? What are the different form of it ?

12. Write a short note on black hole.

GROUP – C

Answer any **two** questions : 8×2

13. (*i*) Draw a figure for different phases of lunar eclipse.

(*ii*) Write down the nebular hypothesis model for explaining our solar system.

(*iii*) Define and draw the geocentric and geographic latitudes ?   2 + 3 + 3

14. (*i*) Write the differences between photosphere and chromosphere of the sun.

(*ii*) If we assume that the expansion of Universe is at a steady rate, then estimate the age of the Universe using the Hubble's law.

(*iii*) How the solar flares, coronal mass ejections (CMEs), high-speed solar wind, and solar energetic particles impact on our earth ?   2 + 2 + 4

15. (*i*) What is luminosity of a star ? If two stars S1 & S2 have same luminosity and the temperature of S1, $T_{S1} = 2\ T_{S2}$ then compare the radius of the stars ?

(*ii*) Compare the structure and formation of open cluster and globular cluster.

(*iii*) What is the difference between IR astronomy and X-ray astronomy ?   3 + 3 + 2

16. (*i*) What is Red-giant star ? Give example of it.

(*ii*) Give the schematic of the evolution process of a star having twenty times higher mass than that of Sun.

(*iii*) What is Wien's displacement law ? What information do we get for astronomical object using this law ?   3 + 3 + 2

[Internal Assessment — 10 Marks]