2017

M.Sc. 3rd Semester Examination

PHYSICS

PAPER—PHS-304

Full Marks : 40

Time : 2 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

(Science of Universe — CBCS)

Answer Q. No. *1* and *2*, and any *two* from the rest.

1. Answer any *four* questions : 2×4

(a) Write down the internal structure of the sun.

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

(c) Write down the main differences between Solar and Lunar eclipses.

(d) If star A has $R_A = 2R_\odot$ & $T_A = 10{,}000$ K ; star B has $R_B = 4R_\odot$ & $T_B = 5{,}000$ K, then compare their "Luminosity".

(e) What do you mean by light-year and parsec ?

(f) What is 'light year' and 'astronomical unit (A.U)' ?

(g) What is 'Pluto' not considered as planet under solar system from 2006 ?

2. Answer any *four* questions : 3×4

(a) What happens when less-massive stars leave the main sequence ?

(b) Write a short note about 'constellations' in the sky.

(c) Explain the origin of solar energy.

(d) Draw the 'main-sequence' position in Hertzsprung-Russel diagram for 'Milkeyway galaxy'.

(e) Schematically show the 'birth' and 'end' of a star which has initial $M = 30M_\odot$.

(f) What is meant by Neuton-star ?

3. (a) Does all solar activity impact on earth ? Give reasons. 1+2

(b) Differentiate asteroids and comets. 3

(c) Describe how the stars appear to change their positions from night to night and from month to month. 4

4. (a) Describe the process of end of a sun-like star. 3

(b) What is the spectral classification of stars ? 3

(c) What is X-ray binary star ? 3

(d) Give an example of red-giant in our vissible night sky. 1

5. (a) Explain what is meant by wave-particle duality of light. 3

(b) Describe an experiment to show light has a particle nature. 4

(c) What is Hubble's law ? 1

(d) Protons in the cosmic rays strikes the earth's upper atmosphere at a rate, averaged over the earth's surface, of 0.15 protons/cm^2-sec. What total current does the earth received from beyond its atmosphere in the form of incident cosmic ray protons. The earth's radius is 6.4×10^6 m. 2

6. (a) What do you mean by the solar cycle ? 1

(b) Describe the relationship between increased solar activity and auroras on earth. 3

(c) What is black-hole ? How does it form ? 2+2

(d) "Quasar is the most-distant object from the earth." True or false ? 1