PG/IIIS/PHS-304/19(CBCS)

M.Sc. 3rd Semester Examination, 2019

PHYSICS

(*Introductory Astrophysics*)

PAPER – PHS-304 (CBCS)

Full Marks : 40

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

Illustrate the answers wherever necessary

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

   (*a*) What do you mean by the hour angle of an object in the sky ?

   (*b*) Write down the main differences between solar and lunar eclipses.

(*c*) Calculate the period in which a star stays on main sequence. (The mass of star is 2·5 times the mass of sun).

(*d*) What do you mean by 'solar constant' ?

(*e*) How do you classify the stars according to their temperature range ?

(*f*) What do you mean by 'Neutron star' ?

(*g*) What is background radiation ? What is the present value of it ?

(*h*) What is absolute magnitude ?

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

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

(*b*) Write the similarities and dissimilarities between asteroids and comets in detail. 4

(*c*) (*i*) When will Halley's comet return ?

(*ii*) Write a short note on 'Polaris'. 1 + 3

(*d*) Explain the internal structure of the sun. 4

(*e*) Draw the Hertz sprung-Russell diagram of our Milky-way galaxy and show the position of different stars with proper axis titles. 4

(*f*) What is meant by binary stars ? What do you mean by mass accretion in X-ray binary star ? 4

(*g*) Write a short note on 'black hole'. 4

(*h*) Compare the structure, velocity, metallicity, and age of stars in open cluster and globular cluster. 4

3. Answer any *two* questions : 8 × 2

(*a*) (*i*) What are the main advantage and disadvantage of the horizontal co-ordinate system useful to know the position of a star ?

(*ii*) Explain the terminology for central solar eclipse.

(*iii*) What is the interstellar medium (ISM) ? 2 + 4 + 2

(*b*) (*i*) Write a short note on 'constellations' in the night sky.

(*ii*) From the results of the thermonuclear reactions in carbon-nitrogen cycle, find the amount of energy liberated in the formation of one helium atom.

(*iii*) Does all solar activity impact on earth ? 3 + 3 + 2

(*c*) (*i*) What is luminosity of a star ? If two stars $S1$ and $S2$ have same radius R but $T_{S1} = 2T_{S2}$ then compare the luminosity of the stars.

(*ii*) What is white dwarf ? How does it form ?

(*iii*) What do you mean by X-ray astronomy ? 3 + 3 + 2

(*d*) (*i*) What is 'Red-giant star' ? Give an example of it. What is Supernova ?

(*ii*) Give the schematic of evolution of a sun like star.

(*iii*) What is QUASAR ? 3 + 3 + 2
