LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FOURTH SEMESTER – **APRIL 2023**

UPH 4601 – ASTRONOMY AND ASTROPHYSICS

Date: 06-05-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A - K1 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
1.	**Definitions**
a)	Celestial sphere
b)	Galactic year
c)	Flux density
d)	Photometric binaries
e)	Hubble's law
2.	**Fill in the blanks**
a)	The duration of daylight and darkness varies throughout the year due to the _____ of the Earth.
b)	Refracting and reflecting telescopes are two types of _____ telescopes used in astronomy.
c)	_____ magnitudes measure how bright a star would appear if it were located at a distance of 10 parsecs from Earth.
d)	The _____ model is a theoretical model of a star as a perfect emitter and absorber of radiation.
e)	Galaxies are classified according to the _____ sequence, which is based on their shape and structure.
	SECTION A - K2 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
3.	**True or False**
a)	The duration of daylight is the same throughout the year at the equator.
b)	CCD cameras detect light by converting it into sound waves.
c)	The absolute magnitude of a star is a measure of its intrinsic brightness.
d)	Visual binaries can be detected by observing the periodic changes in the star's spectral lines.
e)	Hubble's law states that the more distant a galaxy is, the slower it is moving away from us.
4.	**MCQ**
a)	Which astronomical event marks the beginning of spring and fall and has equal amounts of daylight and darkness? a) Sidereal day b) Equinoxes c) Celestial sphere d) Coordinate systems
b)	Which of the following is used to determine the clarity of an image produced by an optical telescope? a) Mounting system b) Magnification

	c) Angular resolution d) Detectors and instruments
c)	Which of the following is used to measure the distance to nearby stars? a) Magnitude system b) Absolute magnitude c) Trigonometric parallax d) Extinction
d)	What is the term for the diagram that shows the relationship between a star's luminosity, temperature, and spectral class? a) Hertzsprung-Russell diagram b) Spectral classification of stars c) Stellar colors d) Black body model of a star
e)	What is the term for the collective matter in a galaxy, including stars, gas, and dust? a) Observable universe b) Red-shifts c) Properties of each matter in galaxies d) Hubble sequence
	SECTION B - K3 (CO2)
	Answer any TWO of the following (2 x 10 = 20)
5.	Explain diurnal motion of sun and stars.
6.	List out the properties of each galaxy.
7.	a) Explain the life cycle of a star in detail. (7) b) Write a short note on GMT. (3)
8.	a) Illustrate HR diagram to show spectral classification of stars. (7) b) Star 1 has an apparent magnitude of 1 and star 2 has an apparent magnitude of 6. Find their brightness ratio. (3)
	SECTION C – K4 (CO3)
	Answer any TWO of the following (2 x 10 = 20)
9.	Describe (a) The apparent motion of celestial objects, (b) solar and sidereal days, (c) light year in terms of kilometre (d) equinoxes and solstices. (3+3+2+2)
10.	Illustrate the Hertzsprung-Russel diagram to show the spectral classification of stars.
11.	Explain visual binaries and astrometric binaries.
12.	Describe (a) apparent magnitudes (b) extinction and optical thickness (c) absolute magnitudes (d) blackbody model of star. (3+3+2+2)
	SECTION D – K5 (CO4)
	Answer any ONE of the following (1 x 20 = 20)
13.	a) Describe the working of Charge Coupled Device (CCD) in the camera of a telescope. (10) b) Explain red shift and blue shift. (10)
14.	What is a black body? Explain black body model of a star with relevant mathematical relations.
	SECTION E – K6 (CO5)
	Answer any ONE of the following (1 x 20 = 20)
15.	Derive the relation connecting absolute magnitude, apparent magnitude and distance of the star.
16.	a) Give a detailed note on the Milky Way galaxy. (10) b) Explain Morgan Keeran spectral classification of stars. (10)