PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch - PHYSICS

ASTROPHYSICS AND INDIAN SPACE SCIENCE / ASTROPHYSICS & PHILOSOPHY OF PHYSICS

Time: Three Hours   Maximum: 75 Marks

SECTION-A (10 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Identify the term for a recognizable pattern of stars that is part of a larger constellation. A) A nebula B) An asterism C) A galaxy D) A planetary orbit	K1	CO1
	2	Predict the main function of India's upcoming satellites. A) Communication and remote sensing B) Observing marine life C) Monitoring volcanoes D) Tracking ocean currents	K2	CO1
2	3	What system locates stars on the celestial sphere? A) Right Ascension & Declination B) Orbital Speed & Velocity C) Apparent Magnitude D) Surface Temperature	K1	CO2
	4	How can a star's apparent brightness be measured? A) By the energy received per unit area B) By its temperature C) By its color index D) By counting spectral lines	K2	CO2
3	5	Which celestial body is a star in the solar system? A) Sun B) Moon C) Earth D) Mars	K1	CO3
	6	Predict the relationship between a Cepheid's brightness and its period. A) Brighter Cepheid's have longer periods B) Dim stars vary rapidly C) All stars have equal luminosity D) Period depends only on temperature	K2	CO3
4	7	List the term for the layer of gases surrounding Earth. A) Atmosphere B) Corona C) Comet nucleus D) Galactic halo	K1	CO4
	8	Why do comets develop tails? A) They have icy nuclei B) They are rocky and airless C) They orbit only between Mars and Jupiter D) They do not emit gases	K2	CO4
5	9	Recall the mass limit for a stable white dwarf? A) Maximum mass of a stable white dwarf B) Temperature of neutron stars C) Radius of a red giant D) Density of a black hole	K1	CO5
	10	Which stellar property is shown on the Hertzsprung–Russell diagram? A) Luminosity versus surface temperature B) Orbital paths of planets C) Formation stages of galaxies D) Changes in stellar magnetic fields	K2	CO5

SECTION - B (35 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks   (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Calculate the force between two masses of 5 kg and 10 kg separated by 2 m using Newton's law of gravitation.	K3	CO1
		(OR)		
	11.b.	Explain the contribution of Indian scientists like Jagdish Chandra Bose, G. N. Ramachandran to space science.		
2	12.a.	Determine the coordinates of a star using the Altazimuth System.	K3	CO2
		(OR)		
	12.b.	Discuss the photoelectric method of measuring apparent luminosity.		
3	13.a.	Derive the method for determining the trigonometric parallax of stars and explain cluster parallax.	K4	CO3
		(OR)		
	13.b.	Analyze how secular parallax is used to determine stellar distances.		
4	14.a.	With neat diagram explain about Refracting Telescope.	K3	CO4
		(OR)		
	14.b.	Discuss the physical properties and masses of stars with examples.		
5	15.a.	Classify stars based on their temperature and spectral characteristics using the Harvard system.	K4	CO5
		(OR)		
	15.b.	Explain the Schoenberg–Chandrasekhar limit for an isothermal stellar core.		

SECTION -C (30 Marks)
Answer ANY THREE questions
ALL questions carry EQUAL Marks   (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain the motion of the Earth and Moon and how it causes lunar and solar eclipses.	K2	CO1
2	17	Illustrate the different between Local Equatorial System and Universal Equatorial coordinate systems.	K3	CO2
3	18	Determine stellar distances using the spectroscopic parallax method.	K4	CO3
4	19	Compare reflecting and radio telescopes in measuring distance, size, and rotation.	K5	CO4
5	20	Analyze the internal structure of stars using the equations of stellar structure and polytrophic models.	K5	CO5

Z-Z-Z   END