


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, May 2024</b>			
<b>Course: Space Science and Space Environment</b> <b>Program: B.Tech Aerospace Engineering</b> <b>Course Code: ASEG4008P</b>		<b>Semester: VIII</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions:</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1	How does an X-ray telescope form images? Why is it necessary for reflection to occur at grazing angles of incidence?	4	CO1
Q 2	What is a white dwarf star? Why is the radius of a white dwarf a decreasing function of its mass? What is the basic physics that leads to the upper limit on the mass of a white dwarf (i.e. the Chandrasekhar limit)?	4	CO3
Q 3	Describe Hubble's classification scheme for galaxies and explain why it is useful.	4	CO1
Q 4	What is the origin of the cosmological constant, and how does it relate to Einstein's field equations of general relativity	4	CO2
Q 5	What physical properties of the local interstellar medium influence its interaction with the heliopause? Are there any observational evidence or experiments supporting the existence of the heliopause and its relationship with the interstellar medium.	4	CO2
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	What is meant by main sequence stars? Can you list the spectral classes of stars, and indicate which class the Sun belongs to? Identify the layers of the solar atmosphere. Explain why the temperature of sunspots is lower than their surroundings?	10	CO4
Q 7	Explain about types of nucleosynthesis process and Demonstrate the Nuclear Binding energies during the process. Write the elemental reactions, which indicate formation of different elements.	10	CO3
Q 8	How do magnetic storms and solar flares impact the Earth's magnetosphere, and what are the potential consequences for technology and communications. How do scientists use data from satellites like the Van Allen Probes and ground-based observatories to monitor and study the Earth's magnetosphere in real-time	10	CO2

Q 9	Describe the types of stellar evolution that lead to type Ia, type Ib and type II supernovae. What are the observational differences among these?	10	CO3
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	Discuss the role of stellar evolution in the formation of stellar-mass black holes and supermassive black holes. Explain the concept of the event horizon and its significance in defining black holes. Explore the different types of black holes, including stellar-mass black holes, intermediate-mass black holes, and supermassive black holes, and their distinguishing characteristics. Discuss the properties of black holes, including their gravitational pull, size, and the phenomena associated with them, such as time dilation and gravitational lensing.	20	CO5
Q 11	(a). How do observations of the cosmic microwave background polarization contribute to our understanding of the early universe and support the Big Bang model? (b). explain how the abundance of light elements, such as hydrogen and helium, observed in the universe supports the predictions of the Big Bang theory? What observational techniques or instruments are currently being used to understand the Big Bang model and its implications.	20	CO4