


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, December 2023</b>			
<b>Course: Space Science and Space Environment</b> <b>Program: B.Tech Aerospace Engineering</b> <b>Course Code: ASEG 3033</b>		<b>Semester: V</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	Describe the Coriolis force and its role in celestial mechanics. How does it affect spacecraft trajectories and launch sites on Earth?	4	CO1
Q 2	Discuss the differences between high-mass stars and low-mass stars in terms of their lifespans, energy production, and eventual fates.	4	CO1
Q 3	What is the mass threshold defined by the Chandrasekhar limit, and how does it impact the possibility of a supernova event?	4	CO2
Q 4	What is dark energy, and how does it differ from dark matter? Describe its role in the universe's expansion and the acceleration of cosmic expansion.	4	CO3
Q 5	What is the Lorentz force, and how does it describe the interaction between charged particles and electromagnetic fields?	4	CO1
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	Discuss the various types of stellar remnants (such as white dwarfs, neutron stars, and black holes) and how they are formed at the end of a star's life cycle. What factors determine the color of a star? How does this relate to its temperature and spectral classification?	10	CO4
Q 7	Describe the process of interferometry in telescopes. How does it enhance resolution and enable astronomers to study fine details of distant objects?	10	CO3

Q 8	Explain the role of the Van Allen radiation belts in Earth's magnetosphere. What are these belts, and how do they impact space missions and satellite operations?	10	CO2
Q 9	Discuss the significance of the heliopause in defining the boundary of the heliosphere. How does it mark the transition between the influence of the Sun's solar wind and interstellar space?	10	CO2
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	What are some of the primary methods used to detect black holes? Explain the significance of each method. Discuss the observations or experiments that have provided evidence for the existence of black holes. How did the Event Horizon Telescope capture the first image of a black hole, and what insights did this image provide to the scientific community?	20	CO4
Q 11	What are the key milestones in the evolution of the universe as hypothesized by the Big Bang Theory, from the initial singularity to the formation of galaxies and stars? How does the cosmic microwave background radiation provide evidence for the Big Bang Theory, and what does its uniformity suggest about the early universe?	20	CO3