



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**Online End Semester Examination, November/ December 2021**

**Course: Space Science & Space Environment**  
**Program: B. Tech ASE+AVE**  
**Course Code: ASEG 4008P**

**Semester: VII**  
**Time 03 hrs.**  
**Max. Marks: 100**

**Instructions: a) All questions are compulsory.**  
**b) Assume any suitable value for the missing data**

**SECTION A**

S. No.		Marks	CO
Q 1	State if the following statements are 'True' or 'False' a) KBOs are found in our galaxy, but out of our solar system. b) Mars has an intrinsic Magnetosphere. c) Van Allen Belts are found around Jupiter too. d) Solar wind is a strong wind of neutral gas particles from the Sun.	4	CO3
Q2.	What is Heliopause?	4	CO4
Q3	What are TNOs in our Solar system?	4	CO1
Q4.	Discuss the origin, structure and composition of Van Allen Belt(s) created in the Earth's atmosphere.	4	CO3
Q5	Differentiate between asteroids, meteoroids and comets.	4	CO1

**SECTION B**

Q 1	Discuss the phenomenon of 'temperature inversion' with respect to the Earth's atmosphere. Discuss the temperature profile of the Earth's atmosphere and the different zones thus delimited.	10	CO2
Q 2	Analyze the Asteroid belt, the Kuiper Belt and the Oort Cloud by their various characteristics. Assign objects, by this analysis, having origins in them.	7+3	CO1
Q 3	a. The energetic charged particles, principally from the solar wind, and some due to the cosmic rays get trapped in specific zones in the Earth's higher atmosphere. What are these zones called? b. How many of them exist in the Earth's system? Discuss them in detail regarding their formation and their characteristics.	5+5	CO3
	<b>OR</b>		
	Discuss the origin and structure of solar wind. Discuss its interaction with the planets of the solar system.		CO4

Q 4	Given that the entire Solar system formed at nearly the same time, discuss the evolution of the Earth's atmosphere in time.	<b>10</b>	<b>CO2</b>
<b>SECTION-C</b>			
Q 1	Involving the relevant Physics, compare the life cycles of stars that begin their lives as Proto-stars, with masses quite smaller than, nearly equal to, and quite larger than our Sun.	<b>20</b>	<b>CO1</b>
Q 2	<p>Explain the terms magnetic inclination, declination and secular variation with respect to the Earth's magnetic field. Has the Earth's magnetic field remained the same since the beginning? Support your answer with proper arguments.</p> <p style="text-align: center;"><b>OR</b></p> <p>Our Sun is not a homogenous ball of fire. Discuss its structure and describe the different regions inside with their characteristic properties. List the different ways in which it impacts the Earth and the other planets.</p>	<b>12+8</b>	<b>CO2</b>