Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **19AE1001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **FUNDAMENTALS OF SPACE SCIENCE** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
| **PART – A (10 X 1 = 10 MARKS)** | | | |
| 1. | What parameter characterizes a planet as inferior and superior? | CO1 | 1 |
| 2. | Name any two fundamental laws of celestial mechanics. | CO1 | 1 |
| 3. | What is the significance of elliptical orbits? | CO2 | 1 |
| 4. | Define commensurability. | CO2 | 1 |
| 5. | What is an ephemeris time? | CO3 | 1 |
| 6. | Define ellipticity. | CO3 | 1 |
| 7. | The angle between the direction of periapsis and the current position of the body in a keplerian orbit is \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | CO4 | 1 |
| 8. | What happens to angular momentum of a body taking an elliptical orbit? | CO4 | 1 |
| 9. | What is a space Debris? | CO5 | 1 |
| 10. | Define spatial density. | CO5 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | |  |  |
| 11. | Write short notes on globular and galactic clusters. | | CO1 | 3 |
| 12. | State Newton’s universal law of gravitation and explain its significance. | | CO2 | 3 |
| 13. | Differentiate between the horizontal and equatorial coordinate systems. | | CO3 | 3 |
| 14. | Write a short note on true anamolies. | | CO4 | 3 |
| 15. | Compare the space debris spatial density in low earth orbit and geo synchronous equatorial orbit. | | CO5 | 3 |
| 16. | Name the different ISRO centers along with their functions. | | CO6 | 3 |
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| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | | |
| 17. | a. | Explain triple and higher systems of stars in detail and distinguish from the binary system. | CO1 | 6 |
| b. | Define asteroid, meteor and comet. | CO1 | 6 |
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| 18. |  | Explain the equatorial system and the ecliptic coordinate system in detail. | CO2 | 12 |
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| 19. |  | Derive the Baker’s equation from the parabolic orbits two body motion. | CO3 | 12 |
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| 20. |  | Derive the total energy of the system from energy conservation principle and classify the orbits based on the energy constants. | CO4 | 12 |
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| 21. |  | Explain debris environment in geosynchronous equatorial orbit and state why it becomes a major threat compared to other orbits. | CO5 | 12 |
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| 22. |  | Derive the Kepler’s equation and show how eccentric anamoly and mean anamoly are related. | CO4 | 12 |
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| 23. | a. | State and explain Kepler’s three laws of planetary motion. | CO2 | 6 |
| b. | Write a short note on debris measurements. | CO5 | 6 |
|  |  | **Compulsory:** | |  |
| 24. | a. | Why PSLV is called the work horse of ISRO? Explain the function of PSLV in ISRO missions. | CO6 | 6 |
| b. | Explain MANGALYAAN mission in detail with the challenges faced by ISRO in completing it. | CO6 | 6 |