

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted from the academic year 2019–20 & thereafter)

B. Sc. DEGREE EXAMINATION, APRIL 2024
BRANCH I – MATHEMATICS
FOURTH SEMESTER

COURSE : **MAJOR ELECTIVE**
PAPER : **ELEMENTS OF SPACE SCIENCE**
SUBJECT CODE : **19MT/ME/ES45**
TIME : **3 HOURS** **MAX. MARKS: 100**

SECTION-A

ANSWER ANY TEN QUESTIONS: **10 × 2 = 20**

1. State cosine formula.
2. Define dip of Horizon.
3. What are the Cardinal points?
4. Define Celestial Meridian.
5. Give any two effects of refraction.
6. Define geocentric parallax.
7. State Kepler's laws.
8. What is retrograde motion of a planet?
9. When do we have lunar eclipse? Why?
10. Define sidereal time.
11. What is standard time at a given location?
12. What is first point of Aries and first point of Libra?

SECTION-B

ANSWER ANY FIVE QUESTIONS: **5 × 8 = 40**

13. What is twilight? Write a short note on civil, nautical and astronomical twilight.
14. Write a note on equatorial system of celestial coordinates.
15. Calculate the effect of refraction on right ascension and declination of a star.
16. Compare geocentric parallax and refraction.
17. Calculate the eccentricity of Earth's orbit around sun.
18. Express in mean solar units an interval of 16h 21m 4s of sidereal time.
19. What are morning stars, evening stars and circumpolar stars?

SECTION-C

ANSWER ANY TWO QUESTIONS:

2 × 20 = 40

- 20. (a) Derive an expression to calculate the duration of twilight at a given location on a given date.
- (b) How do you calculate the hour angle of a celestial body at rising or setting?

- 21. (a) Define aberration of a star. Compare with stellar parallax. What are the different types of aberration?
- (b) Discuss about the ecliptic limits and find the maximum number of eclipses possible near a node.

- 22. (a) What are eclipse seasons? Give the importance of solar eclipse.
- (b) Find the sidereal time at Greenwich corresponding to mean time of 10h 13m 40s AM on a given date, given that the sidereal time of mean midnight was 5 h 15 m 42 s.

