STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI-86

(For candidates admitted during the year 2015 and thereafter)

SUBJECT CODE: 15MT/ME/ES55

B.Sc. DEGREE END SEMESTER EXAMINATION- APRIL 2021

COURSE: MAJOR ELECTIVE **TIME: 90 Minutes**
PAPER: ELEMENTS OF SPACE SCIENCE **MAX.MARKS: 50**

SECTION –A

Answer all questions ($3 \times 2 = 6$)

1. Show that the right ascension α and declination δ of the sun will always be connected by the equation $\tan\delta = \tan\omega \sin\alpha$.
2. Enumerate two points of differences between refraction and geocentric parallax.
3. What is meant by planetary occultation?

SECTION –B

Answer any three questions ($3 \times 8 = 24$)

4. Draw a neat diagram representing the different systems of co-ordinates in the same figure.
5. Write short notes on: (a) Heliocentric parallax (b) Kinds of aberration. (4+4)
6. Find the mean time corresponding to 16h 11m 47s sidereal time at Greenwich, given that the sidereal time at mean midnight was 14h 50m 51s.
7. Find the condition for the occurrence of a lunar eclipse.

SECTION -C

Answer any one question ($1 \times 20 = 20$)

8. (a) Define circular parts in a spherical triangle ABC and prove that if *AD* is the internal bisector of the angle *CAB* of the spherical triangle *ABC*,
   Cot AD = $\frac{1}{2}$ $(\cot b + \cot c)\sec\frac{A}{2}$.
   (b) Obtain the formula for the hour angle of a body at rising and setting.
   (c) Derive the working rule for converting mean solar time into sidereal time.
   (7+6+7)

9. (a) Describe the phenomenon of twilight and calculate the duration of twilight at a place of latitude ϕ, when the sun's declination is δ.
   (b) Find the positions of two planets when they are stationary as seen from each other where the orbits of the two planets being assumed circular and coplanar.
   (10 +10)