LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – MATHEMATICS

THIRD SEMESTER – November 2009

MT 3502/MT 5503 - ASTRONOMY

Date & Time: 06/11/2009 / 9:00 - 12:00 Dept. No. | | Max. : 100 Marks

SECTION – A

Answer ALL the questions. **(10 x 2 = 20 marks)**

1. Define diurnal motion of a star.
2. Define celestial horizon.
3. What are equinoxial points?
4. Define twilight.
5. What is the effect of refraction on the length of the day?
6. State Kepler's laws of planetary motion.
7. Write down the formula to convert sidereal time to solar time.
8. Define age of the moon.
9. What are meteors?
10. Define elongation of a planet.

SECTION – B

Answer any FIVE questions **(5 x 8 = 40 marks)**

11. Explain with diagram the horizontal co-ordinate system to fix the position of a celestial body.
12. Define circumpolar star and find the condition for any star to be circumpolar.
13. Define sidereal time 't' and prove that sidereal time is equal to the R.A. ± Hour angle of a star.
14. Find roughly the distance of a star whose parallax is 0.5" given that parallax of the sun is 9" and the earth's radius is 4000 miles.
15. Prove that equation of time vanishes four times a year.
16. Define sidereal month and synodic month of the moon and find the relation between them.
17. Compare lunar and solar eclipses.
18. Prove that among any two planets, the inner planet moves faster than the outer planet.

SECTION – C

Answer any TWO questions **(2 x 20 = 40 marks)**

19. a) Prove that the hour angle and azimuth of a star at rising or setting are

$\cosh = -\tan\varphi \tan\sigma$

$\cos A = \sin\delta \sec\varphi$

b) Trace the variation in the length of the day and night for Chennai (north latitude 13.4^{o}) (10+10)

20. a) Define astronomical refraction and derive the tangent formula $r = k \tan z$.

b) Explain with diagram the meridian circle. (10+10)

21. a) Derive Newton's deduction from Kepler's law.

b) Write a brief note on the conquest of the moon. (10+10)

22. a) Define phase of the moon and trace the changes in the phase of the moon in one function.

b) Find the maximum number of eclipses in a year. (10+10)

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