LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **MATHEMATICS**

THIRD SEMESTER – NOVEMBER 2007

MT 3502/MT 5503 - ASTRONOMY

AB 8

Date : 31/10/2007 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

SECTION – A

(10 x 2 = 20 marks)

Answer ALL the questions.

1. Define diurnal motion of a star.
2. Define ecliptic and obliquity.
3. Define dip of the horizon.
4. Define aberration of light.
5. State Kepler's laws
6. What is tropical year?
7. What are ascending and descending nodes?
8. What is Golden number?
9. Explain Bode's law.
10. What are Meteors?

SECTION – B

(5 x 8 = 40 marks)

Answer any FIVE questions.

11. Prove that the latitude of any place is equal to the altitude of the pole above the horizon.
12. Prove that the sidereal time 't' = Right Ascension ± hour angle of the star.
13. Define circumpolar star and find the condition for any star to be circumpolar.
14. Define geocentric parallax and with usual notations prove that $p = p \sin z$.
15. Write a note on Seasons.
16. Define sidereal month and synodic month and find the relation between them.
17. Compare solar and lunar eclipses.
18. Explain comets.

SECTION – C

(2 x 20 = 40 marks)

Answer any TWO questions.

19. (a) Explain with diagrams, any two system of coordinates to fix a star on the celestial sphere.
    (b) Prove that the hour angle and azimuth of a star at rising or setting are given by
    $\cos \eta = -\tan\theta \tan\delta$
    $\cos A = -\sin\delta \sec\theta$
20. (a) Define Astronomical refraction and derive tangent formula $r = k \tan z$
    (b) Explain sundial
21. (a) Derive Newton's deduction from Kepler's law.
    (b) Define equation of time and prove that it vanishes four times a year.
22. (a) Define phase of the moon. Trace the changes in the phase and the elongation of the moon in one lunation.
    (b) Find the maximum number of eclipses in a year.

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