PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Fifth Semester)

Branch – **MATHEMATICS**

ASTRONOMY

Time: Three Hours | Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 Any great circle passing through the poles of a circle is called a _____ to the given circle.
(i) secondary (ii) angular distance
(iii) polar distance (iv) vertex

2 The region bounded by the Tropic of cancer and the Arctic circle is called the _____
(i) North Frigid zone (ii) North temperate zone
(iii) Antarctic circle (iv) North Torrid zone

3 _____ is the distance of a star whose annual parallax is one second.
(i) light year (ii) one parsec
(iii) parallactic ellipse (iv) annual parallax

4 Mean anomaly $m =$ _____
(i) 2π (ii) $\frac{2\pi}{T}$
(iii) $2\pi t$ (iv) $\frac{2\pi}{T}t$

5 The moon is said to be in a _____ if its elongation is 90°.
(i) conjunction (ii) opposition
(iii) quadrature (iv) age of moon

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 (a) Write some properties of spherical triangles.
OR
(b) Prove that the latitude of a place is equal to the altitude of the celestial pole.

7 (a) Trace the variations in the durations of day and night during the year for a place in the North temperate zone.
OR
(b) Derive tangent formula for refraction.

8 (a) Explain the terms 'parsec' and 'light year'. Find the relation between them.
OR
(b) Determine the constant of aberration.

Cont...

9 (a) Calculate the eccentricity of the earth's orbit around the sun.

OR

(b) With the usual notation prove that $\tan\frac{v}{2} = \sqrt{\frac{1+e}{1-e}}\tan\frac{u}{2}$.

10 (a) Find the relation between sidereal day and synodic months.

OR

(b) Obtain the condition for the occurrence of a lunar eclipse.

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 (a) Derive an expression for Dip.

OR

(b) Define twilight. Obtain the duration of twilight.

12 (a) Find the duration of perpetual day in a place of latitude.

OR

(b) Derive Cassini's formula for refraction indicating the assumptions made.

13 (a) Obtain the effect of geocentric parallax on the R.A and declination of a planet.

OR

(b) Prove that the apparent position of a star due to aberration describes an ellipse around the true position. Examine the aberration of ellipse when the star is (i) at a pole of the ecliptic (ii) on the ecliptic.

14 (a) State Kepler's law. Derive Kepler's equation.

OR

(b) Derive stationary values of equation of time.

15 (a) What is meant by phase of moon? Discuss the different phases of moon using the formula.

OR

(b) Find the maximum and minimum number of eclipses possible near a node of the lunar orbit.

Z-Z-Z END