North Gauhati College
Department of Mathematics

SEMESTER V (MAJOR)
HOME ASSIGNMENT 2022

MAT-DSE-2
SPHERICAL TRIGONOMETRY AND ASTRONOMY

TOTAL MARKS: 30

INSTRUCTIONS TO CANDIDATES

1. Answer all questions. The marks for each question are indicated at the

 beginning of each question.

2. Submit the assignment as a single **PDF** _le through the online portal

of our college website under section \Assignments" and submit a hard

copy in the Department of Mathematics.

3. Write your **Name, GU Roll No.,** and **Registration Number** in

the assignment .

4. Submission **Due Date** is on or before

1. If ω be the angular velocity of a planet at the nearer end of the major axis prove that its period is $\frac{2\pi}{\omega}\sqrt{\left\{\frac{1+e}{(1-e)^3}\right\}}$.

2. If a planet was suddenly stopped in its orbit supposed circular, show that it would fall into the sun in time which is $\frac{\sqrt{2}}{8}$ times the period of the planet's revolution.

3 .If x is the length of the shadow cast on level ground by a vertical pole at apparent noon at an equinox and if y is the length of the shadow cast by the same pole at the summer solstice when the sun is on the prime vertical ,show that

 x= y tanψ tanϕ, where sin ψ = sinε $cosec\phi$.

4. If u and v are the velocities of two planets in circular and coplanar orbits, show that the period of direct motion is to the period of retrograde motion as

180^0-α : α where cosα = $\frac{uv}{u^2-uv+v^2}$.

5. If the line joining two planets to one another subtends and angle of 60^0at the sun when the planets appear to each other to be stationary ,show that $a^2+b^2=7ab$ where a and b are the distances of the planets from sun.

6. Write down the component of linear velocity perpendicular to the radius vector and to the major axis.