## St John Baptist De La Salle Catholic School, Addis Ababa Physics Midterm Prep 2<sup>nd</sup> Quarter

## December, 2022

Notes, and use of other aids is **NOT** allowed. Read all directions carefully and **write your answers in the answer sheet**. To receive full credit, you must show all of your work.

## **Useful Constants**

- $\mathbf{a}_g = 10m/s^2$  acceleration due to gravity  $\mathbf{G} = 6.672 \times 10^{-12} \frac{Nm^2}{kg^2}$  gravitational constant
- 1. If the net torque in a system is 0, what can we say about the angular velocity, angular momentum, the torques on the system?
- 2. What are the physics concent behind each of Kepler's Laws of Planetary Motion(try to prove each one)?
- 3. The trajectory of planets & celestial bodies around the sun can only be a few shapes what are they?
- 4. What are the factors affecting moment of inertia? How does the moment of inertia change if we change the factors?
- 5. How was the gravitational constant discovered?
- 6. Why do we have the door handles away from the hinges?
- 7. Prove Kepler's Third Law. (For the sake of simplicity, assume the path of planets is circular).
- 8. If a planet is orbitting the sun 10 AU away, find its period.
- 9. Convert the following quantities into their standard units:
  - 2 rev/min
  - 10 rev/s
  - 900<sup>0</sup>
  - 100 revolution
  - $7 \text{ rev}/\text{min}^2$