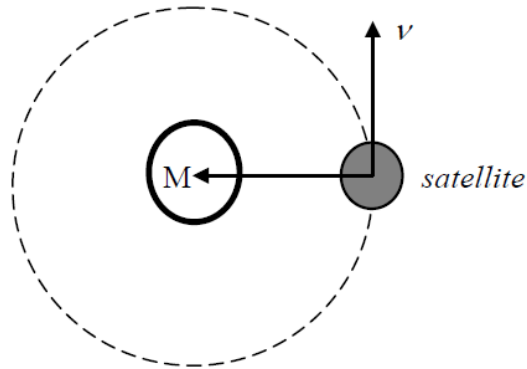


## Year 13 Physics 2021 Worksheet 4

Write the answers in your Exercise Book.

1. A 100 kg satellite orbits 600 km above the surface of the earth.



The mass  $M$  of the earth is  $5.98 \times 10^{24}$  kg,  $G = 6.67 \times 10^{-11}$  Nm<sup>2</sup> kg<sup>-2</sup> and radius of earth is  $6.37 \times 10^6$  m.

Calculate the following energy of the satellite:

- (a) gravitational potential energy. **(1 mark)**
  - (b) kinetic energy **(1 mark)**
  - (c) total energy **(1 mark)**
2. The spinner of a washing machine turning at  $10 \text{ rads}^{-1}$  and increasing to  $30 \text{ rads}^{-1}$  makes 40 revolutions.

Find the:

- (a) total angle turned through in radians. **(1 mark)**
  - (b) angular acceleration. **(2 marks)**
  - (c) time taken to turn through the 40 revolutions. **(1 mark)**
3. A flywheel of moment of inertia  $0.2 \text{ kg m}^2$  rotates with an angular speed of  $40 \text{ rads}^{-1}$

Find the **torque** required to bring the wheel uniformly to rest in 10s. **(2 marks)**