S3 Questions

1. List three vectors and three scalars you have studied.

2. If a rocket's mass is 6.0×10^6 kg,

i) Calculate the weight of the rocket on the Moon and on Earth.

ii) Calculate the thrust (force) needed to make the rocket accelerate upwards from the Earth at 0.07 ms^{-2}. Draw a free body diagram for this question.

ii) Calculate the thrust (force) needed to make the rocket accelerate upwards from the Moon at 0.07 ms^{-2}. Draw a free body diagram for this question.

3. A boy runs round a circle of diameter 60.0 m in a time of 100.0 s, from a northerly position.

i) Calculate his average speed. (Distance / Time)

ii) Calculate his average velocity after 50.0 s. (displacement / time)

4. (a) From what law does the term Newton Pair arise?

(b) Write down the Newton pair for an apple sitting on a table.

6. Horses are pulling a carriage of mass 1000.0 kg to the right. The acceleration of the carriage is 0.5 ms^{-2} to the right and the force of friction on the carriage is 1000.0 N to the left.

Calculate the pulling force of the horses. (Magnitude and Direction). Draw a free body diagram for this question.

7. The power rating of a kettle is 2000.0 W.

i) How much energy will the kettle provide to 4.0 kg of water at 10^oC in 50.0s

ii) Assuming the water absorbs all the energy, calculate its temperature after 50s.