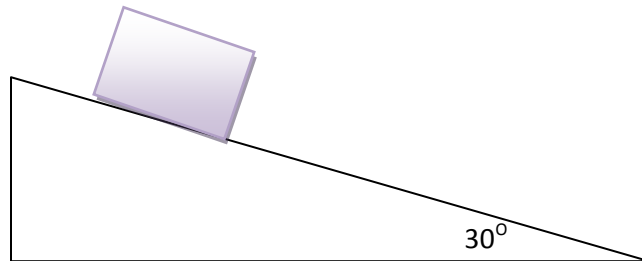


Higher Physics Assignment 007

- 1) During a training session a runner runs 400 m due south and then 300 m due east from the starting point in a time of 250 seconds.
 - a) Using a scale diagram, or otherwise, find the resultant displacement of the runner.
 - b) Calculate the average speed of the run.

- 2) A student drops a metal ball of mass 4 kg onto a metal surface. The metal ball strikes the surface with a velocity of 8 ms^{-1} . The ball comes to a rest on the surface without bouncing. The ball is in contact with the surface for 0.08 seconds.
 - a) Calculate the size of the change of momentum of the ball
 - b) What is the size of the impulse on the ball during the 0.08 seconds?
 - c) Calculate the average force experienced by the ball.

- 3) A package of mass 20 kg sits at rest on a ramp as shown



- a) Calculate the component of the package's weight down the slope.
 - b) What is the size of the frictional force acting on the package?

- 4) A sealed canister containing gas at pressure $3 \times 10^8 \text{ Pa}$ at a temperature of 25°C is heated to a temperature of 50°C.
 - a) Calculate the pressure of the gas in the canister at 50°C
 - b) Explain what happens to the density of the gas in this canister when it is heated up.