**PHYSICS UNIT 3 SKILLS TEST 1 (Motion and Vectors)** NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(26 Marks, 26 Minutes)

1. A small 4kg cart on a frictionless track is travelling at 10ms-1 as shown in the diagram.

A B D E

5m 7 m

C

a) What is the speed of the cart as it passes through C?

*(3 Marks)*

b) What is the speed of the car as it passes through D?

*(3 Marks)*

2. A tight rope walker weighing 60 kg is in the centre of a tight rope. If the tight rope makes an angle of 5º to the horizontal at each end, what is the tension created by the walker in the rope?

*(4 Marks)*

3. A balloon is 30.0m above the ground and is rising vertically with a uniform speed when a coin is dropped from it. If the coin reaches the ground in 4.0 s, what was the speed of the balloon?

*(4 Marks)*

4. A squash ball strikes the front wall of a court as shown. Calculate the change in velocity for this collision.

30 ms-1  20ms-1

60º 60º

*(4 Marks)*

5. Consider this 2kg mass accelerating down a 20º incline at 1 ms-2.

20º

a) Draw a vector sum triangle showing all of the forces involved, including the net force, in the space below.

*(2 Marks)*

b) Calculate the force of friction.

*(4 Marks)*

c) What is the size of the reaction force of the incline on the mass?

*(2 Marks)*