## Physics 2204 Assignment 5 – Kinematics 2011-2012 Outcomes: 325-2

Name:\_\_\_\_\_

- 1. A motorcycle accelerates from rest at  $6.0 \text{ m/s}^2$ . How much farther will it travel during the second 3.0 s of its motion than during the first 3.0 s?
  - A) 15 m
  - B) 27 m
  - C) 54 m
  - D) 81 m
- A race car accelerates at 4.0 m/s<sup>2</sup> from a velocity of 6.0 m/s. Calculate how long the race car takes to travel a distance of 216 m. {4 marks}

- 3. A driver is travelling at 25 m/s when she spots a sign that reads "BRIDGE OUT AHEAD." It takes her 1.0 s to react and begin braking. The car slows down at a rate of 3.0 m/s<sup>2</sup>. Luckily, she stops 5.0 m short of the washed-out bridge.
  - (a) How much time was required to stop the car once the brakes were applied? {2 marks}

(b) How far was the driver from the bridge when she first noticed the sign? {5 marks}

- 4. A car is travelling along a highway with a speed of 25 m/s when the driver sees an obstruction  $1.80 \times 10^2$  m directly ahead. It takes the driver 0.80 s to react and begin braking.
  - (a) How far does the car travel before it begins to slow down? {2 marks}
  - (b) How long will it take the car to stop once the brakes are applied, provided the car stops just before the obstruction? {3 marks}
  - (c) What is the value of the acceleration of the car if it just misses hitting the obstruction? Assume the acceleration is uniform. {2 marks}

5. An object is pushed from rest across a sheet of ice, accelerating at 5.0 m/s<sup>2</sup> over a distance of 80.0 cm. The object then slides at a constant speed for 4.0 s until it reaches a rough section that causes the object to stop in 2.5 s.

(a)	What is the speed of the	object when it reac	hes the rough section?	$\{2 \text{ marks}\}$
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- (b) At what rate does it slow down once it reaches the rough section? {2 marks}
- (c) What is the total distance that the object slides? {5 marks}

- 6. A car is stopped at an intersection. When the traffic light turns green, the car starts to accelerate at  $1.5 \text{ m/s}^2$ . A truck continues through the intersection, at a constant speed of 12 m/s, and passes the car at the same time that it starts to accelerate.
  - (a) How long does the car take to catch up with the truck? {5 marks}

(b) How far does the car travel before it catches up with the truck? {2 marks}

7. You are driving with a constant velocity of 20.0 m/s when a child suddenly steps into the path of your vehicle 65 m away. When you fully apply your brakes, your car slows down at a rate of 7.5 m/s<sup>2</sup>. What is the minimum reaction time that is required so that the child will not be hit? {5 m/s<sup>2</sup>}