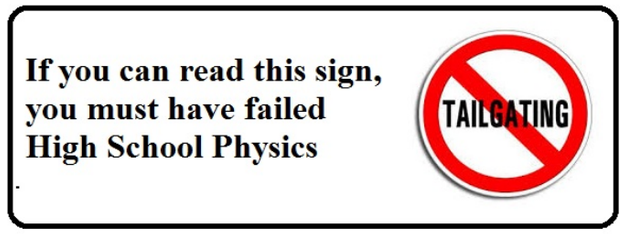
Physics 2204
Unit 1: Kinematics
STSE : Physics of Tailgating

Student Name:_____



PART A: MULTIPLE CHOICE:

Instruction : Place the correct answer on the provided Scantron sheet.

1. Tailgating is the dangerous and usually futile practice of driving to close to someone?

   (A) True
   (B) False

2. The laws of physics and of common sense dictate that you cannot go any faster than the slowest car ahead.

   (A) True
   (B) False

3. An understanding of the physics of tailgating may be crucial in:

   (A) Ensuring road safety
   (B) Helping tailgaters slow down
   (C) Help people to enjoy their ride
   (D) All of the above are correct

4. Tailgating can not cause multiple car crashes even if one car in a line suddenly slows down.

   (A) True
   (B) False

5. As you observe the car ahead of you pass a fixed point, how many seconds should it take for your own car tp d pass that same point?

   (A) 1 second
   (B) 2 second
   (C) 3 second
   (D) 4 second

6. What does your reaction time include ?

   I Time for your brain to process the car ahead is stopping
   II Time for your foot to move to the brake
   III Time for you to respond to a text

   (A) I and II
   (B) II and III
   (C) I and III
   (D) I, II and III

7. What is the typical reaction time of an individual?

(A) 0.1 and 0.5 seconds
(B) 0.1 and 0.5 seconds.
(C) 0.2 and 0.5 seconds.
(D) 0.2 and 0.7 seconds.

8. Which of the following describes the motion of the car during the reaction time?

(A) Uniform acceleration
(B) Uniform deceleration
(C) Uniform motion
(D) Non zero acceleration

9. Which of the following formulae would be used to calculate the distance travelled during the reaction time?

(A) $d = vt$
(B) $v_2 = v_2 + at$
(C) $v_2^{\,2} = v_1^{\,2} + 2ad$
(D) $d = v_1 t + \frac{1}{2} a t^2$

10. A driver of a car going at 100.0 km/h suddenly sees the brake lights of a another car. If the driver has a reaction time of 0.51 s, how far will this person travel before the brakes are applied?

(A) 14 m
(B) 51 m
(C) 184 m
(D) 100 m

11. Which of the following describes the motion of the car during its stopping distance?

(A) Uniform acceleration
(B) Constant Speed
(C) Uniform motion
(D) Zero acceleration

12. Why is acceleration negative for calculating stopping distance?

(A) The car is assumed to be travelling right and slowing down
(B) The car is assumed to be travelling right and speeding up
(C) The car is assumed to be travelling left and slowing down
(D) The car is assumed to be travelling left and speeding up

13. Which of the following formulae would be used to calculate the stopping distance?

(A) $d = vt$
(B) $v_2 = v_2 + at$
(C) $v_2^{\,2} = v_1^{\,2} + 2ad$
(D) $d = v_1 t + \frac{1}{2} a t^2$

14. Which of the following vehicles would have the best braking distance?

(A) BMW M3
(B) Dodge Colt GL
(C) Lincoln Continental
(D) Nissan Maxima

PART C: WRITTEN RESPONSE

1. In a realistic model of tailgating what factors should be considered that would increase the safe stopping distance?

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2. What is the stopping distance of a Toyota Celica ($a = -9.2\ m/s^2$) from 97 km/h where the driver has a reaction time of 0.55 s?

3. A Chevrolet Blazer travelling at 97 km/h can stop in 48 m. Given that the actual stopping distance for a certain driver is 54 m, what was the driver's reaction time?

4. An automobile is travelling at 25 m/s on a country road when the driver suddenly notices a cow in the road 30 m ahead. The driver attempts to brake the automobile but the distance is too short. With what velocity would the car hit the cow if the car decelerated at $7.84\ m/s^2$ and the driver's reaction time was 0.75 s?