**10 Sc     ROAD SAFETY END-OF-TOPIC TEST**

**Max mark: 50 Name:**

Formulae : vav = d / t d = vav x t t = d / v

a = (v2 – v1) / t vav = (v1+ v2) / 2 F = m a

**Ensure that ALL steps are shown in all calculations.**

1 A car travels from Adelaide to Melbourne, a distance of 765 kilometers in 9 hours.

(a) Calculate the average speed of the car in kilometers per hour. (2 marks)

(b) What is the car’s average speed in metres per second? (1 mark)

2 A car travelling at 15 m/s has to stop for a red light ahead. The car brakes, and comes to rest in 5.0 seconds.

(a) Calculate the acceleration of the car. (2 marks)

(b) Convert 15 m/s to km/hr. (1 mark)

3 The graph below shows distance v time for a person walking.

The distance is measured north of the walker's starting point.



(a) In which section(s) is the walker....

(i) walking south?

(ii) stationary?

(iii) walking north? (2 marks)

(b) During which section of the graph was the person travelling faster? **Explain** how you know.

(2 marks)

(c) Calculate the average speed of the walker in the section you named in part (b) of this question.

(2 marks)

4 (a) State Newton's first law of motion.

(2 marks)

(b) Explain briefly why a ball which is rolling on a level surface such as the laboratory bench slows downy and eventually stops.

(2 marks)

(c) Would the ball described in part (b) above slow down if it was in outer space, (ie in a vacuum and far away from any gravitational effects)? **Explain** your answer. (2 marks)

5 (a) Give one example of, when driving a car, a lot of friction between the tyres and the road would be desirable. (1 mark)

(b) Give one example of, when driving a car, it would be preferable to have very little friction between the tyres and the road. (1 mark)

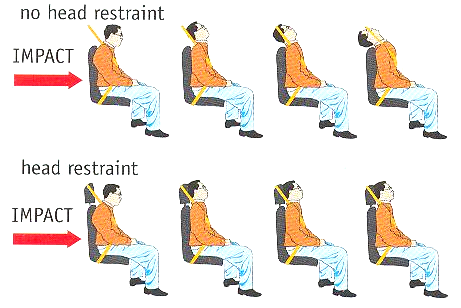
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6 The ticker tape shown above is the actual size. The time interval between each dot was 0.1 second.

Calculate the speed of the tape in mm/second. (3 marks)

7 Apart from head rests (head restraint's), list 2 safety features built in to modern cars.

(a) (b) (1 mark)



Use the diagrams to explain in detail how a head restraint works to reduce the injuries in a car accident.

(4 marks)

9 The following statement appears in your textbook....

*Stopping distance = Reaction distance + Braking distance.*

**Explain** what this statement is saying about driving a car. (3 marks)

10 The diagram below shows a section of ticker-timer tape. The time between dots is 0.1 seconds.

Start Direction of pull

**.. .  .    .        .                .                                .                                                                .**

(a) Briefly describe the motion of the object. (1 mark)

(b) The table below is partly completed.

Complete the table by making measurements from the tape, and then calculating the speed.

|  |  |  |
| --- | --- | --- |
| Space Number | Distance in Space | Vav in Space |
| 1 | 0.1 cm | 1 cm/s |
| 2 | 0.2 cm | 2 cm/s |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |

(6 marks)

(c) On the grid, draw a graph of speed v time for the motion of the ticker tape. (7 marks)

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Speed

(cm/sec)

Time (sec)

5. A space shuttle has a mass of 1000 tonnes. When it takes off it reaches a speed of 600 m/s just 20 seconds after lifting off.

(a) Calculate the acceleration of the shuttle in the first 20 seconds. (2 marks)

(b) Calculate the average speed of the shuttle during the just 20 seconds. (2 marks)

(c) Calculate the distance that the shuttle travels in the first 20 seconds. (2 marks)