nelsonnet

Name:

Driving safely

- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (20 marks)
- Part B: 9 free-response questions (30 marks)

Part A

20 multiple-choice questions
1 mark each: 20 marks
Circle the correct answer.

1 A blood alcohol content (BAC) of 0.04 means the concentration of alcohol in the blood is:

A 4 mg/100 mL   **B** 0.04 g/100 mL

C 0.04 g/L   **D** 40 mg/L

2 Samantha weighs 55 kg. If 7% of Samantha's weight is blood, what is her blood volume?

A 3.85 L   **B** 38.5 L

C 385 mL   **D** 38.5 mL

3 Reece weighs 84 kg and he consumed five standard drinks in 4 hours. What is his BAC?

$$\text{BAC}_{male} = \frac{10N - 7.5H}{6.8\,M}$$

where:

N = number of standard drinks consumed

H = number of hours drinking

M = mass in kilograms

A 0.035   **B** 0.025

C 0.04   **D** 0.032

4 If one standard drink of white wine is 107 mL, how many standard drinks are equivalent to a 150 mL restaurant serve of white wine?

A 0.7 standard drinks

B 0.4 standard drinks

C 1.4 standard drinks

D 1.3 standard drinks

5 Rachel has a blood alcohol content of 0.03 and an hourly rate of decrease of alcohol content of 0.013. How long will it take for her BAC to reach zero?

A 2 hours 18 minutes

B 2 hours 30 minutes

C 3 hours

D 1 hour 18 minutes

6 Daniel's BAC, B, after drinking can be determined using the formula $B = 0.08 - 0.016N$, where N is the number of hours that have elapsed since drinking. What is Daniel's BAC after 3 hours and 15 minutes?

A 0.0296   **B** 0.208

C 0.2016   **D** 0.028

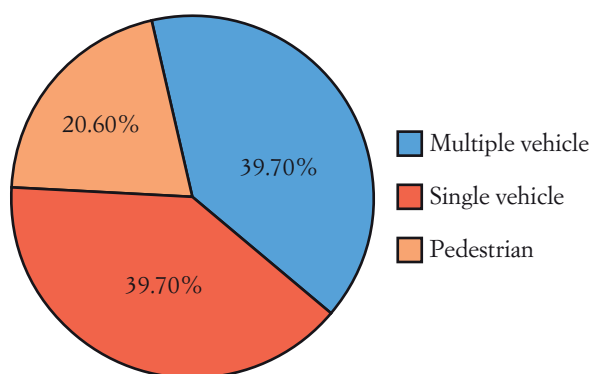**7** This table shows Holly's decline in BAC after drinking. What is the hourly rate of decrease?

Hours	0	0.5	1	1.5
BAC	0.06	0.051	0.042	0.033

A 0.009   **B** 0.018

C 0.09   **D** 0.18

8 This sector graph shows fatal road crash types in NSW in 2016.

Crash type	No. of fatal crashes
Multiple vehicle	143
Single vehicle	74
Pedestrian	143

Fatal crash types NSW 2016

Source: Bureau of Infrastructure, Transport and Regional Economics

The total number of crashes for the year was 360. How many of these were pedestrians?

A 74   **B** 20.6

C 72   **D** 80

9 Jeremy is driving a car and travelling at 50 km/h with a reaction time of 1.8 seconds. He sees a child 30 m ahead, recognises the danger and brakes. His braking distance can be calculated by the formula d (metres) $= 0.00435v^2$ (d metres, v km/h).

What is Jeremy's reaction-time distance?

A 90 m   **B** 30 m

C 26.47 m   **D** 25 m

10 What is Jeremy's stopping distance?

A 10.875 m   **B** 40.875 m

C 35.875 m   **D** 37.345 m

11 What is the normal speed limit on a suburban street?

A 40 km/h   **B** 50 km/h

C 60 km/h   **D** 70 km/h

12 Trisha drove 273 km from Tamworth to Port Macquarie in 3 hours and 25 minutes. What was her average speed?

A 84 km/h   **B** 80 km/h

C 78 km/h   **D** 79 km/h

13 Benson travelled 240 km at an average speed of 90 km/h. How long did the journey take?

A 2 hours and 45 minutes

B 2 hours and 50 minutes

C 2 hours and 40 minutes

D 2 hours and 42 minutes

14 Lavinia travelled at an average speed of 84 km/h for 1 hour and 50 minutes. How far did she travel?

A 154 km   **B** 134 km

C 160 km   **D** 158 km

Questions **15**, **16** and **17** refer to this table that shows the comparative risks for crashing at different speeds relative to 60 km/h.

Speed (km/h)	Risk relative to 60 km/h
65	Double
70	4 times
75	11 times
80	32 times

15 Maya is driving at a speed of 70 km/h. By how many times does her risk of a crash increase if she drives at 80 km/h instead?

A 8   **B** 10

C 32   **D** 28

16 If the chance of having a crash at 60 km/h is 0.0045, at which speed is the chance 0.009?

A 65 km/h   **B** 70 km/h

C 75 km/h   **D** 80 km/h

17 Which statement about the given table is false?

A This information could be represented on a column graph.

B The risk at 75 km/h is over 10 times the risk at 60 km/h.

C Increasing the speed by 5 km/h from 75 km/h more than doubles the chance of a crash.

D The risk of having a crash increases at a constant rate as the speed increases.

18 How far will a car travel in one second when travelling at 95 km/h?

A 32 m   **B** 26.4 m

C 16 m   **D** 19 m

19 Craig stepped on his brake after he saw a car stop suddenly in front of him. He avoided the collision, stopping just in time after travelling 68 m, including 41 m while braking. What was his reaction distance?

A 41 m   **B** 27 m

C 109 m   **D** 28 m

20 Filomena has a reaction time of 1.3 seconds. She is travelling at a speed of 14 m/s. What is Filomena's reaction distance?

A 10.8 m   **B** 15.3 m

C 18.2 m   **D** 18 m

Part B

9 free-response questions
30 marks
Show your working where appropriate.

21 The number of standard drinks consumed can be calculated using the formula:

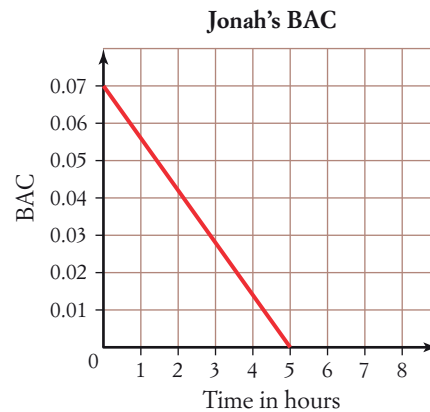$$N = V \times A \times 0.789$$

where

V = volume consumed, in litres

A = % alcohol by volume (mL/100 mL).

Mira consumes five cans (each 375 mL) of beer with 4.8% alcohol. How many standard drinks is this?

_____

_____

[2 marks]

22 This graph shows the rate of decrease of Jonah's BAC after he stopped drinking at 10 p.m.

Jonah's BAC

a What was Jonah's BAC at 10 p.m.?

_____

b At what time did Jonah's BAC return to zero?

_____

c When was Jonah's BAC 0.02?

_____

d What was Jonah's hourly rate of decrease of BAC?

_____

[4 marks]

23 Katie and Michael both weigh 72 kg and both consume 4 standard drinks in 4 hours. What is the difference (correct to 4 decimal places) in their BAC levels?

_____

_____

_____

_____

[2 marks]

24 Miriam and Ziad travel 135 km to the same town, leaving at the same time. Miriam averages 90 km/h and Ziad averages 100 km/h. How much earlier than Miriam will Ziad arrive?

_____

_____

[2 marks]

25 A car travels 18.5 metres in 0.8 seconds. Calculate its speed in km/h.

_____

_____

[2 marks]

26 The driving reaction times of a sample of 20 people are recorded in this table.

Reaction time (s)	1.3	1.4	1.5	1.7	2.3
Frequency	4	5	6	3	2

a What is the median reaction time?

_____

_____

b What is the mean reaction time?

_____

_____

c What percentage of people had a reaction time less than 1.6 s?

_____

_____

d What is the probability that a person chosen at random from this group will have a reaction time between 1.4 s and 2 s?

_____

[5 marks]

27 Tan is driving, travelling at 80 km/h on a wet road and has a reaction time of 1.5 s. He applies his brakes and stops 38 m later.

a What was his reaction distance, to the nearest metre?

_____

b What was his stopping distance?

_____

c The braking distance formula is $d = kv^2$, where v is the initial speed (in km/h) and d is the braking distance (in metres). Use the formula to find the value of k, correct to three significant figures.

_____

d State the braking distance, to the nearest metre, when travelling at 90 km/h under the same conditions.
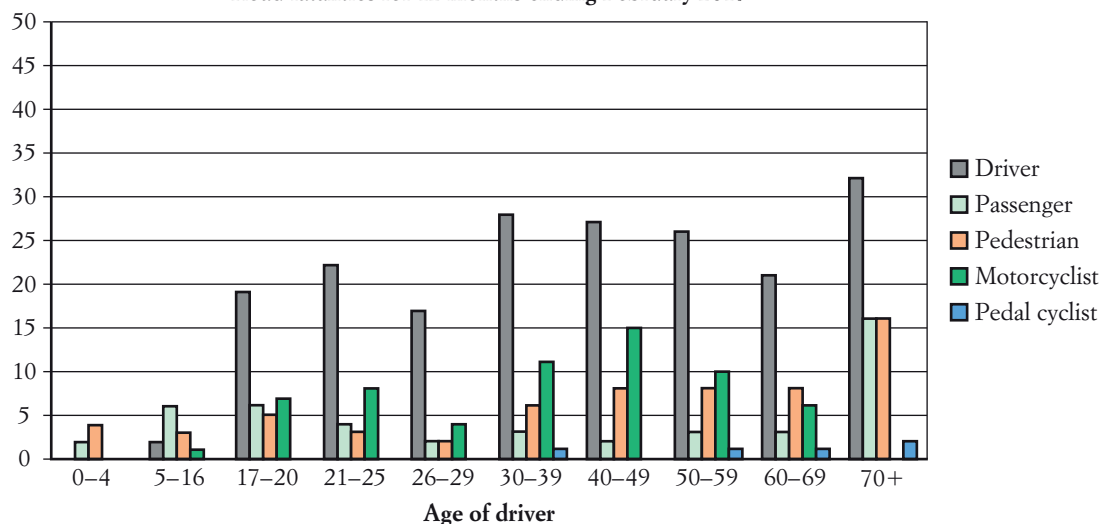
_____

_____

[5 marks]

28

Road fatalities for 12 months ending February 2017

Source: roadsafety.transport.nsw.gov.au

a Which age groups had the same number of passenger and pedestrian fatalities?

_____

b The total number of fatalities in the 40–49 years age group over the 12-month period was 52. What percentage of fatalities in this age group were motorcyclists?
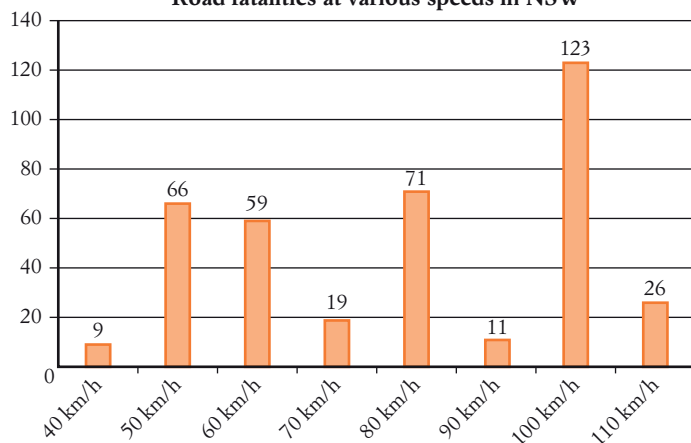
_____

c How many fatalities were there for motorcyclists aged 70+?

_____

[4 marks]

29

Road fatalities at various speeds in NSW

Bar chart showing road fatalities at various speeds: 40 km/h: 9, 50 km/h: 66, 60 km/h: 59, 70 km/h: 19, 80 km/h: 71, 90 km/h: 11, 100 km/h: 123, 110 km/h: 26

a What percentage of fatalities occurred at speeds of 80 km/h or more?

_____

b At what speed did the median number of fatalities occur?

_____

[4 marks]

This is the end of the test.
Use the back for extra working space.

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Answers
Part A

1	B	**2**	A	**3**	A	**4**	C
5	A	**6**	D	**7**	B	**8**	A
9	D	**10**	C	**11**	B	**12**	B
13	C	**14**	A	**15**	A	**16**	A
17	D	**18**	B	**19**	B	**20**	C

Part B

21 7.101

22 **a** 0.07

    b 3 a.m.

    c 3.5 hours

    d 0.014

23 0.0048

24 9 min

25 83.25 km/h

26 **a** 1.5

    b 1.545

    c 75%

    d $\dfrac{9}{20}$

27 **a** 33 m

    b 71 m

    c 0.005 94

    d 48 m

28 **a** 26–29, 70+

    b 28.8%

    c none

29 **a** 60.2%

    b 80 km/h