

M1. (a) (i)	E-F (ticked)	1
(ii)	B-C or D-E <i>accept both answers</i>	1
(b)	fast(er) <i>accept downhill</i>	1
	slow(er)	1
	force <i>do not accept distance</i>	1

[5]

M2.	(a)	53 (m)	1
	(b)	(i) Similar shape curve drawn <u>above</u> existing line going <u>through (0, 0)</u> <i>allow 1 mark for any upward smooth curve or straight upward line above existing line going through (0, 0)</i>	2
	(ii)	rain on road	1
		car brakes in bad condition	1
	(c)	(i) all three lines correctly labelled <i>allow 1 mark for one correctly labelled</i> top line – C <i>accept 1.2</i> middle line – B <i>accept 0.9</i> bottom line – A <i>accept 0.7</i>	2
	(ii)	any two from: <ul style="list-style-type: none"> • (table has) both variables are together <i>accept tired and music as named variables</i> • both (variables) could/ would affect the reaction time • cannot tell original contribution <i>accept cannot tell which variable is affecting the drive (the most)</i> • need to measure one (variable) on its own <i>accept need to test each separately</i> • need to control one of the variables 	2

- M3.** (a) MN
accept 5.8, 8 seconds must include unit 1
- (b) LM
accept 0.8, 5.8 seconds must include unit 1
- (c) (i) 0.8 1
- (ii) drinking alcohol 1
- (d) straight (by eye) line starting at 0.8 seconds 1
- line drawn steeper than LM starting before L
*ignore lines going beyond 2 seconds but line must exceed
 2.5 metres per second before terminating* 1

[6]

M4. (a) time 1
force 1

(b) any **three** from

- driver's reactions are slow(er)
*accept driver could have taken drugs
or alcohol or due to tiredness or
distractions*
- poor weather conditions
*accept raining or snowing or fog /
mist (poor visibility)*
- greater mass or weight
- poor road conditions
*oil / gravel / mud / leaves / wet / icy
going downhill*
- poorly maintained brakes
do not accept driver's weak foot force
- worn tyres

3

[5]

- M5.** (a) 96 (m) 1
- (b) (i) similar shape curve drawn above existing line going through (0,0)
allow 1 mark for any upward smooth curve or straight upward line above existing line going through (0,0) 2
- (ii) Rain on the road 1
- (c) (i) all three lines correctly labelled
allow 1 mark for one correctly labelled
- top line – **C**
accept 1.2
- middle line – **B**
accept 0.9
- bottom line – **A**
accept 0.7 2
- (ii) any **two** from:
- (table has) both variables are together
accept tired and music as named variables
 - both (variables) could / would affect the reaction time
accept cannot tell which variable is affecting the drive (the most)
 - cannot tell original contribution
 - need to measure one (variable) on its own
accept need to test each separately
 - need to control one of the variables
fair test is insufficient

2

[8]

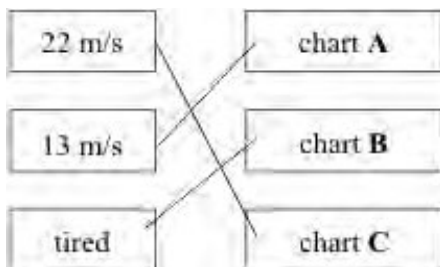
M6. (a) (i) constant

1

(ii) heat

1

(b) (i) 3 links correct



allow 1 mark for 1 correct link

if more than one line is drawn from a condition mark all lines from that condition incorrect

2

(ii) increased

1

[5]

- M7. (a) distance travelled under the braking force
accept braking (distance) 1
- (b) (directly) proportional
accept a correct description using figures
or
increase in the same ratio
eg if speed doubles then
thinking distance doubles
accept for 1 mark positive correlation
accept for 1 mark as speed
increases so does thinking distance
accept as one increases the other increases
accept as thinking distance increases speed increases 2
- (c) (i) control variable 1
- (ii) experiment done, student listens to music / ipod (etc) 1
- experiment (repeated), student not listening to music
for both marks to be awarded there must be a comparison 1
- (d) increase it
accept an answer which implies reactions are slower
*do **not** accept answers in terms of thinking distance only* 1
- (e) Y 1

[8]

M8. (a) The driver has been drinking alcohol.
reason only scores if this box is ticked 1

driver's reaction time increases
accept slower reactions
accept slower reaction time
or thinking distance / stopping distance increases
do not accept braking distance increases
or driver less alert
accept driver may fall asleep / be tired 1

(b) they are all variables that could affect outcome / results
accept specific effect of changing one of the variables
accept to make the test valid
ignore reliable 1

so data / barriers can be compared
accept to see which is / works best / safest
do not accept fair test on its own 1

(c) ticks in both the top and middle boxes 1

[5]

- M9.** (a) time *correct order only* 1
- force 1
- (b) The car tyres being badly worn 1
- (c) (i) braking distance increases with speed
accept positive correlation
*do **not** accept stopping distance for braking distance* 1
- relevant further details, eg
- but not in direct proportion
 - and increases more rapidly after 15 m/s
accept any speed between 10 and 20
accept numerical example
 - double the speed, braking distance increases $\times 4$ 1
- (ii) line drawn above existing line starting at the origin
as speed increases braking distance must increase
each speed must have a single braking distance 1
- (d) (i) reaction time / reaction (of driver) does not depend on speed (of car) 1
- (ii) (on the reduced speed limit roads) over the same period of time
accept a specific time, eg 1 year 1

monitor number of accidents before and after (speed limit reduced)

allow 1 mark only for record number of vehicles / cars using the (20 mph) roads or collect data on accidents on the (20 mph) roads

to score both marks the answer must refer to the roads with the reduced speed limit

1

[9]