KS3 Science

Pressure

Mark Scheme

Time available: 36 minutes
Marks available: 47 marks

Mark schemes

1.

(a) • 10

accept ' $\frac{5}{0.5}$ *' if the answer is not evaluated*

1 (L7)

• N/mm ^{2}

accept, for two marks, '10 ^{7} Pa'

'10 ^{7}' is insufficient

accept 'Nmm $^{-2}$'

*do **not** accept 'n' for 'N'*

1 (L7)

(b) • 5

accept '10 × 0.5' if the answer is not evaluated

1 (L7)

• N cm

accept 'cm N'

*do **not** accept 'n' for 'N'*

accept, for two marks, '0.05 Nm'

'0.05' is insufficient

1 (L7)

(c) • (weight = 200 × 0.05 =) 10

accept '(force = area × pressure =) 10'
*accept, for one mark, '0.05 × 200' if not evaluated **or** evaluated incorrectly*

award two marks for the correct numerical answer, whether or not correct working has been shown

*if the answer is incorrect, award one mark for a rearranged equation showing explicitly how to calculate weight or force e.g. 'force **or** weight = area × pressure'*

2 (L7)

[6]

2.

(a) chemical

accept 'potential'
*accept 'kinetic **or** movement'*

1 (L6)

(b) (i) 50 *J*

1 (L7)

(ii) any **one** from

*accept 'some energy **or** heat **or** sound is wasted'*
*'heat **or** sound **or** friction' are insufficient*

- energy is transferred as heat
  'some of the energy is lost' is insufficient
- energy is transferred as sound
- friction or air resistance slows it down
  accept 'as it is still falling, some is still gravitational'

1 (L7)

(c) any **two** from

- lift it to a greater height
  accept 'make the rod longer'
  *'change the height **or** mass' is insufficient*
- make the mass more streamlined **or** aerodynamic
  'make the rod bigger' is insufficient
  'drop it faster' is insufficient
- push the mass down
  accept 'push it'
  'push the rod down' is insufficient
- put grease **or** oil on the rod (to decrease friction)
  accept 'make the rod smoother'
  'use more force' is insufficient
  'make the rod thinner' is insufficient
  accept 'increase the mass'

2 (L7)

(d) A

***both** blade A, and the correct explanation*
are required for the mark

if you divide the force by a smaller area, the pressure will be larger

accept 'it has a smaller area (at that point)'
'it is more pointed' or 'is it sharper' are insufficient
'force is more concentrated' is insufficient

accept 'the force is more concentrated on a smaller area'
*do **not** accept 'there will be more force'*
*do **not** accept responses that refer to 'concentrated pressure'*

1 (L7)

[6]

3.

(a) (i)
- (molecules) are far apart **or** not touching each other

accept 'only gases can be compressed'

'the gas can be compressed' is insufficient as it is given in the question

accept 'they are randomly arranged'

1 (L7)

(ii)
- there is only one type of molecule **or** compound **or** substance

accept 'there is only one type of particle'

*do **not** accept 'there is only one type of atom **or** element'*

1 (L7)

(b) any **one** from

- the space **or** distance between the molecules **or** particles is smaller

accept 'the volume is less'

accept 'atoms' for 'particles'

- the particles **or** they are closer together
- more particles are touching the sides

accept 'particles hit the sides more often'

'the particles are hitting the sides' is insufficient

'if the gas is compressed the pressure rises' is insufficient

1 (L7)

(c) (i) any **one** from

- new **or** different compounds have formed

accept 'they are now joined in threes'
*accept 'new combinations of particles **or** atoms'*

- there is more than one compound

accept 'the compounds are different'
accept 'there is no longer a pure substance'

1 (L7)

(ii) any **one** from

- the same number of atoms are present

accept 'mass is conserved'

'the mass stays the same' is insufficient

- nothing has been added to **or** lost

'the same atoms are present' is insufficient
'nothing changed' is insufficient
'the amount of gas stays the same' is insufficient

1 (L7)

(iii) •

	NO	*accept 'ON'*
	N_2O	*accept 'ON $_2$'*
	NO_2	*accept 'O $_2$N'*

***all three** answers are required for the mark*

1 (L7)

(iv) • nitrogen oxide

accept 'nitrogen monoxide'

accept 'nitric oxide'

1 (L7)

[7]

4. (a) • 960.000

accept $\frac{192.000.000}{200}$

1 (L7)

• km/day **or** kilometres per day **or** km day^{-1}

accept '40.000 km/hr' for two marks

accept '11.1 km/s' for two marks

accept '11.111 m/s' for two marks

accept 'd' for 'day' and 'h' for 'hour'

*do **not** accept 'km pday'*

1

(b) • gravity on Mars is less

accept 'gravity is greater on Earth'

1 (L6)

(c) any **one** from

• Mars is further from the Sun

accept 'the Sun is closer to the earth'

• less light reaches Mars

accept 'the light rays have spread out more'

'Mars is further away' is insufficient

*do **not** accept 'less heat reaches Mars'*

1 (L7)

(d) • 1600

accept '40/0.025'

1 (L7)

• N/m^2 **or** Pa **or** Nm^{-2}

accept 'pascals'

*do **not** accept lower case 'n'*

1

[6]

5. (a) (i) • 100

accept '200 ÷ 2.0'

1 (L7)

• N/cm^2

*accept '10^6 N/m^2' **or** '10^6 Pa' for two marks*

1 (L7)

(ii) 800

accept '100 × 8'

*accept the numerical answer to **a i** × 8*
the unit is not required for the mark

1 (L7)

(b) (i) any **one** from

• air **or** gas can be compressed

accept 'gases are easier to compress'
*'air **or** gas provides less resistance' is insufficient*

• water **or** liquids cannot be compressed

• gaps between particles of

accept 'atoms can be compressed together'
*air **or** gas can be reduced*

1 (L6)

(ii) any **one** from

• less force would be transmitted to the brakes

accept 'the brakes have less effect'
'the brakes are spongy' is insufficient

• less pressure at B

accept 'less pressure could be produced'
*accept 'less **or** no resistance to the brakes'*

• piston B would not move

accept 'the air bubbles could be compressed'

1 (L7)

[5]

6. (a) (i) ice skate

accept 'skate'

1 (L3)

(ii) Tom's weight on the footwear ✓

if more than one box is ticked, award no mark

1 (L3)

(b) any **one** from

- they do not sink in
- they have a big surface

accept 'they are wide' ***or*** *'they are big'*

accept 'they spread out your weight'

*do **not** accept 'you won't get your feet stuck in the snow'*

accept 'they reduce the pressure'

*do **not** accept 'they spread out your pressure'*

1 (L3)

(c) friction

1 (L4)

[4]

7. (a) 25

accept '175 ÷ 7'

1 (L7)

(b) any **one** from

- greater than 27 N/cm^2

the unit is required for the mark

*do **not** accept '27 N/cm^2'*

- greater than the pressure in the tyre

accept any answer greater than 27 N/cm^2

1 (L7)

(c) 2850

1 (L7)

[3]

8. (a) (i) 450

1

Ncm

accept 'cmN'

accept '4.5 N m' for ***both*** *marks*

1

(ii) 300

the unit is not required for the mark

consequential marking applies

accept the numerical answer to (a) (i) ÷ 1.5 cm

1

(b) (i) 400 000

accept '40 N/m ^{2}' ***or*** *'40 Pa' for* ***both*** *marks*

1

N/cm^2

1

(ii) because the area of contact will increase

1

[6]

9. (a) (i) 40 N/cm^2

the unit is required for the mark

accept '400 000 Pa'

1

(ii) 200 N

the unit of force is required for the mark
consequential marking applies

accept numerical answer to (a)(i) × 5 cm^2

1

(b) (i) 200 N

the unit is required for the mark

1

(ii) 1600 N

the unit of force is required for the mark
consequential marking applies

accept numerical answer to (b) (i) × 8

1

[4]