AQA GCSE Physics | 8463

SPECIFICATION POINT 4.5.5.1.1

Pressure in a fluid 1

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**10**
Available paper years	**2013–2024**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.5.5.1.1 Pressure in a fluid 1

Answer 01 · Mark scheme

June 2013 | PH3FP | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
6(a)(i)	are incompressible		1
6(a)(ii)	in all directions		1
6(b)	1.6	allow **1** mark for correct substitution, ie $\frac{80}{50}$ provided no subsequent step shown an answer 0.032 gains **0** marks	2
6(c)	Pa		1
6(d)	increases		1
Total			**6**

4.5.5.1.1 Pressure in a fluid 1

Answer 01 · Mark scheme June 2013 | PH3FP | Original Q6 | Legacy

PH3FP

Answer 02 · Mark scheme June 2014 | PH3FP | Original Q5 | Legacy

The full source mark scheme begins on page 20. Follow original question 5 in that document.

4.5.5.1.1 Pressure in a fluid 1

Answer 03 · Mark scheme

June 2016 | PH3FP | Original Q3 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	The pressure at X is the same as at Y		1	AO1 3.2.3a
3(b)	larger than		1	AO1 3.2.3b
3(c)(i)	3 (N/mm^2)	accept 3 000 000 Pa (correct unit must be given) allow **1** mark for correct substitution, ie $\frac{24}{8}$ provided no subsequent step	2	AO2 3.2.3c
3(c)(ii)	pascal		1	AO1 3.2.3c
3(d)	the brakes would not work	allow the vehicle (car/bike etc) would not stop accept they would freeze solid **or** seize up	1	AO3 3.2.3
Total			6	

4.5.5.1.1 Pressure in a fluid 1

Answer 03 · Mark scheme

June 2016 | PH3FP | Original Q3 | Legacy



4.5.5.1.1 Pressure in a fluid 1

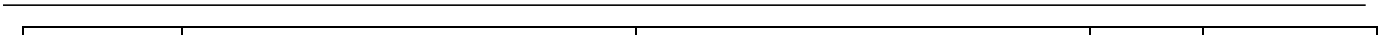
Answer 04 · Mark scheme June 2017 | PH3FP | Original Q3 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	It is almost incompressible.		1	AO1 3.2.3a
3(b)(i)	The (cross-sectional) area is directly proportional to the force	accept for **1** mark when the area increases the force increases **or** the pattern is linear **or** a description using numbers positive correlation is insufficient	2	AO3 3.2.3c
3(b)(ii)	0.5 N		1	AO3 3.2.3b
Total			**4**	

4.5.5.1.1 Pressure in a fluid 1

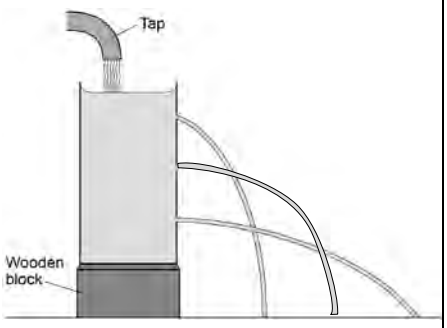
Answer 04 · Mark scheme

June 2017 | PH3FP | Original Q3 | Legacy



4.5.5.1.1 Pressure in a fluid 1

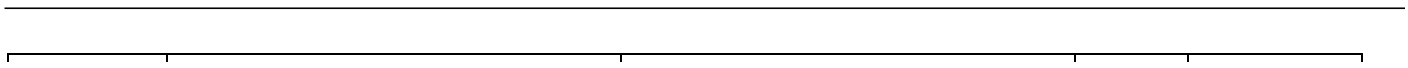
Answer 05 · Mark scheme June 2018 | 8463/2F | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	$p = \frac{27}{0.009}$ p = 3000 Pa	an answer of 3000 scores **2** marks	1 1 1	AO2 4.5.5.1.1 AO2 4.5.5.1.1 AO1 4.5.5.1.1
09.2		the water path hits the surface somewhere between the other two paths	1	AO3 4.5.5.1.2
09.3	pressure increases with depth	allow when the pressure is higher, the water travels further	1	AO3 4.5.5.1.1
09.4	pressure acts in all directions **or** pressure causes a force on (all) the surfaces	ignore liquids cannot be compressed	1	AO3 4.5.5.1.1
Total			**6**	

4.5.5.1.1 Pressure in a fluid 1

Answer 05 · Mark scheme

June 2018 | 8463/2F | Original Q9



4.5.5.1.1 Pressure in a fluid 1

Answer 06 · Mark scheme

November 2020 | 8463/1F | Original Q6

Question 6

Question	Answers		Mark	AO/ Spec. Ref
06.1	**Level 2:** The method would lead to the production of a valid outcome. Key steps are identified and logically sequenced.		3–4	AO3 4.3.3.2
	Level 1: The method would not necessarily lead to a valid outcome. Some relevant steps are identified, but links are not made clear.		1–2	
	No relevant content		0	
	Indicative content: • record the initial volume of air • record the initial pressure • push the plunger of the syringe • to decrease the volume of air • read the new value on the pressure gauge • record the new value of the volume • repeat for different volumes			
06.2	(when the volume is halved) the pressure doubles	allow for **1** mark when the volume is halved the pressure increases	2	AO3 4.3.3.2
06.3	kinetic energy speed		1 1	AO1 4.3.3.1
Total			**8**	

4.5.5.1.1 Pressure in a fluid 1

Answer 07 · Mark scheme

November 2021 | 8463/2F | Original Q8

Question 8

Question	Answers	Mark	AO/ Spec. Ref
08.1	**Level 2:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	3–4	AO1 4.5.6.3.3 4.5.6.3.4 4.1.1.2
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	
	No relevant content	0	
	Indicative content Factors • poor condition of tyres • poor road surface • wet or icy road • poor/worn brakes Explanation • because of decreased friction Factors • increased mass of car/passengers Explanation • increases kinetic energy of car • more work needs to be done to stop car • increases momentum of the car Factor • road slopes downhill Explanation • (a component of) gravity opposes the braking force • resultant (braking) force is reduced allow answers in terms of reducing braking distance throughout A single factor with no related explanation is insufficient to score a mark		

4.5.5.1.1 Pressure in a fluid 1

Answer 07 · Mark scheme

08.2	resultant force = mass × acceleration		1	AO1 4.5.6.2.2
08.3	7200 = 1600 × *a* $a = \frac{7200}{1600}$ *a* = 4.5 (m/s^2)	ignore negatives throughout	1 1 1	AO2 4.5.6.2.2
08.4	15 (m) 38 (m) = 53 (m)	two correct values identified allow the correct addition of a misread braking distance and /or a misread thinking distance taken from the graph	1 1	AO3 4.5.6.3.1
08.5	$p = \frac{F}{A}$		1	AO1 4.5.5.1.1
08.6	120 000 = $\frac{60}{A}$ $A = \frac{60}{120\,000}$ *A* = 0.0005 *A* = 5 (.0) × 10^{-4} m^2	 allow an answer given to 2 sig figs from an incorrect calculation using the given data	1 1 1 1 1	AO2 AO2 AO2 AO2 AO1 4.5.5.1.1
Total			**16**	

4.5.5.1.1 Pressure in a fluid 1

Answer 08 · Mark scheme

June 2022 | 8463/2F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	100 km		1	AO3 4.5.5.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	gas		1	AO1 4.5.5.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	90 000 (Pa)	allow 89 500 to 90 500	1	AO2 4.5.5.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	101 000 – 90 000 = 11 000 (Pa)	allow ecf from question **06.3**	1	AO2 4.5.5.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	the density of the air decreases the mass of air above the student decreases		1 1	AO2 4.5.5.2

4.5.5.1.1 Pressure in a fluid 1

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	$P = \frac{188\,000\,000}{2000}$ 94 000 (Pa)		1 1	AO2 4.5.5.1.1

Total Question 6		**8**

4.5.5.1.1 Pressure in a fluid 1

Answer 09 · Mark scheme

June 2023 | 8463/2F | Original Q9

Question 9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	perpendicular		1	AO1 4.6.1.1

Question	Answers	Mark	AO / Spec. Ref.
09.2	**Level 3:** The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.	5-6	AO3
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.	3-4	AO1
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1-2	AO1
	No relevant content	0	
	Indicative content **Method:** • heat the water / kettle • add an equal volume of (hot) water to each flask • insert a thermometer into each flask • record the initial temperature from both flasks OR • place an IR detector near each flask • the distance between the IR detector and the flask should be the same each time • record initial reading from IR detectors • (and) start a stop clock • record the temperatures / readings after 10 minutes from both flasks • calculate the change in temperatures / readings during the 10 minutes • compare the results to test the hypothesis to access level 3 the method must allow the correct consideration of a temperature decrease for both flasks or the correct comparison of IR detected from both flasks		4.6.2.2

4.5.5.1.1 Pressure in a fluid 1

Answer 09 · Mark scheme

June 2023 | 8463/2F | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.3	during the 1st minute there is the greatest temperature difference (between the hot water and the surroundings)	 allow highest temperature or hottest MP 2 dependent on scoring MP1	1 1	AO2 AO1 4.6.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.4	the temperature (increase / change after 10 minutes)	allow the final temperature do not allow temperature decrease	1	AO1 4.6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.5	black surfaces absorb more (infrared than white surfaces) matt surfaces absorb more (infrared) than shiny surfaces of the same colour	allow black surfaces have a greater temperature increase (than white surfaces) allow matt surfaces have a greater temperature increase than shiny surfaces of the same colour if no other marks scored, allow 1 mark for matt black surface is the best absorber and shiny white surface is the worst absorber if no other marks scored, allow 1 mark for matt black has the greatest temperature increase and shiny white has the smallest temperature increase	1 1	AO3 4.6.2.2 4.6.3.1

4.5.5.1.1 Pressure in a fluid 1

Answer 09 · Mark scheme

June 2023 | 8463/2F | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.6	pressure = $\frac{\text{force}}{\text{area}}$		1	AO1 4.5.5.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.7	area of base = 0.0144 (m^2)	do not allow this or subsequent marks unless base area is used	1	AO2 4.5.5.1.1
	$1500 = \frac{F}{0.0144}$	this mark may be awarded if base area is incorrectly calculated	1	
	$F = 1500 \times 0.0144$	this mark may be awarded if base area is incorrectly calculated	1	
	$F = 21.6$ (N)	this mark may be awarded if base area is incorrectly calculated allow 22 (N)	1	

Total Question 9	17

4.5.5.1.1 Pressure in a fluid 1

Answer 10 · Mark scheme

June 2024 | 8463/2F | Original Q7

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	$W = 25\,000 \times 9.8$ $= 245\,000$ (N)		1 1	AO2 4.5.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2	$p = \frac{1\,960\,000}{49}$ $= 40\,000$ Pa		1 1 1	AO2 AO2 AO1 4.5.5.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	B		1	AO1 4.5.5.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	$a = \frac{1.3 - 0.7}{5.0}$ $= 0.12$ (m/s^2)		1 1	AO2 4.5.6.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5	$\frac{0.21}{0.84} \times 100$ 25%		1 1	AO2 4.5.3

4.5.5.1.1 Pressure in a fluid 1

Answer 10 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.6	force (applied to the spring) = spring constant × extension **or** $F = k \times e$		1	AO1 4.5.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.7	$336 = k \times 0.21$ $\frac{336}{0.21} = k$ $k = 1600$ (N/m)		1 1 1	AO2 4.5.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.8	$v^2 - 0 = 2 \times 9.8 \times 0.95$ $v^2 = 18.62$ $v = 4.3150\ldots$ $= 4.3$ (m/s)	 allow $v = \sqrt{(18.62)}$ allow an answer correctly rounded to 2 significant figures from an incorrect calculation which uses the values in the question	1 1 1 1	AO2 4.5.6.1.5

Total Question 7	18

4.5.5.1.1 Pressure in a fluid 1

AQA

GCSE
PHYSICS

PH3FP
Mark scheme

4403
June 2014

Version: 1.0 Final

4.5.5.1.1 Pressure in a fluid 1

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from aqa.org.uk

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4.5.5.1.1 Pressure in a fluid 1

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; e.g. allow smooth / free movement.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

Quality of Written Communication and levels marking

In Question 9(a) candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

4.5.5.1.1 Pressure in a fluid 1

Question	Answers	Extra information	Mark	AO spec ref
1(a)	transmits absorbs	correct order	1 1	AO1 3.1.1b
1(b)	light	allow ultra violet **or** UV **or** infrared **or** IR **or** gamma	1	AO1 3.1.1b
1(c)	20	allow **1** mark for correct working, ie $\frac{60}{3}$ provided no subsequent step	2	AO2 3.1.1b
1(d)	Killing cancer cells		1	AO1 3.1.1b
Total			**6**	

4.5.5.1.1 Pressure in a fluid 1

MARK SCHEME – GCSE Physics – PH3FP – June 2014

Question	Answers	Extra information	Mark	AO spec ref
2(a)	3000	allow **1** mark for correct substitution, ie 600 × 5 provided no subsequent step	2	AO2 3.2.2b
2(b)	anticlockwise moment	must be both words	1	AO1 3.2.2c
2(c)(i)	3400	allow 3.4 kilo (newtons)	1	AO2 3.2.2c
2(c)(ii)	as the distance (of the girl from point A) increases, force F increases	allow gets bigger for increases force is (directly) proportional to distance will negate any correct response	1	AO3 4.5.3
Total			**5**	

4.5.5.1.1 Pressure in a fluid 1

Question	Answers	Extra information	Mark	AO spec ref
3(a)	<table><tr><th></th><th>Digital Camera</th><th>Eye</th></tr><tr><td>Cornea</td><td></td><td>✓</td></tr><tr><td>Lens</td><td>✓</td><td>✓</td></tr><tr><td>Pupil</td><td></td><td>✓</td></tr><tr><td>CCD</td><td>✓</td><td></td></tr></table>	ignore shaded row each correct row = **1** mark	3	AO1 3.1.4a, d
3(b)	long		1	AO1 3.1.4b
3(c)	lens A it is a concave / diverging lens	 this mark is only gained if lens A is stated any reference to lens material or mass of lens negates this mark allow it will focus light onto the retina	1 1	AO1 3.1, 3.1.4b
3(d)	The refractive index of the lens material		1	AO1 3.1.4f
3(e)	4	ignore any signs allow **1** mark for correct substitution, ie $\frac{1}{0.25}$ provided no subsequent step	2	AO2 3.1.4e

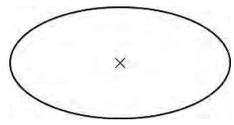
Question 3 continues on the next page . . .

4.5.5.1.1 Pressure in a fluid 1

Question 3 continued . . .

Question	Answers	Extra information	Mark	AO spec ref
3(f)	Cauterising open blood vessels		1	AO1 3.1.5f
3(g)	5	allow **1** mark for correct substitution, ie $\frac{70}{14}$ provided no subsequent step	2	AO2 3.1.3i
Total			**12**	

4.5.5.1.1 Pressure in a fluid 1

Question	Answers	Extra information	Mark	AO spec ref
4(a)	concentrated		1	AO1 3.2.1a
4(b)		judge by eye	1	AO2 3.2.1c
4(c)	C A D	3 correct = **2** marks 1 or 2 correct = **1** mark	2	AO1 3.2.1a
4(d)	Lower the athlete's seating position Move the wheels further apart		1 1	AO2 3.2
Total			**6**	

4.5.5.1.1 Pressure in a fluid 1

Question	Answers	Extra information	Mark	AO spec ref
5(a)	hydraulic		1	AO1 3.2.3
5(b)	9	allow **1** mark for a correct substitution, ie $\frac{1800}{200}$ provided no subsequent step	2	AO2 3.2.3c
5(c)	an environmental		1	AO3 SALoSE
Total			**4**	

4.5.5.1.1 Pressure in a fluid 1

Question	Answers	Extra information	Mark	AO spec ref
6(a)(i)	increase		1	AO3 3.3.1a, 4.5.4
6(a)(ii)	A and B and B and C	both required for the mark either order	1	AO3 3.3.1a, 4.5.4
6(a)(iii)	any **two** from: • size of nail **or** nail material • current • (size of) paper clip • length of wire	 allow (same) nail allow (same) cell allow p.d. same amount of electricity is insufficient accept type/thickness of wire	2	AO3 4.1b
6(b)	4 B picks up the same number as C, so this electromagnet would pick up the same number as A **or** direction of current does not affect the strength of the electromagnet	 allow it has got the same number of turns as A	1 1	AO3 3.3.1a, 4.5.4
6(c)	2	allow 1 or 3	1	AO3 3.3.1a, 4.5.4
Total			**7**	

4.5.5.1.1 Pressure in a fluid 1

Question	Answers	Extra information	Mark	AO spec ref
7(a)	(sound waves) which have a frequency higher than the upper limit of hearing for humans **or** a (sound) wave (of frequency) above 20 000 Hz	sound waves that cannot be heard is insufficient a wave of frequency 20 000 Hz is insufficient	1	AO1 3.1.2a
7(b)	640	an answer of 1280 gains **2** marks allow **2** marks for the correct substitution ie 1600 × 0.40 provided no subsequent step allow **2** marks for the substitution $\frac{1600 \times 0.80}{2}$ provided no subsequent step allow **1** mark for the substitution 1600 × 0.80 provided no subsequent step allow **1** mark for the identification that time (boat to bed) is 0.4	3	AO2 3.1.2c
7(c)	any **one** from: • pre-natal scanning / imaging • imaging of a named organ (that is not surrounded by bone), eg stomach, bladder, testicles • Doppler scanning blood flow	accept heart do **not** allow brain **or** lungs (either of these negates a correct answer)	1	AO1 3.1.2d

Question 7 continues on the next page . . .

4.5.5.1.1 Pressure in a fluid 1

Question 7 continued . . .

Question	Answers	Extra information	Mark	AO spec ref
7(d)	advantage any **one** from: • (images are) high quality or detailed or high resolution • (scan) produces a slice through the body • image can be viewed from any direction • an image can be made of <u>any</u> part (inside the body) • easier to diagnose **or** see a problem (on the image) disadvantage any **one** from: • (the X-rays used **or** scans) are <u>ionising</u> • mutate cells **or** cause mutations **or** increase chances of mutations • turn cells cancerous **or** produce abnormal growths **or** produce rapidly growing cells • kill cells • shielding is needed	clearer / better image is sufficient allow images are (always) 3D / 360° allow whole body can be scanned allow a description of what ionising is allow for cells: DNA / genes / chromosomes / nucleus / tissue damage cells is insufficient can be dangerous (to human health) unqualified, is insufficient	1 1	AO1 3.1
Total			**7**	

4.5.5.1.1 Pressure in a fluid 1

Question	Answers	Extra information	Mark	AO spec ref
8(a)	gravitational attraction (between the satellite and the Earth)	allow gravity allow weight of the satellite	1	AO1 3.2.4b
8(b)	any **two** from: • mass of satellite • speed / velocity (of satellite) • radius of orbit / circle	allow height above the Earth radius / height alone is insufficient	2	AO1 3.2.4c
8(c)(i)	increasing the height (above the Earth's surface) increases the time (for one orbit)	allow a positive correlation allow as one gets bigger, the other gets bigger, or vice versa ignore they are directly proportional	1	AO3 4.5.3
8(c)(ii)	there is no relationship / correlation		1	AO3 4.5.3
8(d)	Isaac Newton was a respected scientist who had made new discoveries before		1	AO3 3.2.4, SALoSE
Total			**6**	

Question	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.		Mark	AO spec ref
9(a)			6	
0 marks	**Level 1 (1–2 marks)**	**Level 2 (3–4 marks)**	**Level 3 (5–6 marks)**	AO1 3.3.2
No relevant / correct content.	**Either** there is an attempt at a description of the construction of a transformer **or** a correct statement of the effect of one type of transformer on the input p.d.	There is a description of the construction of a transformer **and** a correct statement of the effect of one type of transformer on the input p.d.	There is a clear description of the construction of a transformer **and** there is a correct description of how transformers affect the input p.d.	

details of construction:	extra information
a (laminated) core	
core is made from a magnetic material / iron	
2 coils	
the coils are made from an electrical conductor / copper	
the coils are covered in plastic / insulation	
the coils are (usually) on opposite sides	
step-up transformer has more turns on secondary coil than (its) primary (or vice versa)	
step-down transformer has less turns on secondary coil than (its) primary (or vice versa)	
effect on input p.d. :	
step-up transformer, the output p.d. is greater (than the input p.d.)	accept voltage for p.d.
step-down transformer, the output p.d. is lower (than the input p.d.)	

Question 9 continues on the next page . . .

4.5.5.1.1 Pressure in a fluid 1

Question 9 continued . . .

Question	Answers	Extra information	Mark	AO spec ref
9(b)	switch mode (transformer)		1	AO1 3.3.2j
Total			**7**	

4.5.5.1.1 Pressure in a fluid 1

Answer 05 · Examiner comments — June 2018 | 8463/2F | Original Q9

Question 9 (Low and Standard demand)

09.1 Nearly 90% of the students were able to complete the calculation correctly but far fewer (34%) knew the correct unit for pressure.

09.2 The majority of the students understood the information presented in the diagram and completed the missing water path correctly.

09.3 The majority of the students were able to conclude from the given diagram that liquid pressure increases with depth. Some of the students scored the mark by relating the increased liquid pressure to the distance that the water jets travelled.

09.4 The most common incomplete response was that liquids are incompressible. Very few appreciated that the pressure would act in all directions or that it would create a force on the sides of the container.

Answer 08 · Examiner comments — June 2022 | 8463/2F | Original Q6

Question 6 (Low demand)

06.1 Very few of the students could give a correct approximate depth of the Earth's atmosphere.

06.2 Most of the students chose the correct answer although 'Liquid' was a common incorrect choice.

06.3 Approximately three quarters of the students were able to read the correct value from the graph.

06.4 Few of the students seemed to understand what is meant by 'sea level'. As a consequence, they were not able to read a correct value from the graph. Only about 25% of students scored the mark.

06.5 Most of the students scored at least 1 mark, with about a quarter scoring both marks.

06.6 The calculation was well done with just over three quarters of the students scoring both marks. Where an error was made, it was usually with the 2000 m^2 with some students squaring the 2000 rather than realising it is part of the unit.

4.5.5.1.1 Pressure in a fluid 1

Answer 09 · Examiner comments — June 2023 | 8463/2F | Original Q9

09.1

12% of students gave the answer perpendicular or a correct description of perpendicular. Common incorrect responses included parallel, opposite, and proportional.

09.2

29% of responses were level 1 and 45% were level 2. Very few students explained the need to calculate the temperature change or to compare the readings on infrared detectors. A number of students suggested using cold water, or even described a different practical. Students were not penalised for using tiny volumes of water, but many students have no concept of how much 50 ml is, for example.

Answer 09 · Examiner comments — June 2023 | 8463/2F | Original Q9

09.3

Many students scored zero as they had selected the incorrect box. The reason had to state greatest/highest temperature, or the liquid was the hottest. A higher temperature or hotter liquid was insufficient to gain this mark. 21% of students scored both marks.

09.4

31% of students gained this mark. There seemed to be confusion as to which variable was the dependent variable. The majority of students gave control variables or the independent variable as their answer.

09.5

The most common response related to the matt black surface and the shiny white surface. This was awarded 1 mark. Some students did mention that black was the best absorber but failed to adequately describe the relative absorbance of matt versus shiny surfaces, as they did not explain this only applied for the same colour surface. Some students gave their response in terms of emission or reflection of IR radiation, both of which scored zero. Only 2% of students were able to give two meaningful conclusions.

09.6

90% of students correctly identified the formula for calculating pressure.

09.7

47% of students achieved full marks in this calculation. Many scored zero, as they calculated the total surface area, the volume or used the length of the cube.

4.5.5.1.1 Pressure in a fluid 1

Answer 10 · Examiner comments June 2024 | 8463/2F | Original Q7

07.1
Only a few students failed to gain 2 marks in this calculation of weight. Some had not substituted correctly, others tried to convert mass to grams.

07.2
58% of students scored all 3 marks for this calculation of pressure. The unit of area being m^2 seemed to confuse some students into squaring 49. Those scoring 2 marks tended to give an incorrect unit.

07.3
61% of students knew that the pressure in a fluid causes a force normal to the surface.

07.4
Students were expected to calculate the change in velocity to find the acceleration. Many did not calculate the change but just used one of the velocities given in the question. 78% scored both marks.

07.5
A percentage calculation which proved to be too difficult for many students. A common answer was 75% instead of 25%.

07.6
Even though all students had access to the Physics Equations Sheet, 3% did not write down any equation. 7% quoted the wrong equation.

07.7
Well answered calculation of spring constant with 77% getting all 3 marks. Some students struggled to rearrange the equation. Some tried to use the elastic potential energy equation.

07.8
24% of students gained all 4 marks for this velocity calculation. Those who didn't usually did not show a full substitution into the equation, and calculated 2*as*, thinking this was the final answer.

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Answer 10 · Examiner comments June 2024 | 8463/2F | Original Q7

08.176% of students gave an incorrect value of resolution for the protractor. Answers of 10, 90 and 180 degrees were commonly seen.