Mark Scheme
(Results)

Summer 2026
Pearson Edexcel GCEInPhysics
(9PH0) Paper01: AdvancedPhysics I

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2026
Question Paper Log Number P79068A
Publication Code 9PH0_01_2606_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Mark scheme notes

Underlying principle
The mark scheme will clearly indicate the concept that is being rewarded, backed up by examples. **It is not a set of model answers.**

1. Mark scheme format

1.1 You will not see 'wtte' (words to that effect). Alternative correct wording should be credited in every answer unless the MS has specified specific words that must be present. Such words will be indicated by underlining e.g. 'resonance'

1.2 Bold lower case will be used for emphasis e.g. '**and**' when two pieces of information are needed for 1 mark.

1.3 Round brackets ( ) indicate words that are not essential e.g. "(hence) distance is increased".

1.4 Square brackets [ ] indicate advice to examiners or examples e.g. [Do not accept gravity] [ecf].

2. Unit error penalties

2.1 A separate mark is not usually given for a unit but a missing or incorrect unit will normally mean that the final calculation mark will not be awarded.

2.2 This does not apply in 'show that' questions or in any other question where the units to be used have been given, for example in a spreadsheet.

2.3 The mark will not be awarded for the same missing or incorrect unit only once within one clip in epen.

2.4 Occasionally, it may be decided not to insist on a unit e.g the candidate may be calculating the gradient of a graph, resulting in a unit that is not one that should be known and is complex.

2.5 The mark scheme will indicate if no unit error is to be applied by placing brackets around the unit.

3. Significant figures

3.1 Use of too many significant figures in the theory questions will not prevent a mark being awarded if the answer given rounds to the answer in the MS.

3.2 Too few significant figures will mean that the final mark cannot be awarded in 'show that' questions where one more significant figure than the value in the question is needed for the candidate to demonstrate the validity of the given answer.

3.3 The use of one significant figure might be inappropriate in the context of the question e.g. reading a value off a graph. If this is the case, there will be a clear indication in the MS.

3.4 The use of $\boldsymbol{g}$ = 10 m s^{-2} or 10 N kg^{-1} instead of 9.81 m s^{-2} or 9.81 N kg^{-1} will be penalised by one mark (but not more than once per clip). Accept 9.8 m s^{-2} or 9.8 N kg^{-1}

3.5 In questions assessing practical skills, a specific number of significant figures will be required e.g. determining a constant from the gradient of a graph or in uncertainty calculations. The MS will clearly identify the number of significant figures required.

4. Calculations

4.1 **use of** the formula means that the candidate demonstrates substitution of physically correct values, although there may be conversion errors e.g. power of 10 error.

4.2 If a 'show that' question is worth 2 marks, then both marks will be available for a reverse working. If the question is worth 3 marks then only 2 marks will be available.

4.3 The mark scheme will show a correctly worked answer for illustration only.

5. Quality of Written Expression

5.1 Questions that asses the ability to show a coherent and logically structured answer are marked with an asterisk.

5.2 Marks are awarded for indicative content and for how the answer is structured.

5.3 Linkage between ideas, and fully-sustained reasoning is expected.

Question Number	Answer	Mark
1	**The only correct answer is C (0.21 V is the rms value of 3 V and the frequency is 50 Hz)** A is not correct because 0.15 V is not the rms value of V B is not correct because 0.15 V is not the rms value of V and the frequency is not 100 Hz D is not correct because the frequency is not 100 Hz	**1**
2	**The only correct answer is B (the base units of energy can be derived using $E_k = \frac{1}{2}mv^2$ which gives kg ^{2} m s^{-2})** A is not correct because these are the base units of momentum C is not correct because N is not a base unit D is not correct because W is not a base unit	**1**
3	**The only correct answer is A (the field is radial and directed towards O)** B is not correct because the field is radial but not directed away from O C is not correct because the field is not uniform D is not correct because the field is not uniform	**1**
4	**The only correct answer is C ($mc^2 = 4.8\times10^6\times1.6\times10^{-19}$ J $m = \frac{4.8\times10^6\times1.6\times10^{-19}}{9\times10^{16}}$ kg)** A is not correct because the conversion of c^2 and eV are incorrect B is not correct because the conversion of MeV is incorrect D is not correct because 3×10^8 should be squared	**1**
5	**The only correct answer is D ($P = W/2$ Moments around the hinge $P\times l\cos\theta = W\times_2 \frac{l}{}\cos\theta$)** A is not correctbecause the cos angle is the same for both forces so cancels B is not correctbecause the cos angle is the same for both forces so cancels C is not correctbecause the “2” is incorrectly positioned	**1**

6	**The only correct answer is B (as lepton number is not conserved)** A is not correct because this is possible as lepton number (0) conserved C is not correct because this is possible as lepton number (0=−1+1) conserved D is not correct because this is possible as lepton number (0=1−1) conserved **The only correct answer is B (the internal resistance of a cell increases over time)**	**1**
7	A is not correct because the e.m.f. would stay the same C is not correct because the resistance of the bulb would decrease as the filament cools D is not correct because the terminal potential difference would decrease	**1**
8	**The only correct answer is D (The only force acting on the electron is due to the electric field and is vertical)** A is not correct because the only force is due to the electric field and will be vertical B is not correct because the only force is due to the electric field and will be vertical C is not correct because the only force is due to the electric field and will be vertical	**1**
9	**The only correct answer is B (Q and R are equal and opposite, the same type, and act on different bodies)** A is not correct because $P=Q$ but these forces act on the same object so cannot be a Newton third law pair C is not correct because these forces act on the same object so cannot be a Newton third law pair D is not correct because the two forces are a different type so cannot be a Newton third law pair	**1**
10	**The only correct answer is A (the loop moves to the left to reduce the change in flux linkage in the loop)** B is not correct because the loop moves to the left to *maintain* the flux linkage in the loop C is not correct because if the loop moved to the right then this would *increase* the change in flux linkage in the loop D is not correct because if the loop moved to the right then this would *increase* the change in flux linkage in the loop	**1**

Question Number	Acceptable Answer	Additional Guidance	Mark
11(a)	An explanation that makes reference to the following points: • Number of conduction electrons increases **Or** More electrons become free **(1)** • So resistance decreases (with increased light level) **(1)** MP2 dependent on MP1	Accept more electrons in conduction band	**2**
11(b)(i)	An explanation that makes reference to the following points: • (As resistance decreases as getting lighter) the potential difference across the LDR decreases **(1)** **Or** current in circuit increases • So V_{out} increases as its gets lighter **(1)** MP2 dependent on MP1 ecf from (a) if LDR resistance stated as increasing with light level	Accept reference to a potential divider circuit in terms of share of pd or ratios of resistors	**2**
11(b)(ii)	An answer that makes reference to the following point: • To alter the light level required (at which the alarm clock is switched on) **(1)**	Accept To change the threshold voltage (at which alarm clock is switched on	**1**

(Total for Question 11 = 5 marks)

Question Number	Acceptable Answer	Additional Guidance	Mark
12(a)	An explanation that makes reference to the following points: • Current (in coil) produces a magnetic field / flux **(1)** • a.c. leads to changing (magnetic) field / flux **(1)** • Induces an e.m.f. in (waste) metal **(1)** • Leads to current (in waste metal so gets hot) **(1)** MP4 dependent on MP3		**4**
12(b)	An explanation that makes reference to the following points: • High frequency gives large rate of change of flux linkage **(1)** • Leads to a large/increased e.m.f / current (in the waste metal) **(1)** MP2 dependent on MP1	Accept the change occurs in a shorter time	**2**

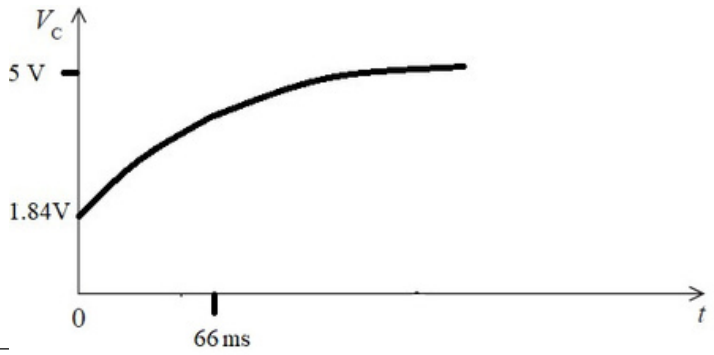
(Total for Question 12 = 6 marks)

Question Number	Acceptable Answer		Additional Guidance	Mark
13(a)	• Calculate cross-sectional area using $A=\pi r^2$	**(1)**	Example of calculation $A = \pi\ 0.06^{\ 2} = 0.0113\ \text{m}^2$	**3**
	• Use of $R=\frac{\rho l}{A}$	**(1)**	$\rho = \frac{4400\ \Omega \times 0.0113\ \text{m}^2}{0.20\ \text{m}}$	
	• Resistivity = 250 (Ω m)	**(1)**	ϱ=249 Ω m	
13(b)	An explanation that makes reference to the following points:			**2**
	• This could be a result of air / water / damp / moisture within the concrete	**(1)**	Accept different substances	
	• Air will increase the resistance **Or** water will decrease resistance	**(1)**	Accept The number density of conduction electrons can change	
13(c)	An answer that makes reference to the following points:		If "unknown" for length or area then give maximum 1 mark if no other credit worth response	**2**
	• The (cross-sectional) area is not constant	**(1)**		
	• The length of the current "lines / paths" varies	**(1)**		

(Total for Question 13 = 7 marks)

Question Number	Acceptable Answer		Additional Guidance	Mark
14(a)	• Use of $s=ut+\frac{1}{2}at^2$ with $a = 0$	**(1)**	Example of calculation $3.60\ \text{m s}^{-1} = \frac{1.09\text{m}}{t}$ $t=0.303\ \text{s}$ $y=4.40\ \text{m s}^{-1} \times 0.303\ \text{s} - \frac{1}{2}g\ (0.303\ \text{s})^2$ $y = 0.883\ \text{m}$	**3**
	• Use of $s=ut+\frac{1}{2}at^2$ with a direction opposite to u	**(1)**		
	• Height of ball = 0.883 (m) (at least 3 sig figs)	**(1)**		
14(b)	• Use of trig to determine angle of launch	**(1)**	Use of ratios to find the initial height could gain MP1 and MP2 Example of calculation Angle of launch (to horizontal) $= \tan^{-1}\frac{14.40\ \text{m s}^{-1}}{3.60\ \text{m s}^{-1}} = 50.7^\circ$ Initial height of monkey $= 1.09\ \text{m} \times \tan 50.7^\circ = 1.332\ \text{m}$ Distance monkey falls $= \frac{1}{2}g\ (0.303\ \text{s})^2 = 0.45\ \text{m}$ Height of monkey off floor = 1.332 m – 0.45 m = 0.882 m Alternative $\frac{1}{2}g\ t^2 = 1.332\ \text{m} - 0.88\ \text{m}$ Time = 0.303 s	**4**
	• Use of launch angle to determine initial height of monkey	**(1)**		
	• Use of $s=ut+\frac{1}{2}at^2$ with $u = 0$ to find vertical height fallen in 0.303 s ecf value of time from (a) to award MP3	**(1)**		
	• The height of the monkey is 0.88(2) m so ball hits monkey **Or** Height of ball is greater than 0.88 m so monkey is not hit by ball	**(1)**		
	Alternative to MP3 and MP4 • Use of $s=ut+\frac{1}{2}at^2$ with $u = 0$ to find time for monkey to fall vertical height of 1.33(2) m − 0.88 m • The time of fall of the monkey is 0.30(3) s so ball hits monkey			

(Total for Question 14 = 7 marks)

Question Number	Acceptable Answer		Additional Guidance	Mark
15(a)(i)	• Useof time constant $=RC$ **Or** $\ln V = \ln V_0 - t/RC$ • time= 33 (ms) (answerneeds to be to at least 2 sig fig)	**(1)** **(1)**	Example of calculation $T = 2.2\times10\,\Omega\times15\times10^{-6}$ F **Or** $\ln\frac{5}{e} = \ln 5 - t/2.2\times10^{3}\,\Omega\times15\times10^{-6}$ F $1 = t/2.2\times10^{3}\,\Omega\times15\times10^{-6}$ F t =0.033 s	**2**
15(a)(ii)	• An attempt at an exponential growth curve • Curve flattens (at 5V) (dependent on MP1) • At time zero V_C is approximately 1/3 of 5V **Or** At time zero V_C is 1.84 (V) **Or** At time zero V_C marked as $5/e$ • The curve should cut through approx. 4 V point at 66 ms **Or** fully charges at about $4RC/5RC$ where RC is 66 ms (allow ecf from (i) or use of "show that" value to give 60 ms)	**(1)** **(1)** **(1)** **(1)**	5Vneeds to be marked on y axis to award first alternative Example of calculation Time constant = 2 × 33 ms = 66 ms The potential at 66 ms will be about $\frac{2}{3}\times(5\text{V} - 1.84\text{ V}) + 1.84\text{ V} = 3.9\text{V}$ $4RC = 260$ ms to $5RC = 330$ ms Example of graph To gain MP3 must see either of the values on V axis To gain MP4 must see 66 / 60 ms / between 260 ms and 330 ms on t axis  	**4**

15(b)	• Use of combining resistors in series **(1)** • Use of combining resistors in parallel **(1)** • Mathematics correct to a value of 2.2 (kΩ) so yes student is correct **(1)**	Example of calculation Two resistors in series 3.3 + 3.3 = 6.6 kΩ One in parallel with two in series $\frac{1}{R} = \frac{1}{6.6} + \frac{1}{3.3} = \frac{1+2}{6.6}$ $R = \frac{6.6}{3} = 2.2$ kΩ	**3**

(Total for Question 15 = 9 marks)

<table>
<tr><th>Question Number</th><th>Acceptable Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr>
<td>*16(a)</td>
<td>
This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.
Total marks awarded is the sum of marks for indicative content and the marks for structure and lines of reasoning.
<table>
<tr><th>IC points</th><th>IC mark</th><th>Max linkage mark</th><th>Max final mark</th></tr>
<tr><td>6</td><td>4</td><td>2</td><td>6</td></tr>
<tr><td>5</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td>4</td><td>3</td><td>1</td><td>4</td></tr>
<tr><td>3</td><td>2</td><td>1</td><td>3</td></tr>
<tr><td>2</td><td>2</td><td>0</td><td>2</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
Indicative content:
IC1 Most alpha particles pass through (the atom) undeflected

IC2 A few alpha particles are scattered/deflected (through a small angle)

IC3 Very few alpha particles are scattered/deflected through a wide angle

IC4 This shows the atom is mainly empty space

IC5 This shows (almost all) the mass of an atom is concentrated in a small/tiny space

IC6 there is a charged nucleus
</td>
<td>
Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.
The following table shows how the marks should be awarded for indicative content.
<table>
<tr><th>Number of indicative points seen in answer</th><th>Number of marks awarded for indicative points</th></tr>
<tr><td>6</td><td>4</td></tr>
<tr><td>5-4</td><td>3</td></tr>
<tr><td>3-2</td><td>2</td></tr>
<tr><td>1</td><td>1</td></tr>
<tr><td>0</td><td>0</td></tr>
</table>
<table>
<tr><th></th><th>Number of marks awarded for structure and lines of reasoning</th></tr>
<tr><td>Answer shows a coherent and logical structure with linkage and fully sustained lines of reasoning demonstrated throughout</td><td>2</td></tr>
<tr><td>Answer is partially structured with some linkages and lines of reasoning</td><td>1</td></tr>
<tr><td>Answer has no linkage between points and is unstructured</td><td>0</td></tr>
</table>
Accept for IC3 small number for very few or about 1 in 8000 scattered through an angle of more than 90º (allow any number 6000-10000)

Accept for IC5 the (radius of the) nucleus is about 10 000 times smaller than an atom
</td>
<td>6</td>
</tr>
</table>

16(b)	• Use of $p = mv$ with a correct atomic mass **(1)** • Use of momentum conservation **(1)** • Recoil velocity of gold atom = $0.04u$ **(1)**	Example of calculation $4u = 197v - 4 \times 0.97u$ So $v = \frac{7.88u}{197} = 0.04u$	**3**

(Total for Question 16 = 9 marks)

Question Number	Acceptable Answer	Additional Guidance	Mark
17(a)	• Charge on p is same magnitude as charge on e **(1)** • Use of $F = \frac{1}{4\pi\varepsilon_0}\frac{Q1Q_2}{r2}$ **(1)** • Use of $F = \frac{mv^2}{r}$ **(1)** • $v = 2.2 \times 10^6$ (m s^{-1}) (answer to at least 2 sig fig) **(1)**	Example of calculation $F = \frac{1}{4\pi 8.85\times 10^{-12}\ \text{F m}^{-1}}\frac{(1.6\times 10^{-19})\ \text{C}^2}{(5.29\times 10^{-11})\ \text{m}^2}$ $F = 8.226 \times 10^{-8}$ N $F = 8.226\times 10^{-8}\ \text{N} = \frac{9.11\times 10^{-31}\ \text{kg}\ v^2}{5.29\times 10^{-11}\ \text{m}}$ $v = 2.19 \times 10^6$ m s^{-1}	**4**
17(b)(i)	An answer that makes reference to the following point: • Because energy would have to be supplied to remove the electron **(1)**	Accept work is done to remove the electron	**1**
17(b)(ii)	• Use of $Ek = \frac{1}{2}mv^2$ **(1)** • Use of $V = \frac{1}{4\pi\varepsilon 0 r}\frac{Q}{}$ **(1)** • Use of $V = \frac{W}{Q}$ **(1)** • Total energy = (−)2.2 × 10^{-18} (J) so agrees with measurement **Or** Total energy = (−)2.2 × 10^{-18} (J) compared with (−)2.2 × 10^{-18} (J) **(1)** • (allow ecf from (a) show that value gives 2.5 × 10^{-18} J so does not agree with measurement) **Or** Total energy = (−)2.5 × 10^{-18} (J) compared with (−)2.2 × 10^{-18} (J)	Example of calculation $Ek = \frac{1}{2} \times 9.11 \times 10^{-31}\ \text{kg} \times (2.19 \times 10^6)^2\ (\text{m s}^{-1})^2$ $Ek = 2.18 \times 10^{-18}$ J $V = \frac{1}{4\pi 8.85\times 10^{-12}\ \text{F m}^{-1}}\frac{1.6\times 10^{-19}\ \text{C}}{(5.29\times 10^{-11}\ \text{m}}$ Electricpotentialenergy=27.2 × −1.6 × 10^{-19}C =−4.35 × 10^{-18} J Total = −4.35 × 10^{-18} J+2.18 × 10^{-18} J = (−)2.17 × 10^{-18} J	**4**

(Total for Question 17 = 9 marks)

Question Number	Acceptable Answers	Additional Guidance	Mark
18(a)(i)	• Into the page **(1)**		**1**
18(a)(ii)	An explanation that makes reference to the following points: • Measure radius (of curvature of the path of the proton) **(1)** • Use scale of diagram to find actual radius **Or** The charge on the proton is known **(1)** • (determine momentum using) $p=Bqr$ **(1)**		**3**
18(b)	An explanation that makes reference to the following points: • Curves in the opposite direction to the proton **(1)** • As proton is positive (the muon must be negative) **(1)** MP2 dependent on MP1	Alternative: Apply FLHR As field into page and force is upwards then current is in opposite to direction of movement so muon must be negative	**2**
18(c)	An answer that makes reference to the following points: • Correct symbols for the neutrino and pion **(1)** • Correct charges and p either side of equation **(1)**	$\nu + p \longrightarrow p + \pi^{+} + \mu^{-}$ Ignore 0 next to neutrinoand any incorrect charge next to pion Allow +1 next to π and−1next to μ Allow +1 or 1 or + nexttop and 0 next to neutrino	**2**
18(d)	First row: • baryon **(1)** • (A baryon is) three quarks **(1)** Second row:	Alternatives: acted on by the strong force **Or** a type of hadron	

	• lepton **(1)** • (A lepton is) a fundamental particle **(1)**	Alternatives: interacts via the weak force	**4**

18(e)	An explanation that makes reference to the following points: • Mass–energy is conserved **(1)** • The (mass of the) muon and pion are created from the (kinetic) energy of the neutrino **(1)** • Excess energy becomes kinetic energy of the particles after the collision **(1)**	Accept mass–energy are interconvertible / equivalent	**3**

(Total for Question 18 = 15 marks)

Question Number	Acceptable Answer	Additional Guidance	Mark
19(a)	• Tangent drawn at $t = 30$ s **(1)** • Base of triangle used larger than 30 s **(1)** • Acceleration = 0.1 ms^{-2} range 0.09 to 0.11 ms^{-2} **(1)**	Example of calculation Gradient at 30 s = 5 m s^{-1} / 51 s = 0.1 m s^{-2}	**3**
19(b)	An explanation that makes reference to the following points: • Resultant force = driving force – resistive force **(1)** • As velocity increases resistive force increase **(1)** • Initial acceleration is high/maximum as resistive force are small **Or** acceleration decreases as resultant force decreases **Or** acceleration decreases as resistive force increases **(1)** • Eventually velocity is constant because resultant force = 0 **Or** eventually velocity is constant because driving force = resistive force **(1)**	Allow rate of change of velocity for acceleration Accept there is a resultant force because driving force is greater than resistive force Accept accelerates for velocity increases Accept acceleration = 0 as alternative to velocity is constant	**4**
19(c)	• Attempt to determine area under graph **(1)** • Use of average speed = total distance / time **(1)** • Average speed = 6.7 (ms^{-1}) (range 6.4 to 7.0 m s^{-1}) so display is/isn't accurate **(1)**	Example of calculation e.g. triangle + rectangle + 10 squares 1 $\frac{1}{2}$ 40×8.7+20×9+10×1×5 =404 m Average speed = 404 m / 60 s = 6.73 m s^{-1}	**3**

19(d)	• Use of $\Delta E_{grav}=mg\Delta h$ **(1)** • Use of $P=E/t$ **(1)** • Power = 320 (W)so accurate **(1)** **OR** • Resolves parallel to slope • Use of $W=Fd$ and $P=W/t$ • Power = 320 (W) so accurate	Example of calculation Increase in height per second = $\frac{9}{18}$ m Rate of increase in GPE =65kg × 9.81 m s $^{-2}$ × $\frac{9}{18}$ m =319 W **OR** $\theta=\tan^{-1}\frac{1}{18}=3.18$ F=65 kg×9.81 m s^{-2}sin3.18 = 35.4 N P=35.4 N×9m s^{-1}=318 N	**3**

(Total for Question 19 = 13 marks)

TOTAL FOR PAPER = 90 MARKS

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom