

## IGCSE DA Physics 4437 3F Mark Scheme (Results) Summer 2008

**IGCSE** 

IGCSE DA Physics 4437 3F



## 4437-3F MARK SCHEME

Abbreviations used in mark scheme:

OWTTE - or words to that effect dop - depending on previous ecf - error carried forward ora - or reverse argument sfs - start from scratch

UP - unit penalty

| Question<br>Number | Correct Answer | Acceptable<br>Answers | Reject | Mark |
|--------------------|----------------|-----------------------|--------|------|
| 1 (a)(i)           | P              | р                     |        | (1)  |

| Question  | Correct Answer | Acceptable | Reject | Mark |
|-----------|----------------|------------|--------|------|
| Number    |                | Answers    |        |      |
| 1 (a)(ii) | Q              | q          |        | (1)  |
|           |                |            |        |      |

| Question<br>Number | Correct Answer | Acceptable<br>Answers | Reject | Mark |
|--------------------|----------------|-----------------------|--------|------|
| 1 (a)(iii)         | Q and R        | q and r<br>either     |        | (1)  |
|                    |                | order                 |        | (-)  |

| Question<br>Number | Correct Answer  | Acceptable<br>Answers | Reject         | Mark |
|--------------------|---|-----------------------|----------------|------|
| 1 (b)(i)           | sloping   |                       | sloping<br>and | 1    |
|                    | straight  |                       | horizontal     | 1    |
|                    | independent marks but sloping and horizontal scores (0) |                       |                | (2)  |

| Question<br>Number | Correct Answer    | Acceptable<br>Answers | Reject | Mark |
|--------------------|-------------------|-----------------------|--------|------|
| 1 (b)(ii)          | horizontal        |                       |        |      |
|                    | ignore 'straight' |                       |        | (1)  |

| Question<br>Number | Correct Answer   | Acceptable<br>Answers | Reject | Mark |
|--------------------|--|-----------------------|--------|------|
| 1 (c)              | less distance (travelled in section R than in section P) |                       |        | (1)  |

(Total 7 marks)

| Question<br>Number | Correct Answer                           | Acceptable<br>Answers                         | Reject | Mark     |
|--------------------|--|---|--------|----------|
| 2 (a)(i)           | long                                     | allow answers to (i) and (ii) in either order |        | (1)      |
|                    |  | order   |        | (1)      |
| Question<br>Number | Correct Answer                           | Acceptable<br>Answers                         | Reject | Mark     |
| 2 (a)(ii)          | frayed                                   |   |        | (1)      |
|                    |  |   |        |          |
| Question<br>Number | Correct Answer                           | Acceptable<br>Answers                         | Reject | Mark     |
| 2 (b)              | stray wire(s)                            |   |        | (1)      |
| _                  |  |   |        |          |
| Question<br>Number | Correct Answer                           | Acceptable<br>Answers                         | Reject | Mark     |
| 2 (c)(i)           | plastic (casing)                         |   |        | (1)      |
|                    |  |   | T = .  | 1        |
| Question<br>Number | Correct Answer                           | Acceptable<br>Answers                         | Reject | Mark     |
| 2 (c)(ii)          | small/low current                        |   |        | (1)      |
|                    |  |   |        |          |
| Question<br>Number | Correct Answer                           | Acceptable<br>Answers                         | Reject | Mark     |
| 2 (d)              | * circuit breaker<br>* double insulation | either one                                    |        | (1)      |
| <u> </u>           | 1  | <b>'</b>                                      | (Total | 6 marks) |

| Question | Correct Answer | Accepta  | able Reject | Mark |
|----------|----------------|----------|-------------|------|
| Number   |                | Answers  | 5           |      |
| 3 (a)    | energy         | in eithe | r           | 1    |
|          |                | order    |             |      |
|          | information    |          |             | 1    |
|          |                |          |             | (2)  |
|          |                |          |             |      |
|          | •              | -        | 1           |      |
| Question | Correct Answer | Accenta  | hle Reject  | Mark |

| Question | Correct Answer | Acceptable | Reject | Mark |
|----------|----------------|------------|--------|------|
| Number   |                | Answers    |        |      |
| 3 (b)    | D              |            | wrong  | 1    |
|          |                |            | order  |      |
|          | C              |            |        | 1    |
|          |                |            |        | (2)  |
|          |                |            |        |      |

| Question | Correct Answer   | Acceptable | Reject | Mark |
|----------|------------------|------------|--------|------|
| Number   |                  | Answers    |        |      |
| 3 (c)(i) | cycles/waves     |            | wrong  | 1    |
|          |                  |            | order  |      |
|          | second/unit time |            |        | 1    |
|          |                  |            |        | (2)  |
|          |                  |            |        |      |

| Question<br>Number | Correct Answer | Acceptable Answers  | Reject | Mark |
|--------------------|----------------|---|--------|------|
| 3 (c)(ii)          | speed          | velocity<br>(time) period<br>time to travel a<br>wavelength |        | (1)  |

| Question<br>Number | Correct Answer | Acceptable<br>Answers | Reject | Mark |
|--------------------|----------------|-----------------------|--------|------|
| 3 (d)(i)           | longitudinal   |                       |        | (1)  |

| Question<br>Number | Correct Answer    | Acceptable<br>Answers | Reject | Mark |
|--------------------|-------------------|-----------------------|--------|------|
| 3 (d)(ii)          | 20 Hz - 20 000 Hz |                       |        | (1)  |

| Question<br>Number | Correct Answer | Acceptable<br>Answers | Reject | Mark |
|--------------------|----------------|-----------------------|--------|------|
| 3 (d)(iii)         | less than      |                       |        | (1)  |

| Question<br>Number | Correct Answer | Acceptable<br>Answers | Reject | Mark |
|--------------------|----------------|-----------------------|--------|------|
| 4 (a)(i)           | microphone     |                       |        | (1)  |

| Question<br>Number | Correct Answer   | Acceptable Answers   | Reject | Mark |
|--------------------|--|--|--------|------|
| 4 (a)(ii)          | kettle/iron/heater/ (electric) fire/ toaster/hairdryer/ soldering iron | there are many other examples credit if the useful energy transfer is from electricity to heat |        | (1)  |

| Question<br>Number | Correct Answer   | Acceptable<br>Answers | Reject   | Mark |
|--------------------|------------------|-----------------------|--|------|
| 4 (b)              | any falling body |                       | do not credit examples where both falling and rising occur e.g. child's swing or bungee jump unless falling is specified | (1)  |

| Question<br>Number | Correct Answer | Acceptable<br>Answers | Reject | Mark |
|--------------------|----------------|-----------------------|--------|------|
| 4 (c)              | heat           | sound                 |        | (1)  |

| Question | Correct Answer      | Acceptable    | Reject | Mark |
|----------|---------------------|---------------|--------|------|
| Number   |                     | Answers       |        |      |
| 4 (d)    | total energy input  | in either     |        |      |
|          | total energy output | order         |        |      |
|          |                     | scores 2 or 0 |        |      |
|          |                     |               |        | (2)  |

| Question<br>Number | Correct Answer     | Acceptable<br>Answers | Reject | Mark          |
|--------------------|--------------------|-----------------------|--------|---------------|
| 4 (e)              | kinetic<br>kinetic |                       |        | 1<br>1<br>(2) |

| Question<br>Number | Correct Answer                |     | Acceptable<br>Answers          | Reject   | Mark     |
|--------------------|-------------------------------|-----|--------------------------------|----------|----------|
| 5 (a)(i)           | 100 000                       |     |                                |          | (1)      |
|                    | <b>.</b>                      |     |                                |          |          |
| Question<br>Number | Correct Answer                |     | Acceptable<br>Answers          | Reject   | Mark     |
| 5 (a)(ii)          | 500 000                       |     | 100 000 × 5<br>for (1)<br>mark |          | (2)      |
|                    |                               |     | 1                              |          | 1        |
| Question<br>Number | Correct Answer                |     | Acceptable<br>Answers          | Reject   | Mark     |
| 5 (b)(i)           | 330                           |     | 400 - 70 for<br>(1) mark       |          | 2<br>(2) |
|                    |                               |     | L                              | 1        | ı        |
| Question<br>Number | Correct Answer                |     | Acceptable<br>Answers          | Reject   | Mark     |
| 5 (b)(ii)          | background (count/radiation)  |     |                                |          | 1        |
|                    | random/variable/not constant  |     |                                |          | 1 (2)    |
| 1                  |                               |     | 1                              | <u> </u> | I        |
| Question<br>Number | Correct Answer                |     | Acceptable<br>Answers          | Reject   | Mark     |
| 5 (c)              | cosmic rays/rocks/medical etc |     | any two<br>(1) each            |          | (2)      |
|                    |                               |     |                                | (Total 9 | marks)   |
|                    |                               |     |                                |          |          |
| Question<br>Number | Correct Answer                | Ans | ceptable<br>swers              | Reject   | Mark     |
| 6 (a)              | yellow<br>green               |     | nark if<br>ours reversed       |          | 1 1      |
|                    |                               |     |                                |          | (2)      |
|                    |                               |     |                                |          | 1        |
| Question<br>Number | Correct Answer                |     | Acceptable<br>Answers          | Reject   | Mark     |
| 6 (b)(i)           | A infra-red                   |     |                                | answers  | 1        |
|                    | B ultra violet                |     |                                | reversed | 1        |

| Question  | Correct Answer   | Acceptable | Reject | Mark |
|-----------|------------------|------------|--------|------|
| Number    |                  | Answers    |        |      |
| 6 (b)(ii) | B / ultra violet |            |        | (1)  |

(2)

| Question<br>Number | Correct Answer | Acceptable Answers        | Mark  |
|--------------------|----------------|---------------------------|-------|
| 7(a)(i)            | 0.8 (seconds)  | 4/5 second<br>8/10 second | 1 (1) |

| Question<br>Number | Correct Answer | Acceptable Answers       | Mark |
|--------------------|----------------|--------------------------|------|
| 7(a)(ii)           | 3.2 (seconds)  | 3 1/5 allow ecf from (i) | 1    |
|                    |                | 4.0 - previous answer    | (1)  |

| Question<br>Number | Correct Answer                              | Acceptable Answers                       | Mark |
|--------------------|---|--|------|
| 7(a)(iii)          | one line                                    |  |      |
|                    | horizontal line beyond 0.8                  |  | 1    |
|                    | less steep slope down (to the $x$ axis) dop |  | 1    |
|                    |   | two_separate lines or one of these lines |      |
|                    |   | l <u>abelled</u> 1 mark for each correct | (2)  |

| Question<br>Number | Correct Answer   | Acceptable Answers  | Reject                              | Mark |
|--------------------|--|---|-------------------------------------|------|
| 7(b)(i)            | air (resistance) mass of car speed (of the car) brakes tyre pressure area of tyre streamlining | drag weight (force of) gravity size shape velocity (of car) | wind<br>(resistance)<br>temperature | (1)  |

| Question<br>Number | Correct Answer   | Reject                   | Mark  |
|--------------------|--|--------------------------|-------|
| 7(b)(ii)           | intentionally straight vertical arrow pointing downwards from, above, below or through point X | arrow from middle of car | 1 (1) |

| Question | Correct Answer          | Acceptable | Reject      | Mark |
|----------|-------------------------|------------|-------------|------|
| Number   |                         | Answers    |             |      |
| 8(a)(i)  | infra red               | i.r.       | microwaves  | 1    |
|          |                         | IR         | ultraviolet |      |
|          | allow phonetic spelling |            |             |      |
|          |                         |            |             | (1)  |

| Question<br>Number | Correct Answer         | Acceptable<br>Answers | Reject | Mark |
|--------------------|------------------------|-----------------------|--------|------|
| 8(a)(ii)           | gamma (rays/radiation) | γ                     | X-rays | 1    |
|                    |                        | gama                  |        | (1)  |

| Question<br>Number | Correct Answer  | Acceptable Answers                           | Reject     | Mark |
|--------------------|---|--|------------|------|
| 8(b)(i)            | same speed (in a vacuum)<br>same velocity (in a vacuum)     | travel through a<br>vacuum or empty<br>space | transverse | 1    |
|                    | or (travel at) speed of light (travel at) velocity of light |  |            | (1)  |

| Question<br>Number | Correct Answer  | Acceptable Answers  | Reject  | Mark |
|--------------------|---|---|---|------|
| 8(b)(ii)           | water (waves)/waves<br>on water/tidal<br>waves/sea<br>waves/ocean waves | waves on (slinky) spring shaken/moved up and down or side to side waves on a rope moved up and down or side to side  S waves ignore 'seismic' | P waves<br>analogue wave<br>waves on a<br>CRO | 1    |
|                    |   | mexican wave  |   | (1)  |

| Question<br>Number | Correct Answer                 | Acceptable<br>Answers                     | Reject                                | Mark |
|--------------------|--------------------------------|---|---------------------------------------|------|
| 8(b)(iii)          | 90°                            | normal/ perpendicule right angles         |                                       | 1    |
|                    | energy<br>independent<br>marks | information or<br>data<br>wavefront/front | crest/vibration/direction/<br>pattern | (2)  |

| Question<br>Number | Correct Answer  | Acceptable answers       | Reject    | Mark  |
|--------------------|---|--------------------------|-----------|-------|
| 9(a)(i)            | <pre>voltage = current × resistance or current = voltage/resistance or resistance = voltage/current</pre> | V = IR<br>I=V/R<br>R=V/I | V = C x R | 1 (1) |
|                    |   |                          |           |       |
| 9(a)(ii)           | 4.5 nwn   |                          |           | 1     |
|                    | volts or V or J/C or JC $^{-1}$ or A $\Omega$   |                          |           | 1 (2) |

| Question<br>Number | Correct Answer | Acceptable Answers | Mark |
|--------------------|----------------|--------------------|------|
| 9(b)               | decrease       |                    | 1    |
|                    | increase       |                    | 1    |
|                    |                | Increase           | (2)  |
|                    |                | decrease           |      |
|                    |                | scores 1           |      |
|                    |                | decrease           |      |
|                    |                | decrease           |      |
|                    |                | scores 1           |      |
|                    |                | increase           |      |
|                    |                | increase           |      |
|                    |                | scores 1           |      |

| Question<br>Number | Correct Answer       | Reject               | Mark  |
|--------------------|----------------------|----------------------|-------|
| 10(a)(i)           | (semiconductor)diode | LED                  | 1 (1) |
|                    |                      | light emitting diode | (1)   |

| Question<br>Number | Correct Answer | Acceptable<br>Answers | Reject | Mark  |
|--------------------|----------------|-----------------------|--------|-------|
| 10(a)(ii)          | 50 50          | both required         |        | 1 (1) |

| Question<br>Number | Correct Answer   | Acceptable<br>Answers   | Reject  | Mark |
|--------------------|--|---|---|------|
| 10(a)(iii)         | one cell is connected the wrong way  | two cells cancel<br>one another/not<br>all facing the<br>same way                 | battery   | 1    |
|                    | some of the voltage is across/used up by diode/component Y/ ammeter(s)/(connecting) wire /switch | reference to<br>resistance of<br>these<br>components<br>/cells / whole<br>circuit | voltage used up by/voltage across voltmeter/lamp  voltmeter does not have infinite resistance  ignore reference to current and energy | 1    |
|                    |  |   |   | (2)  |

| Question<br>Number | Correct Answer             | Acceptable Answers                               | Mark |
|--------------------|----------------------------|--|------|
| 10 (b)             | any <u>three</u> points    |  |      |
|                    | current increases          | voltage increases                                | 1    |
|                    | increases temperature      | increases heat /<br>molecular movement           | 1    |
|                    | increases resistance       | motecutal movement                               |      |
|                    | line or slope becomes less |  |      |
|                    | steep                      | non-ohmic / / not proportional to <i>V</i> /     |      |
|                    |                            | decrease rate of increase<br>/current levels off | (3)  |

| Question  | Correct Answer            | Acceptable        | Reject         | Mark |
|-----------|---------------------------|-------------------|----------------|------|
| Number    |                           | Answers           |                |      |
| 11 (a)(i) | not moving (or vibrating) | no kinetic energy | a response     | 1    |
|           | none                      | no momentum       | which suggests |      |
|           | zero                      |                   | any kind of    |      |
|           |                           |                   | movement       |      |
|           |                           |                   |                | (1)  |

| Question<br>Number | Correct Answer | Acceptable Answers   | Mark  |
|--------------------|----------------|----------------------|-------|
| 11 (a)(ii)         | -273 (°C)      | minus 273<br>-273.15 | 1 (1) |

| Question    | Correct Answer | Acceptable | Reject | Mark |
|-------------|----------------|------------|--------|------|
| Number      |                | Answers    |        |      |
| 11 (a)(iii) | 373 (K)        | 373.15(K)  | 373°C  | 1    |
|             |                |            |        | (1)  |

| Question<br>Number | Correct Answer   | Reject    | Mark |
|--------------------|--|-----------|------|
| 11 (b)             | particles knock /jostle /collide                             | diffusion | 1    |
|                    | smaller/invisible /air/water particles                       |           | 1    |
|                    | cause a change of direction dop only as 3 <sup>rd</sup> mark |           | 1    |
|                    |  |           | (3)  |

PAPER TOTAL 75 MARKS