Practice Question Set For GCSE
**Subject : Physics**
**Paper-1 Topic : 6_Radioactivity**

**Name of the Student**:_____
**Max. Marks : 18 Marks** **Time : 18 Minutes**

Mark Schemes

Q1.

| Question number | Answer | Additional guidance | Mark |
|---|---|---|---|
| | An explanation that combines understanding (1 mark) and reasoning/justification - understanding (2 marks):<br><br>• slows down neutrons (1)<br><br>• increase chance of collision / fission (1)<br>• maintain the reaction rate (1) | <br><br><br><br>to allow capture by nucleus<br><br>increase the reaction rate | **(3)** |

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Q2.

| Question Number | Answer | Additional guidance | Mark |
|---|---|---|---|
| | An explanation linking:<br><br>neutron (decays) to proton (1)<br><br><br><br><br><br><br>beta emitted (1) | <br><br>mass number stays the same but atomic number increases by 1<br><br>accept answers in terms of quarks<br><br>(dud becomes uud)<br><br><br><br>beta decay / β seen<br><br>NOT $\beta^+$/beta plus<br><br>allow (fast) electron emitted<br><br><br><br>allow for 2 marks:<br><br>n □ p + e<br><br>OR<br><br>$^{14}_{6}C \rightarrow {}^{14}_{7}N + {}^{0}_{-1}\beta^{(-)}$ | **(2)** |

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Q3.

| Question | Answer | Additional guidance | Mark |
|---|---|---|---|
| | an explanation linking any **four** of the following:-<br><br>UV/energy absorbed by electrons (1)<br><br>electrons change orbit/energy level/shell (1)<br><br>electrons in an 'excited' state (1)<br><br>electrons emit energy/ move to lower energy level/fall down/de-excite (1)<br><br>(energy) emitted as (visible) light / at a different frequency/wavelength (1)<br><br>(process is called) fluorescence / (light emitted is) fluorescent (1) | a labelled diagram can score up to 4 marks | **4**<br>**AO1.1** |

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Q4.

| Question number | Answer | Additional guidance | Mark |
|---|---|---|---|
| | An explanation that makes reference to identification - knowledge (2 marks ) and reasoning/justification - knowledge (1 mark):<br><br>• fusion requires high temperatures and pressures (1)<br>• (in order to overcome) electrostatic repulsion of nuclei (1)<br><br>• (we are currently) unable to maintain these conditions (in a commercial reactor) (1) | | **(3)** |

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Q5.

| Question Number | Answer | Additional guidance | Mark |
|---|---|---|---|
| (i) | an explanation linking:<br>(high temperature means) high energy (1)<br>(needed) to overcome (force of) repulsion (1)<br>between nuclei / because they both have the same charge (1) | accept "them" / hydrogen for nuclei | (3)<br>AO 2 1 |

| Question Number | Answer | Additional guidance | Mark |
|---|---|---|---|
| (ii) | substitution (1)<br>$4.5 \times 10^{-12} = m\ (3.0 \times 10^{8})^2$<br>rearrangement (1)<br>$(m =) \frac{4.5 \times (10^{-12})}{9.0 \times (10^{16})}$<br>evaluation (1)<br>$5.0 \times 10^{-29}$ (kg) | accept substitution and rearrangement in either order<br>ignore POT errors until evaluation<br>award full marks for the correct answer with no working | (3)<br>AO 2 1 |

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