



# Pearson Edexcel GCE Physics

Additional Support Worksheets: Answers

Contents

Answers .....1

1	<p><b>The only correct answer is C</b></p> <p>Relative atomic mass = 23 and proton number = 11</p>	1
2	<p><b>The only correct answer is A</b></p> <p>Isotopes have the same atomic / proton number but a different number of neutrons so nucleon number is different.</p>	1
3	<p><b>The only correct answer is D</b></p> <p>The nucleus is very dense and most of the mass is concentrated there</p>	1
4	<p><b>The only correct answer is D</b></p> <ul style="list-style-type: none"> <li>• Most alpha particles passed straight through the gold foil → <b>Conclusion:</b> Atoms are mostly empty space, allowing particles to travel through without deflection.</li> <li>• Some alpha particles were deflected at small angles → <b>Conclusion:</b> There is a positively charged centre in the atom that repels the positively charged alpha particles.</li> <li>• A very few alpha particles were deflected at large angles or bounced back → <b>Conclusion:</b> The positive charge and most of the atomic mass are concentrated in a tiny central region, which Rutherford named the nucleus.</li> </ul>	1
5	<p><b>The only correct answer is A</b></p> <p>Higher temperature gives more electrons enough energy to overcome the work function. Distance does not directly affect rate of emission. Negative potential would repel electrons. Lower work function would increase rate of emission.</p>	1
6	<p><b>The only correct answer is B</b></p> <p>The electric field between the cathode and anode exerts a force on the emitted electrons, accelerating them toward the anode.</p>	1
7	<p><b>The only correct answer is C</b></p> <p>A cyclotron uses a constant (in time) magnetic field perpendicular to the particle motion to force circular motion; an oscillating electric field across the gap between the Dees accelerates particles each time they cross that gap</p>	1
8	<p><b>The only correct answer is B</b></p> <p>Force and velocity are not constant. A beam focussing is typically provided by a magnetic field. C there is ideally no electric field inside the drift tubes D a centripetal force is required for circular motion . A linear accelerator accelerates particles in a straight line</p>	1
9	<p><b>The only correct answer is D</b></p> <p>In an elastic collision both kinetic energy and momentum are conserved.</p>	1

<b>10</b>	<b>The only correct answer is C</b>  Straight tracks in a cloud chamber → alpha Detection at 15 cm by GM tube → not alpha (range in air too short) Thin aluminium reduces count to background → beta stopped, not gamma Therefore, the source must emit alpha and beta	<b>1</b>
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11	<p><b>The only correct answer is B</b> (insert answer)</p> <p>Use conservation of momentum:  <math display="block">0 = mv_1 + mv_2 \Rightarrow v_2 = -v</math></p>	1
12	<p><b>The only correct answer is B</b></p> <p>A high energy electron is the only one with a small enough de Broglie wavelength</p>	1
13	<p><b>The only correct answer is B</b></p> <ul style="list-style-type: none"> <li>• A Energy of a single proton only.</li> <li>• C) Half the energy; ignores the antiproton.</li> <li>• D) Incorrect unit (momentum, not energy).</li> </ul>	1
14	<p><b>The only correct answer is A</b></p> $\Delta E = \Delta mc^2$ $\Delta E = 3.0 \times 10^{-27} \times (3.0 \times 10^8)^2 = 2.7 \times 10^{-10} \text{ J}$ <ul style="list-style-type: none"> <li>• B) <math>5.4 \times 10^{-10} \text{ J}</math> mass given is per particle double the energy.</li> <li>• C) <math>1.35 \times 10^{-10} \text{ J}</math> confusing it with kinetic energy.</li> <li>• D) <math>2.7 \times 10^{-11} \text{ J}</math> <math>E = mc</math> instead of <math>E = mc^2</math>.</li> </ul>	1
15	<p><b>The only correct answer is D</b> (insert answer)</p> $E = 0.511 \times 1.602 \times 10^{-13} \text{ J} \approx 8.187 \times 10^{-14} \text{ J}$ <p>3. Use <math>E = mc^2</math> to find mass in kg:</p> $m = \frac{E}{c^2} = \frac{8.187 \times 10^{-14}}{(3.00 \times 10^8)^2} \text{ kg}$ $m \approx \frac{8.187 \times 10^{-14}}{9 \times 10^{16}} \text{ kg} \approx 9.1 \times 10^{-31} \text{ kg}$	1
16	<p><b>The only correct answer is A</b></p> <ul style="list-style-type: none"> <li>• <b>B:</b> Time dilation depends on speed; different speeds → different lifetimes.</li> <li>• <b>C:</b> Slower muon experiences less time dilation.</li> <li>• <b>D:</b> Faster muon is more likely to reach the surface due to longer relativistic lifetime.</li> </ul>	1
17	<p><b>The only correct answer is D</b></p> <p>Pion is a meson and electron ant neutrinos are leptons.</p>	1
18	<p><b>The only correct answer is B</b></p> <ul style="list-style-type: none"> <li>• A (three quarks) → confuses baryon and meson composition.</li> <li>• C (two quarks) misconception.</li> <li>• D (quark + lepton) confusion between hadrons and leptons.</li> </ul>	1

<b>19</b>	<b>The only correct answer is A</b>  B includes baryons; C includes both hadrons and leptons; D includes boson and hadrons	<b>1</b>
<b>20</b>	<b>The only correct answer is C</b> <ul style="list-style-type: none"><li>• <b>A:</b> both charge and baryon number differ.</li><li>• <b>B:</b> charge is opposite.</li><li>• <b>C:</b> antiproton: charge = <math>-e</math>, baryon number = <math>-1</math>.</li><li>• <b>D:</b> baryon number changes sign.</li></ul>	<b>1</b>