



# **A Level Physics A**

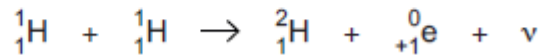
H556/02 Exploring physics

## **Question Set 11**

1

Stars produce energy by nuclear fusion.

One particular fusion reaction between two protons ( ${}^1_1\text{H}$ ) is shown below.



In this reaction 2.2 MeV of energy is released.

- (a) Only one of the particles shown in the reaction has binding energy.  
Determine the binding energy per nucleon of this particle. Explain your answer. [2]
- (b) Explain why high temperatures are necessary for fusion reactions to occur in stars. [2]
- (c) A gamma photon in a star can spontaneously create an electron-positron pair.  
Calculate the **maximum** wavelength of a gamma photon for this creation event.

maximum wavelength = ..... m [3]

**Total Marks for Question Set 11: 7**

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