

Q1.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (~~☒~~) and then mark your new answer with a cross (☒).

Nuclear fusion is a process that releases energy.

Which of these statements applies to a nuclear fusion reaction?

(1)

- A** it emits daughter nuclei
- B** it is a controlled chain reaction
- C** it produces radioactive waste
- D** it requires high temperature and pressure

(Total for question = 1 mark)

Q2.

In a nuclear fusion reaction, mass is converted into energy.

(i) Describe what is meant by nuclear fusion.

(2)

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(Total for question = 2 marks)

Q3.

Nuclear fusion provides the energy source for stars including the Sun.

Describe what happens during nuclear fusion.

(3)

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(Total for question = 3 marks)

Q4.

Stars may originate as a nebula.

(i) Describe the process that then occurs to produce the conditions necessary for nuclear fusion in a new star.

(3)

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(Total for question = 3 marks)

Q6.

Fusion and fission are nuclear reactions in which large amounts of energy are released.

- (i) In a fusion reaction, two hydrogen nuclei are forced together to form a helium nucleus.
Explain why a very high temperature is needed for this reaction to happen.

(3)

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(Total for question = 3 marks)

Q7.

- (a) Fast neutrons are released during nuclear fission.

Another type of nuclear reactor is a fusion reactor.
Nuclear fusion also releases fast neutrons.
Suggest why a nuclear fusion reactor does not need anything to slow these neutrons down.

(1)

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- (b) Both nuclear fission and nuclear fusion release thermal energy.
Describe how the thermal energy released could be converted into electrical energy in a power station.

(3)

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*(c) Scientists and engineers are still trying to build a practical and economic nuclear fusion reactor. They have not been able to sustain the extreme conditions needed for controlled nuclear fusion. Explain what these conditions are and why they are needed.

(6)

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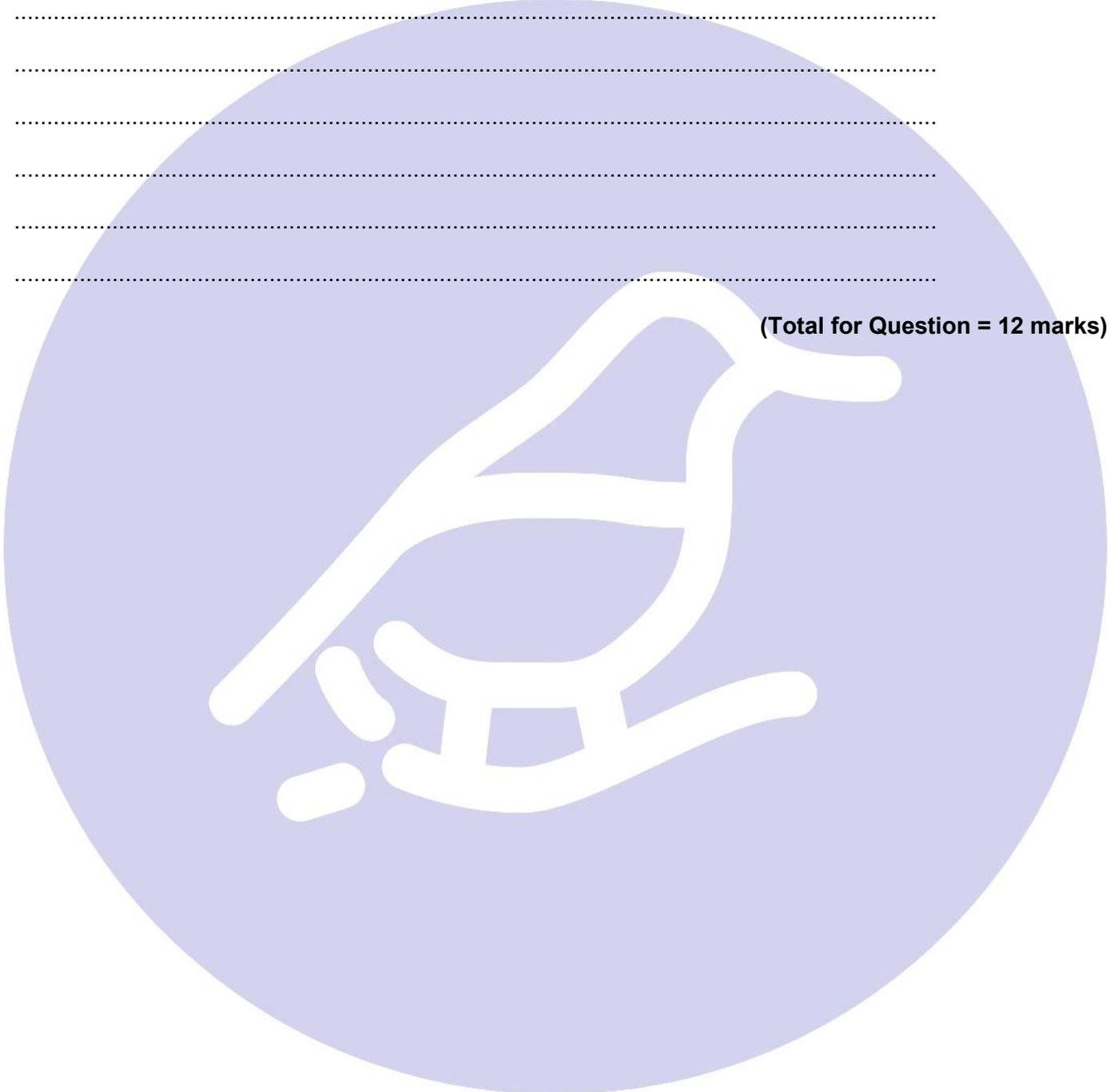
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(Total for Question = 12 marks)



Q8.

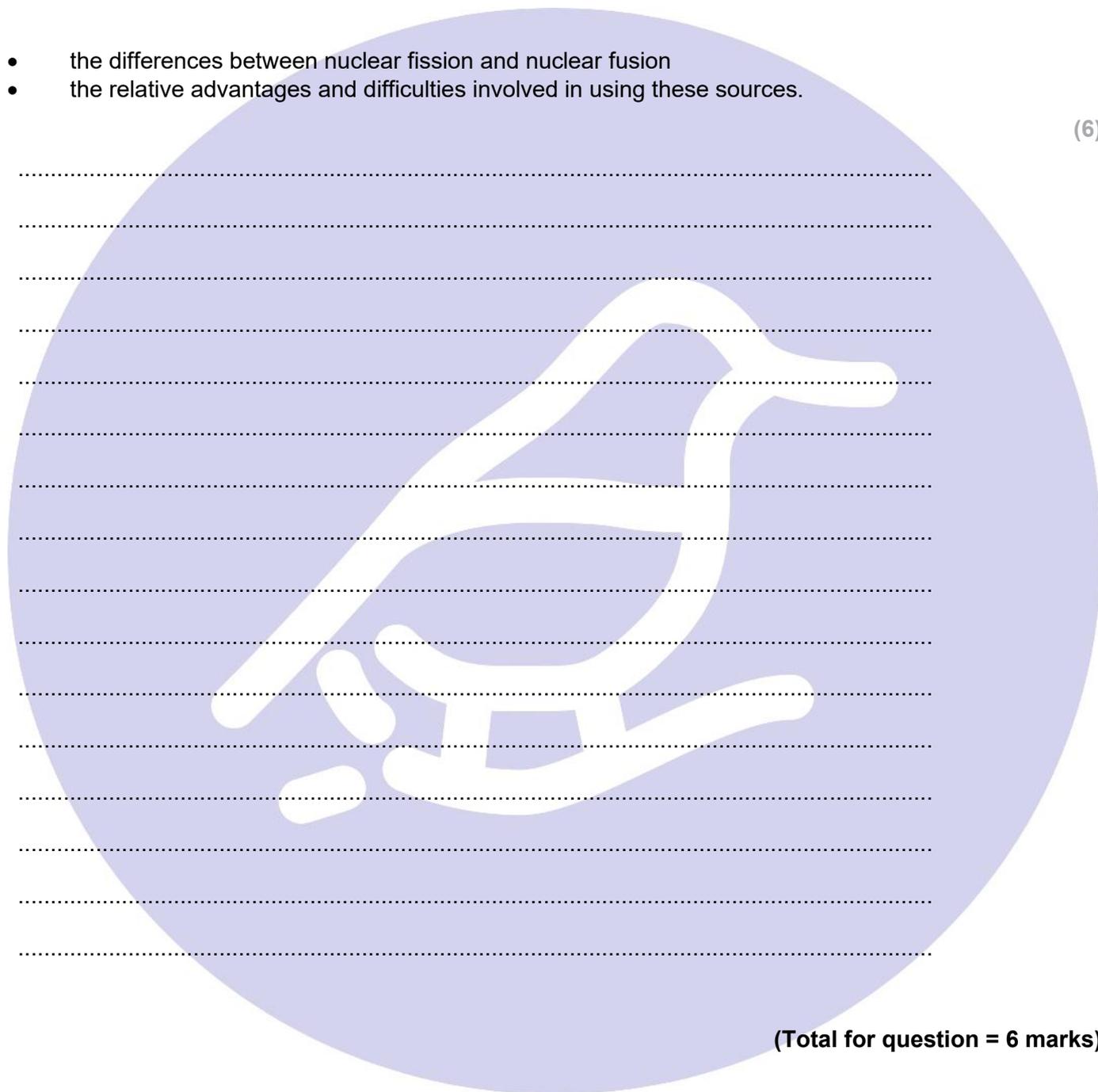
* Nuclear fission and nuclear fusion are two non-renewable sources of energy.

Compare nuclear fission and nuclear fusion as possible sources of energy for generating electricity using a nuclear reactor.

Your comparison should refer to

- the differences between nuclear fission and nuclear fusion
- the relative advantages and difficulties involved in using these sources.

(6)



(Total for question = 6 marks)