

12.2_I

Paragraph	Summary
1	computing power has increased gradually
2	artificial neural networks increased computer capability
3	new developments could radically change hardware capability
4	ideas and practical developments in quantum computing
5	general purpose quantum computing

Model answer

Computers have become smaller and more powerful over time, and this has completely transformed the way in which people live. The increase in the power of computers was gradual at first, but it continues to increase rapidly. One reason for the current increase in power is because of artificial intelligence (AI) and machine learning. This has meant that computers can now do tasks which, in the past, could only be done by humans, such as speech recognition and translation, and object and facial recognition. It has also meant that computers can perform tasks which humans cannot match, such as predicting the structures of proteins which can lead to the creation of new drugs and new materials. In addition to developments in software, there are also developments in hardware. Until now, computing has been 'classical computing' which follows a Turing model of input, process and output and which uses binary values. This means that there are limits to how quickly these computers can process data. Quantum computing could produce much higher levels of processing power. Although the key principles of quantum mechanics have been known since the early 20th century, it is only more recently that practical quantum computing has become possible. The power of these computers continues to increase. However, these are specialized computers, and the next challenge is to create general purpose quantum computers. General purpose quantum computers would have many possibilities. For example, they could lead to new discoveries in drug development and materials development. They also have the potential to read all types of existing secret communications. While it is difficult to make predictions about these developments, it is likely that the power of computing will continue to increase.