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| **Q** | **Answer/Indicative content** | **Marks** | **Guidance** |
| 1 | |  |  |  | | --- | --- | --- | | 1. James Gosling |  | 1. The first computer programmer, the first person to realise computers could do more than just calculate numbers. | | 1. Admiral Grace Hopper |  | 1. Developed the Java programming language. | | 1. Alan Turing |  | 1. Devised the first commercial electronic computer. | | 1. Steve Jobs |  | 1. Developed computational theory upon which modern computing is based. | | 1. Sir Tim Berners-Lee |  | 1. Commoditised computing, and developed smartphones and handheld devices. | | 1. Ada Lovelace |  | 1. Inventor of the World Wide Web. | | 6 |  |
| 2a | 1 mark per bullet  Machine learning   * Systems that have the ability to automatically learn…. * ….from experience without being explicitly programmed.   Deep learning   * A system that closely tries to mimic…. * …..how the human brain works. | 4 |  |
| 2b | Any three from:   * Speech recognition * Smart devices * Decision making * Autonomous vehicles * Computer-controlled technology/Robots * Natural language (generation) * Virtual agents * Image recognition * Virtual reality * Augmented reality * Accept any other reasonable examples | 3 |  |
| 2c | **Mark Band 4 (7-8 marks)**   * An excellent explanation, which shows:   + thorough knowledge and understanding of the term autonomous vehicles   + an excellent description of a wide range of smart devices for the home and strong knowledge of the impact of increased use of autonomous vehicles. * Writing is very well structured and organised, using accurate grammar, punctuation and spelling. * A range of specialist terminology is used with accuracy.   **Mark Band 3 (5-6 marks)**   * A good explanation, which shows:   + generally secure knowledge and understanding of the term autonomous vehicles.   + A good description of some smart devices for the home and some good knowledge of the impact of increased use of autonomous vehicles. * Writing is generally well structured and organised, using mainly accurate grammar, punctuation and spelling. * Specialist terminology is used with accuracy.   **Mark Band 2 (3-4 marks)**   * A basic explanation, which shows:   + some knowledge and understanding of the term autonomous vehicles.   + A basic description of some smart devices for the home and some basic knowledge of the impact of increased use of autonomous vehicles. * Writing shows some evidence of structure though some errors in grammar, punctuation and spelling affect meaning. * Basic use of specialist terminology.   **Mark Band 1 (1-2 marks)**   * A limited explanation, which shows:   + limited knowledge and understanding of the term autonomous vehicles.   + A limited description of some smart devices for the home and some basic knowledge of the impact of increased use of autonomous vehicles.   + Some errors in grammar, punctuation and spelling, which affect clarity of communication.   + Limited use of specialist terminology.   **0 marks**  No attempt to answer the question or response is not worthy of credit | 8 | Ethical   * Driverless cars might be expensive and not everyone could afford it due to the social divide. * Some jobs that require drivers won’t need them anymore, thus increasing the level of unemployment.   Environmental   * It will use a lot of electricity due to the in-built computer system that's consuming a great deal of energy. * It would be able to calculate the most efficient route, therefore saving petrol/diesel and reducing emissions.   Legal   * What if they break the speed limit then who would be responsible? * What if the car kills or injures someone? * Who is to blame – the machine or person who owns it? |
| 3a | Advantages   * Can operate 24 hours a day without taking a break…. * ….this will lead to increased productivity/more being produced. * Can be used in dangerous or awkward environments…. * ….without the risk of becoming liable in case an employee is injured as a result. * Will work without any wages…. * ….this reduces cost and increase their profits. * Will accurately repeat actions over and over again…. * ….wouldn’t have to be re-programmed/won’t affect productivity. * Can take account of hundreds of inputs at the same time… * ….increases productivity/reduces human error. * Can make reliable and accurate decisions…. * ….reduces human error/mistakes. * Can work without holidays or sick days….. * ….never be short staffed and should not affect productivity. * Can process data from sensors very quickly…. * ….a more efficient process/more can be done/increases productivity. | 4 |  |
| 3b | Disadvantages   * The software for the control system is specialist… * …...and may cost a lot of money to develop * People sometimes want to know that an expert is in control even if a computer could do it as well…. * …..they may have more trust in their employees than robots. * The computer cannot react to unexpected events as perhaps a person could/It can only respond in the way it has been programmed. * ….this could lead to mistakes which can affect the level of service provided. * If there is a power cut the system will not work… * ….this decreases productivity and can impact revenue. * If the computer malfunctions the system will not work… * …. his decreases productivity and can impact revenue. | 4 |  |
| 3c | 1 mark per bullet   * Computer-controlled technology could replace jobs normally performed by humans… * …this could lead to people losing their jobs…. * …they would need to possibly re-train for another career before being employed again. | 3 |  |
| 4 | Router  Smart air conditioning  Smart thermostat  Smart home  Smart lock  Smart meter | 8 | * 1 mark for correctly labelled router * 1 mark for correctly labelled smart home * 1 mark that shows router connected to smart home * 2 marks for adding four smart devices (Award 1 mark if they’ve added between 2-3 devices. 0 marks for just one device) * 2 marks for correctly labelling all four smart devices (Marks follow on from previous point) * 1 mark for correct connecting the smart home to its devices. |