Topic 5

Legal, Moral, Cultural and Ethical Issues

1(a) A team of programmers create a robot that will be used in a factory. The robot will be able to do the work of multiple humans.

The programmers discuss whether to write the instructions for the robot in assembly language or a high-level language.

The robot provides a web-based interface for users. The home screen webpage for this interface is shown in **Fig. 4**.

Fig. 4

(i) Complete this HTML code that will display the webpage shown in **Fig. 4**.

```
<html>
    <head>
        <title>Robot User Interface</title>
    </head>
    <body>
        <h1>Robot prime directives</h1>
        ...........................................
            <li>Serve the company trust</li>
            <li>Protect data</li>
            <li>Uphold standards</li>
        ...........................................
        <a ............................ = "updates.html">Updates</a>
```

```
<p>…………………………………</p>
<form action="dologin.php">
    Password
    <input type = "…………………………" name="pw">
    <input type = "…………………………">
</form>
</body>
</html>
```

[5]

(ii) Write CSS code that could be used in an external stylesheet to format all text using the <h1> tag as white with a red background.

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[3]

(b) The robot's web interface uses images that show the robot in action. These photographs have been taken using a digital camera.

The programmers do not want other people to download and use these images.

(i) State the name of **one** relevant piece of legislation and describe how this would protect these images.

Legislation _____

_____

Description _____

_____

_____

_____ **[3]**

(ii) For other areas of the web interface, the programmers need to use images that they have not created themselves.

Give **two** ways that they could make sure these images are used legally.

1 _____

_____

2 _____

_____ **[2]**

2   The Regulation of Investigatory Powers Act (2000) has been described as both a vital legal tool to ensure the public's safety and an attack on an individual's freedoms.

Evaluate the purpose and use of the Act.

You should include:

- the additional powers given under the Act
- to whom these powers are given
- the perceived benefits and/or drawbacks of the Act.

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[12]

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3   The Copyright Designs and Patents Act 1988 applies to all videos that are streamed.

Explain how this act applies to the videos.

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[2]

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4   * Amit is studying Computer Science at university. He has been asked to write an assignment on Artificial Intelligence (AI).

Discuss the extent to which you think computer systems will inherit the biases and discrimination of their programmers as the use of AI increases.

You should include the following in your answer:

- the meaning of AI
- examples of when AI may be affected by bias
- the measures that can be taken to prevent people being affected by bias in AI.

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[9]

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5   * Many technologists predict that in the future, shops on the high street will use facial recognition to
     identify customers before they walk into a shop.

     Discuss the possible benefits and drawbacks of technology being used in this way.

     You should refer to the following in your answer:

     •   The benefits and drawbacks to both the customers and businesses
     •   Moral and ethical issues
     •   Legal issues

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[9]

6   *   *"The Computer Misuse Act means that computer users are criminalised for simply trying to learn how systems work."*

Discuss whether or not you agree with this statement.

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[9]

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7   * "When it comes to government electronic surveillance, if you have nothing to hide, you have nothing to fear."

Discuss whether or not you agree with this statement. You should include:

- To what extent the UK government is able to monitor electronic communications of its citizens
- Technical measures citizens can take to help prevent their communications being monitored.

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[9]
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8   *OCR Car Park would like to calculate the parking charges when a car leaves their car park.

They will need to record the time that a car enters and leaves their car park in order to calculate the parking charge.

Discuss the different methods that could be used to collect this data.

In your answer you should include:
•   The benefits and drawbacks of each method
•   Ethical implications
•   Legal implications

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[9]

9(a) A number of laws govern the use of computers.

For each of the following scenarios tick **one** law that is being broken.

Scenario	Computer Misuse Act	Copyright Design and Patents Act	Data Protection Act
A bank accidentally publishes customers' account details on its website.			
Someone downloads a pirated version of a piece of software that users would ordinarily have to pay for.			
Someone writes and distributes a virus.			

[3]

(b) Describe the purpose of the Regulation of Investigatory Powers Act.

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[3]
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10 *"Developments in Artificial Intelligence mean that in twenty years' time most people will be unemployed."*

Discuss whether or not you agree with this statement.

--[9]

11   * Many websites try to ensure they are accessible to all visitors regardless of disability, language
spoken or the device being used to access it. Discuss the technical and design measures that can be
taken to ensure a website is accessible.

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[9]

12   See And Believe is a company that specialises in computer-generated imagery (CGI) for films.

Producing CGI requires lots of processing power and so the company has a large number of high-performance computers.

* The company is working on scenes from the latest *Stellar Scuffles* film. There is strict security around the film, and there are worries about unauthorised people gaining access to the company's network and putting clips from the film on the Internet.

Discuss to what extent each of the following laws is intended to address the issue of someone accessing and distributing clips of the film online:

- the Computer Misuse Act
- the Copyright Design and Patents Act
- the Data Protection Act.

---[9]

13   Computers are becoming more portable and are replacing more traditional means of communication. Applications allowing social interaction are widely available.

Discuss the effects of these trends on society.

---[8]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Guidance
1	a	i	• and • href • Login • text/password • submit	5	<html> <head> <title>Robot User Interface</title> </head> <body> Robot directives - Serve the company trust - Protect data - Uphold standards Updates Login <form action="dologin.php"> Password <input type = "text" name="pw"> <input type = "submit"> </form> </body> </html> HTML tags are not case sensitive Correct answer only **Examiner's Comments** Generally well answered and many candidates gained full marks with most being able to gain at least two.

	Question		Answer/Indicative content	Marks	Guidance

		ii	• h1 and other code contained in { }
			 • color :white;
			 • background-color : red;
			   //background: red;
				3	Ignore presence or lack of <style> tags. Ignore lack of semicolons
					
					 Penalise misspelling of "color" once and then FT
					
					 h1 {
					    color:white;
					    background-color: red;
					 }
					
					 White can be #FFFFFF or #FFF
					 Red can be #FF0000 or #F00
					
					 <u>Examiner's Comments</u>
					
					 Many candidates were able to gain full marks. The most common reasons candidates lost marks was through the use of quotes around the colour equals instead of colons and for misspelling colour

	b	i	• <u>Copyright Designs and Patents Act</u> Any two from: • Gives the author (the programmers)ownership/copyright of the photographs • …no need to apply // this is automatic • Others cannot use/distribute // can beprosecuted/fined for using/distributing… • …without permission • Permission can be granted / bought / licenced	3	Must be full name of Act for MP1 FT for versions of Copyright or nothing for MP2-6 <u>Examiner's Comments</u> Many candidates were able to gain 2 marks but many did not give the full name of the legislation.

Question			Answer/Indicative content	Marks	Guidance
		ii	• Ask permission of **author / photographer /owner** • Use images marked as copyright free (e.g.Creative Commons Licence) • Purchase (licence to use) image	2	Do not accept just "ask permission" **Examiner's Comments** Many candidates were able to gain 2 marks. It was surprising to see how many believed that you could use copyright images for your business just by crediting the artist. Candidates should be made aware that although crediting the artist may help avoid plagiarism it does not allow you free use of a copyright image.
			Total	13	

	Question		Answer/Indicative content	Marks	Guidance
2			**Mark Band 3 – High Level (9–12 marks)** The candidate demonstrates a thorough knowledge and understanding of The Regulation of Investigatory Powers Act (RIPA) 2000. The material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate is able to weigh up both sides of the argument which results in a supported and realistic judgement covering the benefits and drawbacks of the Act. This is well balanced. There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Mark Band 2 – Mid Level (5–8 marks)** The candidate demonstrates reasonable knowledge and understanding of The Regulation of Investigatory Powers Act (RIPA) 2000; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence / examples are for the most part implicitly relevant to the explanation. The candidate makes a reasonable attempt to come to a conclusion showing some recognition of benefits and/or drawbacks. This may not be	12 AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)	*The following shows example content that may form part of a candidate's answer. It is not intended to be an exhaustive resource, nor should a candidate be expected to specifically cover any particular amount of this.* **Knowledge (AO1)** • Implements additional rights regarding surveillance / monitoring of individuals and acquisition of communications data • Provides the right for many organisations (including the Police and security services) to do this. • Purpose is to detect crime and defend national security (e.g. terrorism, public disorder) • Gives access to individuals' private communications, such as emails, text messages, phone calls, Internet history. • Some people feel this is an invasion of their privacy **Application (AO2)** • Monitoring can be carried out by far more organisations than just the Police and Security services – for example, local councils, the pension regulator and the Environment Agency are all able to use surveillance or request data about individuals. • If files are encrypted, the Act gives powers to force the handover of keys (from individuals or organisations) with a 2 year prison sentence possible on refusal. • Wide ranging powers have allowed Police and Security services to intercept criminals' communications and stop / disrupt crime.

Question			Answer/Indicative content	Marks	Guidance
			well-balanced, covering one side significantly more than the other, although both sides will be present. There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence. **Mark Band 1 – Low Level (1–4 marks)** The candidate demonstrates a basic knowledge of The Regulation of Investigatory Powers Act (RIPA) 2000; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides nothing more than unsupported assertions. Any conclusion, if present, will be almost entirely one-sided. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 mark** No attempt to answer the question or response is not worthy of credit.		**Evaluation (AO3)** • In the modern world, it is important that Police and Security services are given the power to deal with electronic communications in this way. Many crimes (e.g. terrorism) can be detected and stopped before they occur, making the public safer. • However, some say that it is now a "snooper's charter", with more organisations using their powers for minor offences such as detecting those lying about their address to get children into a better school or fly-tipping. • Many communication tools (e.g. WhatsApp) now include end-to-end encryption by default so that messages cannot be divulged by the organisation because they do not have access to it. Other encryption tools include plausible deniability. **Examiner's Comments** Responses to this question were varied, some candidates showed a clear understanding of the powers and to whom they are given. Some were aware of the powers but focused on the police or security services in their response. Some went off track, talking about other countries. In general this was not answered well and candidates tended to have a one sided view of the act.
			Total	12	

Question			Answer/Indicative content	Marks	Guidance
3			• Copyright assigned to owner of video automatically on creation • Makes it illegal to copy/distribute videos **as your own/without permission** • Copyright holder can ask for their work to be removed from the streaming platform • Membership/licence gives subscribers the agreement to view videos • Which may restrict their use (e.g. to whom it is shown or geographical location from which it is accessed).	2	**Examiner's Comments** Most candidates were able to gain 1 mark for this question, but few went on to gain a second mark.
			Total	2	

Question			Answer/Indicative content	Marks	Guidance
4			**Mark Band 3–High Level (7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of artificial intelligence, machine learning and how biases can be inherited. The material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate provides a thorough discussion which is well balanced. Evaluative comments are consistently relevant and well-considered. There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Mark Band 2-Mid Level (4-6 marks)** The candidate demonstrates reasonable knowledge and understanding of artificial intelligence, machine learning and/or how biases can be inherited; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation. The candidate provides a sound discussion, the majority of which is focused. Evaluative comments are for the most part appropriate, although	9 (AO1.1) (2), (AO1.2) (2), (AO2.1) (2), (AO3.3). (3)	**AO1** Artificial intelligence is used for computer systems that are required to perform tasks that normally require human intelligence. AI is generally programmed. Machine learning is where a machine improves its performance/output through experience/access to data. Machine learning is a subset of AI. **AO2** AI follows programming so if a program contains biases then so will the AI outcomes. Programmers must be aware of this and tackle it during design/implementation/testing. Machine learning bias depends on data given. Larger data sets are generally more inclusive/less biased but must be aware of data that is itself biased. Candidates may give examples that meet this. **AO3** Thorough testing, multiple programmers and scrutiny of data sets are essential to ensure that unconscious biases are not inherited. If not thoroughly considered then biases will certainly be inherited. Datasets for machine learning need to be large enough to be representative but not so large that data is not able to be checked. <u>Examiner's Comments</u> There were a wide range of responses to this question and a wide range of marks given. The most successful responses were able to address all parts of the question and could give the meaning of AI as well as some relevant examples of AI bias. They were also able to give at least one

Question			Answer/Indicative content	Marks	Guidance
			one or two opportunities for development are missed. There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence. **Mark Band 1-Low Level (1-3 marks)** The candidate demonstrates a basic knowledge of some aspects of artificial intelligence or machine learning; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** No attempt to answer the question or response is not worthy of credit.		measure that could be taken. Many candidates used self-driving cars as their only example and should be encouraged to explore the use of AI in different fields. Some confused the AI being biased with people being biased against AI. Many candidates were unable to give relevant measures for preventing bias. Candidates should be encouraged to make sure they include all points the question asked for, in their answer.
			Total	**9**	

Question			Answer/Indicative content	Marks	Guidance
5			**Mark Band 3–High Level (7-9 marks)** The candidate has weighed up benefits and drawbacks of the technology and has applied the moral, legal and ethical issues to both the customer and the business; the material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate will have come to a fully justified conclusion. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Mark Band 2-Mid Level (4-6 marks)** The candidate has weighed up benefits and drawbacks of the technology. They will have explored some of the moral, legal and ethical issues but they may not be equally spread across both the customer and the business; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation. The candidate will have come to a conclusion although they may not fully justify it. *There is a line of reasoning presented with some structure. The information presented is in the most part relevant*	9 (AO1.1) (2) (AO1.2) (2) (AO2.1) (2) (AO3.3) (3)	<u>Knowledge:</u> Benefits Customer: • Personalised offers Business: • Targeted adverts • Able to track movement habits of customers • Provide more personalised shopping experiences. **Drawbacks** Customer: • Personal intrusion • Invasion of privacy • Pressured selling Business: • Cost of infra structure • Viewed as invading personal privacy **Moral and Ethical issues** • Violation of civil liberties • Recording people on the street who are not going into the shop **Legal issues:** • under data protection laws the shop would need to ◦ Keep any data recorded secure ◦ Personal data should be accurate and up to date <u>Application:</u> **Benefits** Customer: • Personalised experience will lead to

Question	Answer/Indicative content	Marks	Guidance
	and supported by some evidence. **Mark Band 1-Low Level** **(1-3 marks)** The candidate identifies some of the benefits and drawbacks, though they have probably shown little consideration of the legal, ethical and moral issues; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate may not reach a recognisable conclusion. *The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.* **0 marks** No attempt to answer the question or response is not worthy of credit.		more convenient shopping trips • Staff will give personalised service Business: • Tracking movement of customers means able to identify best opening times • Tracking customers around shop allows better analysis of popular products • Use of modern technology will make the shop be seen as forward thinking. **Drawbacks** Customer: • Customers may not want to be "pressured" meaning they decide not to shop there anymore. • Tracking data could be hacked and used by criminals Business: • Extra hardware costs may lead to higher prices/competitors undercut them. • Customers who feel their privacy has been invaded may "vote with their feet" **Moral and Ethical issues** • Abuse of civil liberties could damage reputation of shop **Legal issues:** • Shop may need to add extra software to blur out faces of non-customers • Shop will need to spend more money on data protection

Question			Answer/Indicative content	Marks	Guidance
					compliance, leading to higher costs.
					Evaluation: Benefits • Increased revenue from directed sales offset extra costs from hardware/legal obligations • Improved reputation through use of modern technologies may attract more customers Drawbacks: • Loss of customer base due to customers unhappy with "pushy techniques" • Poor public opinion from invasive advertising puts new customers off. **Examiner's Comments** Candidates were assessed on the quality of their extended response in this question. Most candidates understood the basic concept of storing personal details being a violation of customers civil liberties. Few candidates had a balanced discussion and focused too heavily on the negative aspects of this system therefore being restricted to a mid-level mark.
		Total		9	

Question	Answer/Indicative content	Marks	Guidance
6	**Mark Band 3–High Level (7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of legislation including the Computer Misuse Act. The material is generally accurate and detailed.

The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation.

The candidate provides a thorough discussion which is well balanced. Evaluative comments are consistently relevant and well-considered.

There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.

Mark Band 2-Mid Level (4-6 marks) The candidate demonstrates reasonable knowledge and understanding legislation including the Computer Misuse Act; the material is generally accurate but at times underdeveloped.

The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation.

The candidate provides a sound discussion, the majority of which is focused. Evaluative comments are for the most part appropriate, although one or two opportunities for development are missed. | 9 AO1.1 (2), AO1.2 (2), AO2.1 (2), AO3.3. (3) | **AO1** Computer Misuse Act is legislation aimed at criminalising unauthorised access to a computer system Three stages: Unauthorised access to a computer system Unauthorised access with intent to commit further offences Unauthorised modification of computer material Punishable by up to twelve months in prison and an unlimited fine.

AO2 Computer users who investigate how systems work require authorisation in order to not break the Act. Examples such as changing a social media post on a friend's mobile phone potentially breaks all three sections of the Act. Investigation of systems can break the Act without intent, e.g. by changing server logs because of their actions. Users must be aware of the Act (as with any other law) in order to be responsible.

AO3 Material available online (e.g. self study videos) that explain how systems work and teach without the need to investigate using unauthorised access. Investigating systems that you own yourself or have authorisation to access does not break the law. Systems are offered to users with strict conditions attached and investigation is not a legitimate excuse for breaking the law. Ethical / white hat hackers will not break this law because they have authorisation. Grey and black hat hackers will break |

Question			Answer/Indicative content	Marks	Guidance
					Computer Misuse Act.
			There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence. **Mark Band 1-Low Level (1-3 marks)** The candidate demonstrates a basic knowledge of legislation including the Computer Misuse Act; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** No attempt to answer the question or response is not worthy of credit.		
			Total	**9**	

	Question		Answer/Indicative content	Marks	Guidance
7			**Mark Band 3–High Level (7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of electronic communication monitoring techniques and the social and legal impact of this. The material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate provides a thorough discussion which is well balanced. Evaluative comments are consistently relevant and well-considered. There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Mark Band 2-Mid Level (4-6 marks)** The candidate demonstrates reasonable knowledge and understanding electronic communication monitoring techniques and the social and legal impact of this; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation. The candidate provides a sound discussion, the majority of which is focused. Evaluative comments are for	9 AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)	**AO1** Encryption means that data is scrambled so that if it is intercepted, it cannot be understood. Requires the use of a key to decrypt. Symmetric encryption uses on key for encrypt/decrypt and so key exchange is problematic. Asymmetric encryption uses different keys (public and private) so no need to exchange keys. Regulation of Investigatory Powers Act (RIPA) gives authorities the power to compel disclosure of encryption keys **AO2** Encrypted messages cannot be read by outsiders without the key RIPA gives Police the power to insist on users decrypting messages / handing over the key to allow reading of messages. Many messaging services already include end-to-end encryption by default Use of VPNs to re-route traffic and attempt to escape monitoring possible The ending of encrypted data shows that two parties are passing information they want to keep secret. Techniques like steganography can be used to his the existence of encrypted data. **AO3** Monitoring communication runs the risk of revealing secret but non-illegal communications Restricting encryption means that secure sites (eg banks) may struggle to function Legislation (RIPA) already ensures that communications can be monitored if there is just cause Routine monitoring runs the risk of

Question	Answer/Indicative content	Marks	Guidance
	the most part appropriate, although one or two opportunities for development are missed. There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence. **Mark Band 1-Low Level (1-3 marks)** The candidate demonstrates a basic knowledge of electronic communication monitoring techniques and the social and legal impact of this; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** No attempt to answer the question or response is not worthy of credit.		false-positives However, will reduce risk of illegal activities being co-ordinated (e.g. terrorism, drug trafficking).
	Total	**9**	

Question	Answer/Indicative content	Marks	Guidance
8	**Mark Band 3–High Level** **(7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of relevant data collection methods. They have covered a range of ethical issues and relevant legislation; the material is generally accurate and detailed across all three. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate has used a range of ethical implications and laws to justify their conclusion *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Mark Band 2-Mid Level** **(4-6 marks)** The candidate demonstrates reasonable knowledge and understanding of relevant data collection methods. They have covered ethical issues and relevant legislation; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation. The candidate has either good consideration of ethical issues or legal issues or a weaker consideration of both. These are used to come to some justification although it may not be completely justifiable.	9 AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)	**AO1.1** • Automatic Number Plate Recognition (ANPR) could be used. This makes use of OCR to turn number plates on camera into digital characters. • Use of a token/ticket could be used when cars enter the car park which is time stamped. • Staff could be employed to manually record the time cars enter the car park and then again when cars leave. • Sensor could be used to detect cars entering / leaving the car park. • Photographs of vehicles can be taken when cars enter / leave the car park. These can be time stamped. **AO2.1** • Data will be input into an algorithm that will work out the price based on amount of time car has spent in car park. • If the car park is considering storing videos / photographs of the cars then they will need to follow current data protection legislation as these may contain faces of people. • Car park users may see this as an invasion of privacy. Civil liberty issues as movements are being tracked / monitored. • Automated systems are likely to be more reliable and will produce statistical data that can be analysed better. Manual methods may be prone to human error. Automatic methods will allow for quicker processing than if a human was doing it. • Lower overheads as no human to

Question			Answer/Indicative content	Marks	Guidance

			There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.
			
			Mark Band 1-Low Level
			(1-3 marks)
			The candidate demonstrates a basic knowledge of relevant data collection methods. They have covered ethical issues or relevant legislation; the material is basic and contains some inaccuracies.
			The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides comes to a conclusion though there may be little considerations of legal or ethical issues to back it up.
			
			The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.
			
			0 marks
			No attempt to answer the question or response is not worthy of credit.
					employ.
					• They could connect to the other databases (e.g. police and DVLA) to check that cars are genuine (e.g. can check if cars have been stolen)
					• If connecting the cameras over the internet, then this would make them susceptible to hackers and therefore security methods would need to be put in place.
					
					AO3.3
					
					• If automated systems are used then this can lead to improved customer satisfaction and lower costs due to streamlined system. However this could lead to less employment in the local area as computer systems taking over jobs.
					• Some people may be afraid of using carpark due to cameras.
					• Data protection laws should mean consumers are protected
					  ○ System secure
					  ○ Data only stored for a short time
					  ○ Only relevant data stored

			Total	**9**	

Question			Answer/Indicative content	Marks	Guidance
9	a		<table><tr><td>Scenario</td><td>Computer Misuse Act</td><td>Copyright Design and Patents Act</td><td>Data Protection Act</td></tr><tr><td>A bank accidentally publishes customers' account details on its website.</td><td></td><td></td><td>✓</td></tr><tr><td>Someone downloads a pirated version of a piece of software that users would ordinarily have to pay for.</td><td></td><td>✓</td><td></td></tr><tr><td>Someone writes and distributes a virus.</td><td>✓</td><td></td><td></td></tr></table> 1 Mark per row	3 (AO2.1)	
	b		– Sets out to empower/ limit the extent... – to which <u>public bodies</u> … – can use technological surveillance.. – This can include monitoring internet activity – Electronic communications – And forcing users to hand over encryption keys (1 per - , max 3)	3 (AO1.2)	<u>**Examiner's Comments**</u> Many candidate responses lacked the technical terminology appropriate for this level of study. The terms 'surveillance' and 'communication' were used too generically. Candidates need to make it clear that the surveillance is technological and the communication electronic.
			Total	**6**	

Question	Answer/Indicative content	Marks	Guidance
10	**Mark Band 3–High Level (7–9 marks)** The candidate demonstrates a thorough knowledge and understanding issues around computers and the workforce and Artificial Intelligence. The material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence / examples will be explicitly relevant to the explanation. The candidate provides a thorough discussion which is well balanced. Evaluative comments are consistently relevant and well-considered. There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Mark Band 2-Mid Level (4–6 marks)** The candidate demonstrates reasonable knowledge and understanding issues around computers and the workforce and Artificial Intelligence; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the	AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3) 9	Points may include but aren't limited to: **AO1 Knowledge and Understanding** Artificial Intelligence (AI) is the study of computers displaying intelligent behaviour (usually characterised by decision making). AI techniques include neural networks, evolutionary computation, Bayesian networks etc. Computers are well suited to certain jobs and as AI techniques improve the range of jobs they can do is likely to increase. **AO2.1 Application** **For the argument:** Many jobs have already been taken over by computers. Manual job such as work in the automotive industry has been replaced by robots. Computer based systems are attractive to employers, they don't require paying, don't get sick and can work 24/7 without making mistakes. Computer systems can be used for work that is considered dangerous for humans And for repetitive and menial tasks. Future developments may make computers better at highly skilled tasks making computers preferable

Question	Answer/Indicative content	Marks	Guidance
	context provided although one or two opportunities are missed. Evidence / examples are for the most part implicitly relevant to the explanation. The candidate provides a sound discussion, the majority of which is focused. Evaluative comments are for the most part appropriate, although one or two opportunities for development are missed. There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence. **Mark Band 1-Low Level (1–3 marks)** The candidate demonstrates a basic knowledge around computers and the workforce and Artificial Intelligence.; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks**		And in the case of certain tasks (e.g. surgery) would make the use of human workers unethical. May cite recent developments in AI (e.g. beating world Go Champion) **Against the argument:** As technology develops people will be required to design these new systems. It is likely to assist but not take over all roles Producing a more skilled workforce Developments in AI have been forecast for many decades but never materialised. Forecasts as to the development of AI have always been wildly optimistic There is debate as to whether AI will ever be able to show human levels of intelligence. Tasks that humans find inherently 'easy' are still beyond the reach of computers. Crucially for many areas of work computers will have to pass the Turing Test – i.e. converse to such a level that will enable them to pass as human… …Most believe this is still well beyond our current understanding. Laws would need changing as currently people have the right to have automated decisions checked over by humans (DPA)

Question			Answer/Indicative content	Marks	Guidance
			No attempt to answer the question or response is not worthy of credit.		**AO3.3 Evaluation** Candidate should have come to a well reasoned conclusion for or against the argument. They could come down on either side, the important thing is they have considered both points of view and based their conclusion on the evidence they have discussed. **Examiner's Comments** Candidates were assessed on the quality of their extended response in this question. Many candidates offered a balanced discussion although some of the examples used did not demonstrate that the candidate understood the difference between AI and robotic automation. Conclusions were often not fully justified / reasoned. Many candidates scored in the mid-level band on this question.
			Total	9	

Question			Answer/Indicative content	Marks	Guidance
11			**Mark Band 3–High Level** **(7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of a wide range of technical and design measures that make a website accessible; the material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate provides a thorough discussion which is well-balanced. Evaluative comments are consistently relevant and well-considered. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Mark Band 2 –Mid Level** **(4-6 marks)** The candidate demonstrates reasonable knowledge and understanding of a range of technical and design measures that make a website accessible; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation The candidate provides a reasonable discussion, the majority of which is focused. Evaluative comments are for the most part appropriate, although one or two opportunities for development are missed. *There is a line of reasoning presented with some structure. The information*	9 AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)	**AO1: Knowledge and Understanding** The following is indicative of possible factors/evidence that candidates may refer to but is not prescriptive or exhaustive: Methods of improving accessibility: Using text alternatives for images Changing styles using CSS Avoiding combining colours that may be indistinguishable by those with colour blindness. Using character sets and fonts that support different alphabets. Using server side processing to amend the content shown. Writing web pages to facilitate screen readers (such as giving hyperlinks meaningful names and not just "click here"). Using tables for tabular data (as they are intended) and not layout (again to aid screen readers). Ensuring that all content can be accessed with the keyboard alone in a logical way. Avoiding CAPTCHA. **AO2.1: Application** The selected knowledge/examples should be directly related to the specific question. The example below is not prescriptive or exhaustive:

Question			Answer/Indicative content	Marks	Guidance
			presented is in the most part relevant and supported by some evidence. **Mark Band 1-Low Level** **(1-3 marks)** The candidate demonstrates a basic knowledge of how a website can be made accessible. Limited understanding shown of how these design or technical issues behind it; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** No attempt to answer the question or response is not worthy of credit.		- Using the alt attribute with the img tag allows descriptive text to be shown where the image cannot be loaded or the user has disabled images (e.g. a screen reader). - By having multiple external style sheets the look of the page can be switched. This might include changing the layout for smaller devices or increasing font size and contrast of colours for people who are visually impaired. - JavaScript may be used to allow users to switch style sheets without having to reload the page - Choosing colours is important as to people with colour blindness might for example not be able to see green text on a red background. - Designers also need to have an awareness of the cultural meanings of colours. - Use of Unicode supports all character sets. - If the website is processed Server side the content itself can be changed according to the user. The language used may be determined by the user's IP address. Cookies may be used to save the user's preferences. **AO3.3: Evaluation** The following is indicative of possible evaluation points that candidates may refer to but is not prescriptive or exhaustive: Simple design considerations can have

Question			Answer/Indicative content	Marks	Guidance
					a positive effect on accessibility. Colours and fonts affect readability. A good design can be accessible to a wide audience. Standards exist to help maximum accessibility for those with disabilities. Use of web technologies can then personalise the output to help ensure the site is specifically accessible to the individual. **Examiner's Comments** Candidates were assessed on the quality of their extended response in this question. Most candidates could cite some design measures which could be applied to aid accessibility. Few candidates described neither technical measures nor the technicality of implementing the design features. Fewer candidates effectively evaluated the effect of their suggested measures. This resulted in few candidates achieving in the high mark band on this question.
			Total	9	

Question	Answer/Indicative content	Marks	Guidance
12	**Mark Band 3–High Level (7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of to what extent all three of the laws apply to this scenario; the material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence / examples will be explicitly relevant to the explanation. The candidate provides a thorough discussion which is well-balanced. Evaluative comments are consistently relevant and well-considered. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Mark Band 2 –Mid Level (4-6 marks)** The candidate demonstrates reasonable knowledge and understanding of to what extent the three laws apply to the scenario; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence / examples are for the most part implicitly relevant to the explanation. The candidate provides a reasonable discussion, the majority of which is focused. Evaluative comments are for the most part appropriate, although one or two opportunities for development are missed *There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.*	9	**AO1: Knowledge and Understanding** *The following is indicative of possible that candidates may refer to but is not prescriptive or exhaustive:* Any individual or organisation that produces media has their ownership of that media protected by the Copyright, Designs and Patents Act. *(Accept Copyright Act)* This means other parties are not allowed to reproduce or redistribute it without permission. Gaining unauthorised access to a computer system is in breach of the Computer Misuse Act. Gaining unauthorized access with intent to commit a crime is a more severe offence under the act. The Data Protection Act is designed to protect personal data and focuses on the data holder **AO2.1: Application** *The selected knowledge / examples should be directly related to the specific question. The following is indicative of possible factors / evidence that candidates may refer to but is not prescriptive or exhaustive:* Posting the material on the Internet would be in breach of the Copyright, Designs and Patents Act. As the hacker is gaining unauthorised access to the network they are breaking the Computer Misuse Act. As they are accessing it with the intent of committing a further crime (i.e. breaking the Copyright, Designs &

Question			Answer/Indicative content	Marks	Guidance
			Mark Band 1-Low Level (1-3 marks) The candidate demonstrates a basic knowledge of legal issues surrounding the scenario with limited understanding shown; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated. *The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.* **0 marks** No attempt to answer the question or response is not worthy of credit.		Patents Act) they are committing the most second serious offence under this Act. Were they to amend any data on the network whilst on there they would be committing an even more serious offence. As DPA focuses on personal data the hacker would not be in breach of this law. However if whilst on the network the hacker were able to access employee data the company could find themselves in trouble. **A03.3:Evaluation** The relative weights of the three acts and the impact that they have in relation to the question: copyright and patent act highly relevant if clips are shared, computer misuse act relevant due to unauthorised access, data protection act only relevant if personal data is accessed (affects company obligations not the hacker.) **Examiner's Comments** Candidates were assessed on the quality of their extended response in this question. Most candidates could describe each of the laws appropriately, with some applying them to the scenario. However, fewer candidates discussed the extent to which the laws could be applied in the scenario. Therefore limiting credit awarded, in many cases, to the low / mid level mark band. Centres should encourage candidates to structure their response to clearly address all parts of the question.
			Total	9	

Question			Answer/Indicative content	Marks	Guidance
13			Points to include: - –People are becoming more reliant on portable computer systems - –Instant access to data - –Accessible anywhere (where there is a signal) - –Problems for those in society who are technologically unaware - –Problem with divided society, the haves and the have nots - –Social interaction apps make contacts more plentiful - –No difficulty in contacting individuals or groups of individuals - –Problems caused by social pressures to conform and use them - –Problems caused by online bullying - –Loss of traditional means of communication	8	**Mark band 6 – 8. Higher level response** Candidate has discussed the effects of portability of devices AND social interaction applications on society. The candidate has discussed BOTH the positive and negative effects of portability and social interaction applications on society. Candidate has used appropriate technical terminology throughout. There are few if any spelling errors or errors of grammar. **Mark band 3 – 5. Medium level response** Candidate has discussed effects of portability of devices OR social interaction applications on society and has discussed both the positive and negative. OR Candidate has discussed the effects of portability of devices AND social applications on society but has only discussed either the positive or negative effects but not both. Candidate has used some appropriate technical terminology in the response. There may be spelling errors or errors of grammar in the response but they are not obtrusive. **Mark band 0 – 2. Low level response** Candidate has described an effect of portability of devices or social interaction apps on society. Candidate has failed to use appropriate technical terminology. There are likely to be spelling errors and / or errors of grammar, which will disrupt the flow of the response. **Examiner's Comments**

Question			Answer/Indicative content	Marks	Guidance
					This was a QWC question. Most candidates were credited medium level band or above. There were some very good responses that looked at the implications of portable computing on work, life and society in general, citing both positive and negative effects. For the most part, candidates focused on the impact on social interaction, specifically through the use of social networking. Some candidate responses lacked structure. Centres should encourage candidates to structure their response to clearly address all strands in the stem of the question.
		Total		8	