



## 8.1 Individual, social, legal and cultural issues

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date: \_\_\_\_\_

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Time: **199 minutes**


Marks: **169 marks**

Comments:

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**Q1.**

Explain some of the challenges that face legislators in the digital age.



**(Total 3 marks)**

**Q2.**

Google have a service called Street View which allows a user to view surroundings from street-level. Google have extended their Street View service to cover the inside of buildings such as museums and sports stadiums.

Discuss a range of ethical, legal and cultural issues that Google may have needed to deal with when extending the service.

**(Total 9 marks)**

**Q3.**

Between 2008 and 2010, a company that was gathering data for an online mapping system, using cars fitted with cameras and WiFi equipment, collected some information that was being transmitted on personal WiFi networks. The company apologised for doing this and an investigation found that a small number of software developers had been responsible for adding this functionality to the mapping system data collection software.

In the context of this example, discuss:

- how it was possible for this data to be collected.
- what steps the owners of the networks could have taken to prevent the data from being collected.
- what legal and ethical issues might have arisen as a result of collecting this data.
- what lessons the company might have learnt from the incident and how their practices might have changed as a result of it.

In your answer you will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

(Total 12 marks)

**Q4.**

- (a) Describe **two** important properties of a robot.

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(2)

- (b) Do you believe that a computer will ever be as intelligent as a human being?

Tick **one** row in the table below to indicate your opinion, then, in the space underneath the table, give reasons for this. Marks will be awarded for the development of a reasoned justification of your opinion.

Statement	Tick One
A computer will, at some time in the future, be as intelligent as a human being.	
A computer will never be as intelligent as a human being.	

Reasons

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(3)

- (c) (i) Some people say that a hacker is someone who loves to program or who enjoys playful cleverness, or a combination of the two.

What is the more common definition of a hacker?

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(1)

(ii) Which law aims to protect companies against computer hacking?

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(1)

(iii) Identify **two** reasons why it is difficult to identify and catch computer hackers.

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(2)

(Total 9 marks)

### Q5.

(a) Below is a numbered list of the names of some of the legislation that applies in situations where computers are used:

1. Copyright, Designs and Patents Act
2. Computer Misuse Act
3. Regulation of Investigatory Powers Act
4. Health and Safety Regulations
5. Data Protection Act

For each of the situations given below, identify the relevant legislation which is being followed. Write the number that corresponds to the appropriate legislation in the box given after each situation.

Marcus wanted an MP3 of a recent song so he went to an online music store. After paying he was able to immediately download the purchased song.

Legislation

A new workstation is installed in an office and an assessment is performed regarding the lighting for the workstation and the positioning of the desk, monitor and chair.

Legislation

Mr Smith hands over his 50-character encryption key in response to a request from the authorities investigating a fraud case.

Legislation

(3)

- (b) The operators of a number of multi-storey car parks have installed systems to scan and recognise number plates. The system is used at both the entrance and exit of the car parks so that the arrival and leaving times can be recorded.

Customers can set up an account so that money is automatically debited when their car number plate is recognised as the car leaves the car park.

Customers who do not have an account can use their mobile phones to pay the car parking fees by sending a text message to a specified number with their number plate details and length of stay.

As these car parks are based around the UK the company also collects location-specific data.

- (i) The number plate recognition system uses CCTV cameras and OCR software.

What is the full name of the technique known by the abbreviation OCR?

\_\_\_\_\_

(1)

- (ii) The company will need to follow the Data Protection Act as they will be storing personal data.

What is meant by personal data?

\_\_\_\_\_

(1)

- (iii) Why might the storing of number plate details, mobile phone numbers and location-specific data be a concern for privacy campaigners?

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

(2)

(Total 7 marks)

## Q6.

A school has recently launched a 'Parent Portal' which is a website that provides information from the school. By logging on to the portal a parent can access the information that is stored about their son or daughter. This information includes academic reports, discipline records and other personal data.

- (a) A parent recently contacted the school because he was concerned that when he logged on to read his daughter's report he could access the reports of all the other students.

The school should immediately look into this concern as a law has been broken. State the **full name** of the law that has been broken.

- \_\_\_\_\_ (1)
- (b) Which principle of the law identified in your answer to part (a) has been broken?

\_\_\_\_\_  
\_\_\_\_\_ (1)

- (c) State another principle of the law identified in your answer to part (a).

\_\_\_\_\_  
\_\_\_\_\_ (1)

- (d) A parent also noted that the website was using HTTP (HyperText Transfer Protocol).

Why should the school be concerned about the use of this protocol and which protocol would you recommend that the school should use instead?

Why concerned

Suggested protocol

- (e) The process of writing reports and then allowing access to these reports via the parent portal involves the use of many different categories of software.

Below is a list of different categories of software:

Operating system, Utility program, Special purpose application software, Bespoke application software, General purpose application software

Complete **Table 1** by writing the correct category from the list above in the **Category** column next to the appropriate **Software**.

You should **not** use a category more than once.

**Table 1**

<b>Software</b>	<b>Category</b>
Word processor used to write the pupil reports	
The parent portal web application which was programmed for this school	
The web server software run by the school	

(3)  
(Total 8 marks)

**Q7.**

Students often search online for music files and then download them to their computer, mobile phone or music player.

- (a) State the **full name** of the law that students might have broken by downloading music files in this way.

\_\_\_\_\_ (1)

- (b) State **two** arguments against music being available for free on the Internet.

Your answers should **not** refer to the law asked for in part (a).

Argument 1 \_\_\_\_\_

\_\_\_\_\_

Argument 2 \_\_\_\_\_

\_\_\_\_\_

(2)

- (c) Many websites now offer the ability to download music files which are without any DRM(Digital Rights Management) protection.

State **two** advantages to students of DRM-free files over files that have DRM restrictions.

Advantage 1 \_\_\_\_\_

\_\_\_\_\_

Advantage 2 \_\_\_\_\_

\_\_\_\_\_

(2)

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(Total 5 marks)

**Q8.**

An ICT technician at a secondary school has access to a variety of programs that she uses to manage a group of servers.

- (a) State **one** use for each of the protocols listed below.

(i) Telnet: \_\_\_\_\_

(1)

(ii) FTP: \_\_\_\_\_

(1)

(iii) POP3: \_\_\_\_\_

(1)

- (b) Whilst remotely connecting to one of the servers the technician executes a

command that displays the current network connections. The table below shows these network connections.

Active Internet Connections					
Proto	Recv-Q	Send-Q	Local Address	Foreign Address	(state)
tcp4	0	0	192.168.3.205:80	74.125.4.148:58539	ESTABLISHED
tcp4	0	0	192.168.3.205:80	208.43.202.29:57458	ESTABLISHED
tcp4	37	0	192.168.3.205:25	208.43.202.29:57459	CLOSE_WAIT

From the table above provide an example of the following:

(i) IP address: \_\_\_\_\_ (1)

(ii) Port:: \_\_\_\_\_ (1)

(iii) Socket: \_\_\_\_\_ (1)

(c) State **two** reasons why the technician uses remote management software from her computer rather than going to the actual servers.

Reason 1: \_\_\_\_\_

Reason 2: \_\_\_\_\_

**EXAM PAPERS PRACTICE** (2)  
(Total 8 marks)

### Q9.

You have been asked to design and set up a computer work area for the employees of a library.

(a) State the legislation that is concerned with how the work area should be physically set out and state two ways that this legislation will affect the design.

Legislation: \_\_\_\_\_

Affect 1: \_\_\_\_\_

Affect 2: \_\_\_\_\_

(3)

(b) Application software has already been installed onto computers in another room.

- (i) State the **full name** of the law that may be broken by installing the same software onto the new computers.

\_\_\_\_\_

(1)

- (ii) What information should you find out before installing this software to ensure that you will comply with the law identified in part (i)?

\_\_\_\_\_  
\_\_\_\_\_

(1)

- (c) As soon as an employee logs onto one of the computers they have to agree to the Code of Conduct relating to their use of the computer system.

What is a *Code of Conduct*?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(1)

(Total 6 marks)

### Q10.

There are various formats of optical storage media currently available.

- (a) Choose the most appropriate medium from the list below that would be best suited to the purpose given. Write your answer in the Medium column in the table below. You must **not** use the same medium more than once.

CD-ROM, CD-R, CD-RW, DVD-R, DVD-RW, Blu-Ray

Purpose	Medium
To distribute 300MB of commercial software	
To store a 20GB high definition movie file	
To use for a 3GB archive of the data on a school server	
To create a copy of a 60 minute audio music album	

(4)

- (b) Describe how data is written to and read from a CD-R disk.

\_\_\_\_\_

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(3)

- (c) A series of word-processed documents have been archived onto CD-R.

State **two** reasons why in 20 years' time it might be impossible to open up these documents.

Reason 1: \_\_\_\_\_

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Reason 2: \_\_\_\_\_

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(2)

(Total 9 marks)

**Q11.**

An Internet Service Provider (ISP) has instructed a firm of solicitors to investigate the download activities of the ISP's clients.

- (a) What is the primary role of an ISP?

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(1)

- (b) The clients under investigation are alleged to have downloaded music files from a file-sharing site.

The ISP wishes the firm of solicitors to investigate whether any laws have been broken.

State the **full name** of the law which might have been broken by the clients downloading music files.

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(1)

- (c) The ISP stores personal data concerning each of its clients.

What is meant by the term *personal data*?

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(1)

- (d) The firm of solicitors discovers during their investigation that the same clients have been downloading personal data relating to other clients of the ISP without authorisation.

(i) State the **full name** of the law that may have been broken by the ISP.

\_\_\_\_\_ (1)

(ii) State the **full name** of the law that may have been broken by the clients.

\_\_\_\_\_ (1)  
(Total 5 marks)

### Q12.

A well established use for robots in industry is the spraying of car bodies on a car production line.

A robotics researcher is investigating the feasibility of developing and installing in a car a computer-based control system to take over completely the driving of the car on public highways.

She has identified some of the inputs into the control system already:

- detailed map
- current weather report.

And some of the outputs:

- position of steering wheel (in degrees from the vertical)
- forces on accelerator and brake pedals.

Discuss why automated car control is a harder programming problem to solve than developing programmed control of a robot for spraying car bodies on a car production line.

For full marks your discussion must cover both programming problems.

\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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(Total 4 marks)

**Q13.**

- (a) If you borrow a shop bought music CD and “rip” (copy) the tracks to your hard disk before you give the CD back to your friend, you have probably broken a law.

State which law you are likely to have broken.

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(1)

- (b) Alternatively, you could download music from an official music website on the Internet. The website owners might protect this music using Digital Rights Management.

Give **two** examples of how Digital Rights Management could prevent you from sharing downloaded music with a friend.

1. 

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2. 

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(2)

(Total 3 marks)

**Q14.**

What are machines good and bad at, in comparison to humans?

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**Q15.**

- (a) State a task that could be carried out by a robot.

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(1)

- (b) Explain why a robot is suited to completing the task that you have identified in part (a).

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(2)

(Total 3 marks)

**Q16.**

Discuss the arguments for and against the use of Digital Rights Management (DRM) to protect digital music and videos.

In this question you will also be assessed on your ability to use good English and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.

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(Total 6 marks)

**Q17.**

A company that develops computer software has just taken on a new employee.

- (a) The actions of the employee and company are covered by several laws.

Name the law that would be most relevant in each of the following cases.

- (i) The employee brings into work a copy of a computer game that he has purchased and already installed on his home computer. He installs it on his work computer.

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(1)

- (ii) The employee gains access to company confidential data by correctly guessing a manager's username and password.

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(1)

- (iii) The company issues the employee with a voucher once a year for a free eye test.

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(1)

- (b) The company makes the employee sign a Code of Conduct before he is allowed to start work.

- (i) What is a Code of Conduct?

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(2)

- (ii) Why does the company have a Code of Conduct rather than just expecting employees to obey the law?

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(2)

(Total 7 marks)

**Q18.**

Imagine that you are a computer programmer in a company that stores personal data. The company must comply with the Data Protection Act.

- (a) What is personal data?

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(1)

- (b) You are writing a new program to handle personal data.

State **one** principle of the Data Protection Act that could be met by the careful design of your program.

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(1)

- (c) Name **one** feature that you could include in your program and describe how it would help the company comply with the principle stated in part (b).

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(2)

(Total 4 marks)

**Q19.**

A company sells music to its customers over the Internet. The music can be downloaded as files and saved on the user's computer. It is protected by Digital Rights Management (DRM).

- (a) What is DRM and why does the company use it to protect the music that it sells?

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(3)

- (b) Explain how the company could use DRM to protect its music.


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(2)

(Total 5 marks)

**Q20.**

- (a) Describe what is meant by a robot.

**EXAM PAPERS PRACTICE**

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(2)

- (b) Illustrate your answer to part (a) with an example application of where robots are used and why.

Application: \_\_\_\_\_

Why: \_\_\_\_\_

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(2)

(Total 4 marks)

**Q21.**

A company stores all its data in an on-line information retrieval system. Some of this data is personal data about the employees; some of it is confidential data about the business. All staff have authorised access to those parts of the system which they need to carry out their job role.

- (a) (i) Describe **two** distinct steps that should be taken to minimise unauthorised access by staff to those parts of the system they have no need to access in order to carry out their job role.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

(4)

- (ii) How could such unauthorised access be detected?

\_\_\_\_\_

\_\_\_\_\_

(1)

- (b) What safeguards should be used to keep the data protected from loss or corruption due to:

- (i) Hackers

\_\_\_\_\_

(1)

- (ii) Viruses

EXAM PAPERS PRACTICE

\_\_\_\_\_

(1)

- (iii) A system failure caused, for example, by a power cut?

\_\_\_\_\_

(1)

- (c) Describe **one** further safeguard which needs to be in place to enable the company to get back into operation swiftly and effectively after a serious problem causing a complete system failure.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(1)

(Total 9 marks)

**Q22.**

An architect has been asked to design a 'smart' home using components of a computer-controlled home automation system, for a client who uses a wheelchair. The client cannot stand easily and has limited use of their arms.

The architect has the following components to choose from:

- Radio-frequency remote controls
- Programmable switching units to control appliances
- Movement detectors
- CCTV (Closed Circuit TV)
- Fingerprint door locks
- Climate control system
- Motors to operate doors/curtain-rails/shutters
- Voice recognition system

For **three** of the above devices, state the device and explain its use for a home automation system and why it would help the client.

Device 1: \_\_\_\_\_

Use: \_\_\_\_\_

Why: \_\_\_\_\_

Device 2: \_\_\_\_\_

Use: \_\_\_\_\_

Why: \_\_\_\_\_

Device 3: \_\_\_\_\_

Use: \_\_\_\_\_

Why: \_\_\_\_\_

(6)

(Total 6 marks)

**Q23.**

- (a) Spam is unwanted advertising e-mail. It has been estimated that it accounts for more than half of e-mail traffic. Explain **three** different unwelcome consequences of spam; **one** social, **one** economic and **one** ethical.

Social \_\_\_\_\_

\_\_\_\_\_  
(2)

Economic

\_\_\_\_\_  
\_\_\_\_\_  
(2)

Ethical \_\_\_\_\_

\_\_\_\_\_  
(2)

- (b) Give **one** method of restricting the effects of spam.

\_\_\_\_\_  
(1)

(Total 7 marks)

#### Q24.

Computer software is protected by the Copyright, Designs and Patents Act 1988, amended by subsequent legislation.

- (a) What is meant by copyright in the context of computer software?

\_\_\_\_\_  
\_\_\_\_\_  
(1)

- (b) Under the terms of the licensing agreement, what is a purchaser legally entitled to do with the purchased PC software?

\_\_\_\_\_  
(1)

- (c) Give **two** ways a purchaser might wish to use the purchased PC software, which are forbidden under this legislation.

1. \_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_  
(2)

(Total 4 marks)

#### Q25.

A company backed by the UK government has been set up to provide on-line degrees

from UK universities. All study material, tutorials and assessment will be on-line.

Students, aged 18 to 80, from all over the world have registered to study courses. Businesses are also being encouraged to take advantage of this scheme for the continuous professional development of their employees.

(a) Give **one** economic or social advantage to **each** of the following:

(i) UK universities for being partners in this scheme;

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(1)

(ii) students living overseas for registering with such a course of study;

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(1)

(iii) businesses for registering their employees on such a course of study.

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(1)

(b) Certain hardware and software are specifically required to study in this way.

Give **one** example of:

hardware; \_\_\_\_\_

software. \_\_\_\_\_

(2)

(Total 5 marks)

## Q26.

A well-known software company has constructed a media player to query an on-line database at the company's headquarters. It retrieves the titles of tracks on audio CD's for display in the media player's window. In the process it assigns a unique identifying digital fingerprint to the computer playing the audio track.

In a separate transaction, the company can then link this digital fingerprint to an e-mail sent from the same computer. This links the user's e-mail address to the music interests of the user for marketing purposes.

(a) Explain one benefit to

(i) the user

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(1)

- (ii) the software company.

(1)

- (b) Why might the use of the link be considered unethical?

(1)

(Total 3 marks)

### Q27.

The United Kingdom's National Health Service was created to provide health care to the nation through:

- hospitals
- health centres/GPs' (doctors') surgeries
- pharmacies (chemists).

The UK government is proposing to computerise and network the entire National Health Service (NHS) so that it will be possible to have on-line *access to the system at a level of security relevant to their status* for anyone who

- works for the NHS
- uses its services
- works at a branch of government responsible for the NHS.

Patient records will be stored in multi-user distributed relational databases managed by *Database Management Systems (DBMS)*.

- Every person in the UK is assigned a unique numeric key, *the patient reference number*, and is assigned for primary health care to a doctor in a health centre or a GPs (General Practitioner's or doctor's) surgery located in a single building.
- A person's doctor may, if necessary, arrange for the person to see a specialist doctor in a hospital.
- Drugs prescribed for a person by the person's GP for the treatment of an illness are obtained from a pharmacy.
- Every computer in the service of the NHS will be interconnected in *local area networks* (LANs) and the *local area networks* will be interconnected by a *wide area network* (WAN).

Which network type is most appropriate, WAN or LAN, **within** a health centre or GPs (doctor's) surgery? Justify your choice.

(Total 2 marks)

**Q28.**

Electronic Funds Transfer (EFT) makes it possible for a company in the UK to pay for goods manufactured in Malaysia without needing physically to exchange money in the form of coins, notes or cheques. The transfer is carried out electronically by messages sent between the company's bank and the supplier's bank.

- (a) Why must EFT systems be available for use 24 hours a day?

(1)

- (b) EFT messages are encrypted before being sent. Give **one** reason why this is done in this context.

(1)

- (c) Some governments have passed laws that require banks to lodge with them the encryption keys that are used to decrypt EFT messages. Give **one** reason why this is done.

(1)

**EXAM PAPERS PRACTICE** (Total 3 marks)

**Q29.**

In some countries government agencies routinely monitor the content of e-mail routed over the Internet.

- (a) Give **two** reasons why some governments may allow this to happen.

1. \_\_\_\_\_

(1)


2. \_\_\_\_\_

(1)

- (b) Suggest **one** way in which an individual may make it difficult for any such agency to read the content of a particular e-mail sent over the Internet.

**(Total 3 marks)**

A company has all its records stored on the company's networked computer system which is also connected to the Internet. State **three** distinct ways in which the company's data might be corrupted or lost, and for **each** of the three suggest how the company could protect itself.



## EXAM PAPERS PRACTICE