PG ONLINE

ClearRevise

Illustrated revision and practice

BTEC Tech Award

Digital Information Technology

Component 3

ClearRevise™

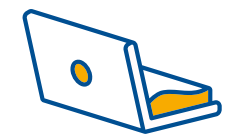
BTEC Level 1/2 Tech Award **Digital Information Technology**

Component 3: Effective Digital Working Practices

Illustrated revision and practice

Published by
PG Online Limited
The Old Coach House
35 Main Road
Tolpuddle
Dorset
DT2 7EW
United Kingdom

sales@pgonline.co.uk
www.pgonline.co.uk
www.clearrevise.com
2020



PG ONLINE

PREFACE

Absolute clarity! That's the aim.

This is everything you need to ace your exam and beam with pride. Each topic is laid out in a beautifully illustrated format that is clear, approachable and as concise and simple as possible.

Each section of the specification is clearly indicated to help you cross-reference your revision. The checklist on the contents pages will help you keep track of what you have already worked through and what's left before the big day.

We have included worked examination-style questions and case studies with answers for almost every topic. This helps you understand where marks are coming from and to see the theory at work for yourself in an examination situation. There is also a set of exam-style questions at the end of each section for you to practise writing answers for. You can check your answers against those given at the end of the book.

LEVELS OF LEARNING

Based on the degree to which you are able to truly understand a new topic, we recommend that you work in stages. Start by reading a short explanation of something, then try and recall what you've just read. This has limited effect if you stop there but it aids the next stage. Question everything. Write down your own summary and then complete and mark a related exam-style question. Cover up the answers if necessary, but learn from them once you've seen them. Lastly, teach someone else. Explain the topic in a way that they can understand. Have a go at the different practice questions and case studies – they offer an insight into how and where marks are awarded.

ACKNOWLEDGEMENTS

The questions in the ClearRevise textbook are the sole responsibility of the authors and have neither been provided nor approved by the examination board.

Every effort has been made to trace and acknowledge ownership of copyright. The publishers will be happy to make any future amendments with copyright owners that it has not been possible to contact. The publisher would like to thank the following companies and individuals who granted permission for the use of their images in this textbook.

Design and artwork: Jessica Webb / PG Online Ltd
Graphics / images: © Shutterstock

First edition 2020. 10 9 8 7 6 5 4 3 2 1
A catalogue entry for this book is available from the British Library
ISBN: 978-1-910523-26-1
Copyright © PG Online 2020
All rights reserved
No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the prior written permission of the copyright owner.

Printed on FSC certified paper by Bell and Bain Ltd, Glasgow, UK.

THE SCIENCE OF REVISION

Illustrations and words

Research has shown that revising with words and pictures doubles the quality of responses by students.[1] This is known as 'dual-coding' because it provides two ways of fetching the information from our brain. The improvement in responses is particularly apparent in students when asked to apply their knowledge to different problems. Recall, application and judgement are all specifically and carefully assessed in public examination questions.

Retrieval of information

Retrieval practice encourages students to come up with answers to questions.[2] The closer the question is to one you might see in a real examination, the better. Also, the closer the environment in which a student revises is to the 'examination environment', the better. Students who had a test 2–7 days away did 30% better using retrieval practice than students who simply read, or repeatedly reread material. Students who were expected to teach the content to someone else after their revision period did better still.[3] What was found to be most interesting in other studies is that students using retrieval methods and testing for revision were also more resilient to the introduction of stress.[4]

Ebbinghaus' forgetting curve and spaced learning

Ebbinghaus' 140-year-old study examined the rate in which we forget things over time. The findings still hold true. However, the act of forgetting things and relearning them is what cements things into the brain.[5] Spacing out revision is more effective than cramming – we know that, but students should also know that the space between revisiting material should vary depending on how far away the examination is. A cyclical approach is required. An examination 12 months away necessitates revisiting covered material about once a month. A test in 30 days should have topics revisited every 3 days – intervals of roughly a tenth of the time available.[6]

Summary

Students: the more tests and past questions you do, in an environment as close to examination conditions as possible, the better you are likely to perform on the day. If you prefer to listen to music while you revise, tunes without lyrics will be far less detrimental to your memory and retention. Silence is most effective.[5] If you choose to study with friends, choose carefully – effort is contagious.[7]

1. Mayer, R. E., & Anderson, R. B. (1991). Animations need narrations: An experimental test of dual-coding hypothesis. *Journal of Education Psychology*, (83)4, 484–490.
2. Roediger III, H. L., & Karpicke, J.D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science*, 17(3), 249–255.
3. Nestojko, J., Bui, D., Kornell, N. & Bjork, E. (2014). Expecting to teach enhances learning and organisation of knowledge in free recall of text passages. *Memory and Cognition*, 42(7), 1038–1048.
4. Smith, A. M., Floerke, V. A., & Thomas, A. K. (2016) Retrieval practice protects memory against acute stress. *Science*, 354(6315), 1046–1048.
5. Perham, N., & Currie, H. (2014). Does listening to preferred music improve comprehension performance? *Applied Cognitive Psychology*, 28(2), 279–284.
6. Cepeda, N. J., Vul, E., Rohrer, D., Wixted, J. T. & Pashler, H. (2008). Spacing effects in learning a temporal ridgeline of optimal retention. *Psychological Science*, 19(11), 1095–1102.
7. Busch, B. & Watson, E. (2019), *The Science of Learning*, 1st ed. Routledge.

CONTENTS

Section A Modern technologies

Specification point			☑
A1	Setting up ad hoc networks	2	☐
A1	Network security and performance	3	☐
A1	Issues affecting network availability	4	☐
	Case study: **Fashion retail**	**5**	☐
A1	Cloud storage and computing	6	☐
A1	Selection of platforms and services	8	☐
A1	Using systems together	10	☐
A1	Implications for organisations when choosing cloud technologies	11	☐
A1	Cloud service considerations	12	☐
	Case study: **ABM advertising**	**14**	☐
	Examination practice	**15**	☐
A2	Changes to modern teams	16	☐
A2	Managing modern teams	18	☐
A2	Communication with stakeholders	19	☐
	Case study: **StarPlay Adventure**	**20**	☐
A2	Interface design and accessibility	21	☐
A2	Impacts of modern technologies on organisations	22	☐
A2	Impacts of modern technologies on infrastructure	24	☐
A2	Impacts of modern technologies on individuals	25	☐
	Case study: **Think Impact Productions**	**26**	☐
	Examination practice	**27**	☐

Section B Cyber security

☑

B1	Why systems are attacked	28	☐
B1	Internal threats to digital systems and data security	29	☐
B1	External threats to digital systems and data security	30	☐
B1	Impacts of a security breach	32	☐
	Case study: **Hawking cars**	**33**	☐
	Examination practice	**34**	☐
B2	User access restriction	35	☐
B2	Data level protection	36	☐
B2	Encryption	37	☐
B2	Finding weaknesses and improving system security	38	☐
	Case study: **Wedding and portrait photographer**	**39**	☐
	Examination practice	**40**	☐

B3 Defining responsibilities ..... 41 ☐
B3 Defining security parameters ..... 41 ☐
B3 Disaster recovery policy ..... 42 ☐
B3 Actions to take after a disaster ..... 43 ☐
Case study: BMC Pharmaceuticals ..... 44 ☐
Examination practice ..... 45 ☐

Section C The wider implications of digital systems ☑

C1 Sharing data responsibly ..... 46 ☐
C1 Environmental responsibilities ..... 48 ☐
C1 Usage and settings policies ..... 49 ☐
Case study: Best Nutrition Foods ..... 50 ☐
Examination practice ..... 51 ☐
C2 Equal access ..... 52 ☐
C2 Net neutrality ..... 53 ☐
C2 Acceptable use policies ..... 54 ☐
C2 Social and business boundaries ..... 55 ☐
C2 Data protection principles ..... 56 ☐
C2 Dealing with intellectual property ..... 57 ☐
C2 Criminal use of computer systems ..... 58 ☐
Case study: Dance17 ..... 59 ☐
Examination practice ..... 60 ☐

Section D Planning and communication in digital systems ☑

D1 Information flow diagrams ..... 61 ☐
D1 Data flow diagrams ..... 62 ☐
D1 Flowcharts ..... 64 ☐
D1 System diagrams ..... 65 ☐
D1 Interpreting information ..... 67 ☐
D1 Presenting knowledge and understanding ..... 67 ☐
Case study: Sun Solar Installations ..... 68 ☐
Examination practice ..... 69 ☐

Command verbs vi
Examination practice answers 71
Levels based mark schemes for extended response questions 76
Index 77
Examination tips 80

COMMAND VERBS

The exam paper that you take will use the following command verbs in each question. You may understand lots about a topic, but if you do not answer each question in the correct way, the mark you get may be lower than expected. Study each of the command verbs below along with their meanings and understand how they are used to answer a question.

Give / State / Name

Recall something that you know. These are short answers with 1 mark for each point.	Give three types of malware. [3]	*Virus(1), Trojan(1), spyware(1).*

Identify

Select some key information from something you are given.	Mia uses her home computer to go on the Internet. Identify **one** item of network equipment that Mia uses. [1]	*A router.(1)*

Explain

An explain question needs two parts. First give an example and then give a reason why this example answers the question. Make sure to use words like 'because' or 'so' in this type of question.	Cecilia is concerned about her customers' personal data being stolen from her laptop. Explain **one** security feature Cecilia should use to protect her data. [2]	*She should encrypt the hard drive(1) so that if the computer is stolen, the thief won't be able to understand the data on it(1).* *Example* *Reason*

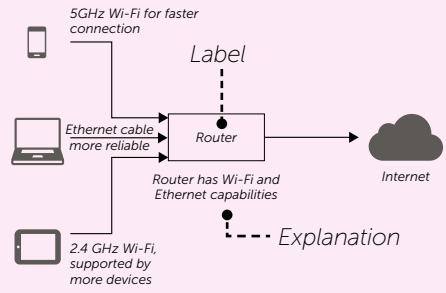
Describe

Give an account of something. This will often be the steps in a process.	Milo wishes to start his own online shop. He needs to collect personal customer data. Describe the actions he must take before collecting personal data. [3]	*Register with the Information Commissioner's Office.(1)* *Make sure his customer database is secure.(1)* *Create a privacy policy for the website.(1)*

Annotate the diagram to explain how...

Label the diagram and add an explanation for each label.

Janice has a laptop, tablet and smartphone. Label the diagram to show how these can all connect to the same Internet connection.



Assess

1) Write down all the factors or events that apply.
2) Identify those that are most important.
3) Assess the importance of the factors.
4) Give a conclusion.

You should use full paragraphs in your answers.

A full answer will usually be around a page of text.

A company wants staff to use their smartphones to monitor their social media accounts.

Assess the impact of smartphone use for monitoring social media accounts.

You must provide a conclusion as to whether you think that providing smartphones for this use is a good idea. [8]

Monitoring social media accounts on a smartphone will encourage staff to work whilst at home as the devices will constantly be giving notifications for new posts. This is a serious problem as it will affect their work-life balance.

Relevant factor

Importance of the factor

Detailed knowledge

The company could mitigate the work-life balance problem by explaining to staff when they should and shouldn't be monitoring the accounts.

Clear link to previous point

In conclusion, this is only a good idea if the company makes it clear when they should be used. Even then, they should make sure that staff agree to the request before implementing it.

Conclusion is based on the assessment

Discuss

Identify the problem or issue in the question.

Explore the relevant points that relate to the problem or issue with logical thoughts or arguments.

You should use full paragraphs to answer these questions.

The full answer will usually be around a page of text.

Virtual PA provide laptops and headsets to all their remote workers.

Discuss how remote workers can help protect the environment. [6]

They could change the power settings so that the displays turn to suspend mode if the computer hasn't been used for 10 minutes. The hard disk platters could also be made to stop spinning.

Accurate knowledge

Detailed knowledge

As remote workers pay for their own electricity they would have the incentive of lower energy bills and the result would be a reduced impact on the environment.

Relevant to the question context

Clear links between points

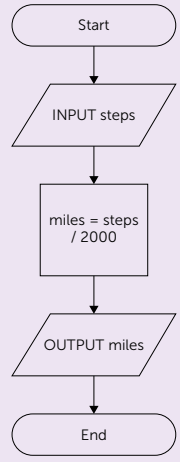
Draw

Draw a process using a data flow diagram, information flow diagram or flowchart.

The drawing should be labelled and annotated.

A health app has the number of steps a user walks as an input. It then calculates the number of miles walked and outputs it.

Draw a flowchart of this process.



Evaluate

Give a logical evaluation that considers different and competing points. Include strengths, weaknesses, relevant data or information.

Give a conclusion that is supported by the evaluation.

You should use full paragraphs to answer these questions.

The full answer will usually be around a page of text.

SmartGym want all their personal trainers to have a computer device. The options are a smartphone, tablet or laptop.

Evaluate the advantages and disadvantages of the different devices, stating which would be best for their personal trainers to use.

A Smartphone is small and portable meaning that it can be used when monitoring people as they train. It makes use of modern wireless Wi-Fi standards which enables it to be connected to a network via a wireless access point. — *Advantages*; *Relevant to the question context*; *Detailed knowledge*; *Detailed understanding*

Smartphones have small screens, which makes it hard to show results or video to their clients. ... — *Disadvantages*

In conclusion, a tablet would be the best device as it offers portability and a screen size that can display more content. — *Conclusion*

MARK ALLOCATIONS

Green mark allocations[1] on answers to in-text questions throughout this guide help to indicate where marks are gained within the answers. A bracketed '1' e.g. [1] = one valid point worthy of a mark. In longer answer questions, a mark is given based on the whole response. In these answers, a tick mark[✓] indicates that a valid point has been made. There are often many more points to make than there are marks available so you have more opportunity to max out your answers than you may think.

TOPICS FOR COMPONENT 3
EFFECTIVE DIGITAL WORKING PRACTICES

Information about the externally assessed exam

Written exam: 1 hour 30 minutes
60 marks
All questions are mandatory
40% of qualification grade

Specification coverage

Modern technologies, cyber security, the wider implications of digital systems and planning and communication in digital systems.

The content for this assessment will be drawn from the essential subject content sections A to D of Component 3 in the specification.

Questions

A mix of short answer and longer answer questions assessing knowledge, understanding and skills in contextual scenarios building on all components within the qualification.

SETTING UP AD HOC NETWORKS

An ad hoc network is a temporary network that connects two or more computers or devices. An ad hoc network is commonly used to connect a device whilst on the move. This could be done via an open Wi-Fi network or a personal hotspot.

An ad hoc network requires no additional specialist hardware (such as a router) making them easy to connect to and set up However, as these types of networks get bigger, they may be difficult to manage without any central control.

Open Wi-Fi

An open **Wi-Fi** network may be provided by a company, a town council or a school for example. It is commonly a free service that creates a Wi-Fi network that anyone can connect to as and when they come and go.

Tethering / Personal hotspot

A **personal hotspot** is an **ad hoc Wi-Fi network** created using a mobile device such as a smart phone. The device will connect to the data network using the cellular phone network's 4G or 5G connection. A very local Wi-Fi network is then created using a Bluetooth connection from the phone to which you may connect or **tether** another device such as a laptop. This is useful when there are no other reliable Wi-Fi connections available.

A **personal area network** (**PAN**) can be created by pairing devices together via **Bluetooth** or Wi-Fi. Generally, these pairings work within a very small range of up to 10 metres. They are commonly used with hands free phone systems or smart speakers.

1. Amy is looking to connect to an open Wi-Fi network. Give **two** common places Amy should look for an open network. [2]

Hotels[1], transport hubs such as stations or airports[1], trains[1], coach services[1] and cafés[1].

2. Jamil is a journalist reporting from a remote location with no Internet connection. He is required to send his report to Head Office from his laptop. He has a smartphone with a good signal.

Explain how Jamil could send the report electronically. [2]

He can tether his laptop to his phone / create a mobile hotspot[1]. His laptop can then use his phone's Internet connection[1].

NETWORK SECURITY AND PERFORMANCE

Security issues with open networks

Open networks are typically less secure than private networks. All data on an **unsecured** network is sent unencrypted. This means that anyone who intercepts data that is sent across the network can read and understand it. This includes passwords and credit card numbers for example.

WPA encryption (**Wi-Fi Protected Access**) should be used with Wi-Fi networks to prevent any data from being understood if it is intercepted.

Performance issues with ad hoc networks

Network performance can suffer as a result of the volume of data being transferred across it. If there are many users on the same network, each downloading video, performance is going to be very slow. Mobile hotspots support up to 11 Mbps (megabits per second) whereas standard Wi-Fi supports 54 Mbps or higher. **Mobile speeds** are increasing constantly and 5G aims to offer a much faster data transfer rate which can also cope with many more users.

3. Terry is using an unencrypted open network to access an email in his email account.

Explain **one** reason why he shouldn't access his account without suitable security. [2]

The username and password to access his email account will be sent over an unencrypted network[1] which will allow an eavesdropper/hacker to read them both[1].

If the username and password are obtained due to it being an unencrypted network[1] then a hacker will easily be able to look at Terry's emails to find personal information and passwords[1] that can be used to steal money / commit fraud[1].

ISSUES AFFECTING NETWORK AVAILABILITY

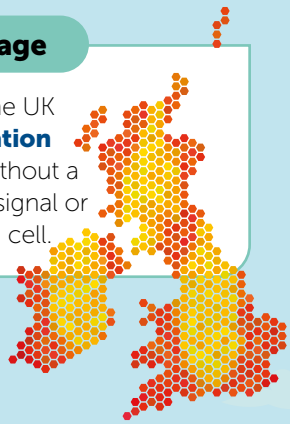
The availability of networking connections can be affected by various factors.

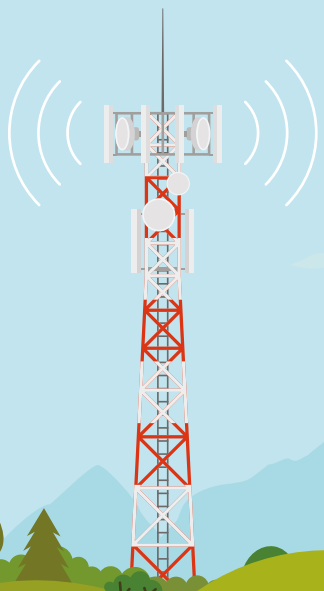
Developed vs developing countries

Developing countries have far less networking **infrastructure** than **developed countries** but mobile and satellite technology is helping where cable networks cannot reach. This, however, can be expensive to use and many areas are still without mains electricity to power connections.

Mobile coverage

The **cellular network** divides the UK into cells with a mobile **base station** transmitter in each cell. A cell without a **transmitter** is likely to have no signal or a poor one from a neighbouring cell.





Mobile blackspots

Hills and large buildings can cast 'shadows' by absorbing radio signals, causing apparent mobile **blackspots**.

Network availability

In the UK, some rural areas have limited access to fibre **broadband**. Towns and cities have generally faster connections and can increasingly access **fibre** directly to the home. In the UK, most 'fibre' connections make use of **fibre to the cabinet** (**FTTC**) which has a **copper** connection from the home to the **cabinet** and then a fibre connection from the cabinet to the **exchange**.

Rural vs city locations

Cities and **urban areas** tend to have many more **open networks** available to use than rural areas. They can expect greater numbers of people to use the service so it is worth the set up and maintenance costs of providing it. This infrastructure is not always worth the investment in rural areas.
Many **rural areas** rely on the mobile phone network for their data connection. Commonly, they will use a **4G** or **5G dongle**.

CASE STUDY

Lucy lives in a rural location and works for a fashion retailer. She often needs to fly abroad to India.

She will need to use her laptop and smartphone in both rural factories and hotels as well as the company head office in London.

Discuss the issues Lucy may have with ad hoc networks and open networks. **[6]**

- Lucy's home network in the countryside may have limited **infrastructure**, so she may find **video conferencing** difficult if she has only a slow **copper connection**. She may need to use **mobile broadband** using a **4G connection**, but there may be issues here with **mobile blackspots**. Before purchasing, she will need to check the network coverage to see if she will have a signal.
- If she gets the train to the airport or head office, she could use her mobile broadband to continue doing her work. She will also need to be able to work offline in case she goes into a **blackspot** or through a tunnel.
- At head office, the infrastructure may include a very fast **fibre optic connection**. This would be the best place to upload and download videos or large files if possible, and to resynchronise any files she has worked on offline from the cloud.
- If she wants to work when flying, she won't have an Internet connection. She will need to download any files she needs from the **cloud** to her local computer in advance.
- Many of the locations of factories in India are likely to be **rural**. Whilst they may have good Internet connections, unless she knows otherwise, she should anticipate no, or very slow, Internet. As such, she should be able to store any **work offline** until she returns to a hotel room with a signal.
- She should take an ethernet cable to connect to the hotel as well as having a Wi-Fi enabled laptop and phone. This will give her the maximum chance of connecting to the hotel's Internet.
- When connecting to the hotel Wi-Fi, she needs to consider that the network may be open and is therefore a security risk.
- She should use a **Virtual Private Network (VPN)** connection to encrypt all communications with the Internet.
- If she can get **mobile Internet** on her phone using a **4G data connection** then she will be able to **tether** her laptop to it using **Bluetooth**.
- Before she books any hotel, she may want to check they have an Internet connection and that it has **sufficient bandwidth** for the Internet use that she will require. This will be very important if she wants to send back videos of products or issues in the factories.

Long answers must be written in paragraphs. Bullet points have been used here to make the answers easier to understand. This type of question will be marked using a Levels Based Marks Scheme. See page 76 for details.

INTERFACE DESIGN AND ACCESSIBILITY

Modern technologies can provide new ways to access data and information. It is important to consider the accessibility of technologies along with how they help organisations to be inclusive.

Communication platforms

The **layout**, **font** and **colour scheme** of a web page or software application can affect its usability. **Screen layout** should maximise the available visible area and use plenty of white space. **White space** is the part of the screen design that does not contain content. This may be in margins, between columns or around graphics. Screen content should also automatically adjust to fit the screen size and proportions of most common devices. This is known as **responsive design**.

Fonts

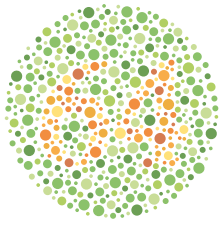
Fonts can affect readability. **Serif** fonts contain serifs which are small strokes at the ends of letters. This style of font tends to be harder to read on screen, however, it may give a more traditional feel. **Sans serif** fonts do not have serifs and tend to give a modern feel. They are easier to read on screen and can improve accessibility for dyslexic readers as they appear less cluttered. Facilities to **magnify** the screen or to change the font size displayed are also helpful.

Serif Sans serif

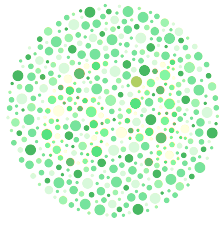
'Sans' means 'without' in French.
'Sans serif' means 'Without serifs'.

Colour schemes

Colour schemes should use contrasting text and backgrounds. Dark text on a light background is easiest to read, however, white text on a black background can also be very effective. **Colour blindness** can cause colours of a similar tone to look alike so greens and blues used together in a colour scheme, for example, would be difficult for some to tell apart.



Colour blindness test



Simulated image as seen by a colour-blind person

Alt text

Alt text should be added to images and video. **Screen readers** or **text-to-speech** readers use this to inform a blind or partially sighted user of what media is showing. Text-to-speech also allows users to listen to a page of text.

Buttons

Navigation buttons should be clear and in **consistent positions** on each page of a web site or on each software screen. Large buttons can also help those who find mouse accuracy difficult.

Give **two** accessibility features used by supermarket self-checkouts to assist users. [1]

A beep is heard when each item is scanned[1]. Instructions on the screen are also played in audio.[1] Specialised or tactile keypads.[1] High colour contrast on the display screen.[1]

IMPACTS OF MODERN TECHNOLOGIES ON INDIVIDUALS

Modern technologies have transformed the way that people work in organisations.

Early starts or commutes could be a thing of the past for remote workers, saving valuable time and shortening the working day. This creates more time for family or leisure.

Flexible working means that staff can have schedules that best suit their lifestyle and family life. They can also work late at night or early in the morning if they prefer.

Public transport or fuel costs would be greatly reduced without a regular commute. This would also benefit the environment.

Home may be a less stressful working environment with greater control over the daily schedule leading to greater job satisfaction.

Explain how a poor Internet connection at home may affect access to home working opportunities or arrangements. [2]

A poor Internet connection will mean you have fewer job opportunities with companies offering home working only[1]. You may not be able to access job advertisements from companies who advertise online only[1]. If you are able to secure a job, you may find video conferencing difficult [1] and be unable to synchronise your files with the rest of the company in real time[1]. This may create delays and frustration[1].

Access to a wider range of opportunities may be available to the less able or those who live very remotely.

Staff can move about during the day, switching from one device to another depending on which is most suitable for their location. This may include **working from home**, or **remote working** at other offices, customer locations, coffee shops or on trips.

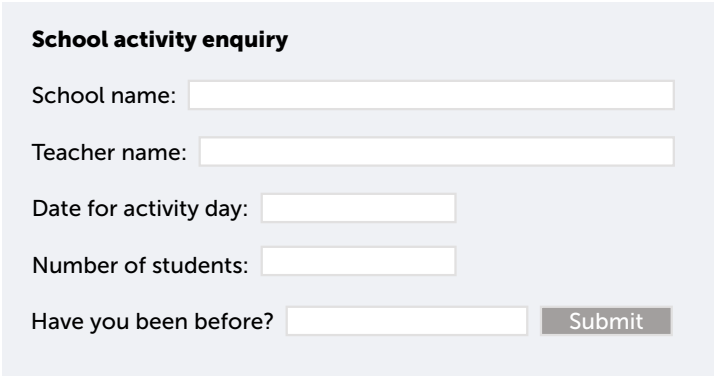
SECTION A2

EXAMINATION PRACTICE

Walter's Watersports is a water-based activity centre in the Lake District. The business is owned by Walter and they provide activities for groups of children and teenagers in the summer months. In the winter months they run adventure trips for adults abroad.

(a) Walter makes use of a website to capture information about schools that want to have activity days at the centre.

Annotate the form below to show **four** improvements that could be made to make it more accessible and user friendly. [4]



(b) Walter's Watersports makes use of communication platforms such as their website and email to give information and communicate with customers.

Give **two** other communication platforms that they could use. [2]

Walter's Watersports communicates with stakeholders using their website.

(c) State **two** types of stakeholders that they may use the website to communicate with. [2]

(d) Walter wants to create a new page on his website that will advertise a new kayaking day that will appeal to teenagers.

Explain **two** ways that media could be used on this website. [4]

(e) Walter is concerned by negative effects that modern technologies are having on young people. He wants to build a page on his website that outlines some of the negative impacts of modern technologies that people could escape if they have a day at Walter's Watersports.

State **three** negative impacts that people may avoid by having a day at Walter's Watersports. [3]

(f) Walter uses a number of instructors to take water sports sessions. When they are not running activity days, they may be doing admin tasks or making training resources at home.

Explain **two** ways that scheduling and planning tools can help Walter manage his team of instructors. [4]

(g) State **one** collaboration tool that Walter may use with his instructors. [1]

ACTIONS TO TAKE AFTER A DISASTER

The following five-stage plan is used to show the actions to take in the event of a disaster or cyber-attack.

1. Investigate the problem
2. Respond
3. Manage the issues
4. Recover
5. Analyse

1. **Investigate – Establish severity and nature:** An organisation needs to quickly establish the nature of the attack or problem, how damaging it has been and what systems have been affected. They may also examine how long the attack has been going on for.
2. **Respond – Inform and update stakeholders and authorities:** When an incident occurs, the correct people need to be informed. For instance, if customers' personal data is stolen, a network administrator may be involved in fixing a security hole, whilst the **data protection officer informs the authorities** (**Information Commissioner's Office**). A **customer services manager** may have to inform customers of the data loss.
3. **Manage – Containment procedures begin:** The attack or natural disaster should be contained. Systems may need to be shut down or disconnected.
4. **Recover – Implement disaster recovery plan:** Remedial action such as replacing damaged hardware, restoring backups or moving premises will now be carried out in line with the disaster recovery plan.
5. **Analyse – Update policy and procedures:** The incident will be studied to evaluate how well the policy and procedures worked and what lessons have been learnt. Policies will be updated to improve their effectiveness.

2. The five-step process of investigation, response, management, recovery and analysis is commonly adopted in disaster control.

   Explain why the Analysis stage takes place at the end of the process. [2]

The whole incident can be reflected upon[1] with consideration to what parts of the existing disaster recovery policy worked and where it can be improved[1] before the policy is updated[1].

FLOWCHARTS

A flowchart can be used to represent a sequence of steps for a task or process. They are commonly used for troubleshooting problems, to show how a business process works or to design software systems before developers begin writing the program code.

Standard symbols

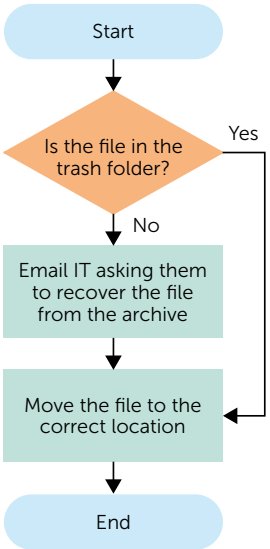
Standard symbols used in flowcharts are:

Symbol	Meaning
Terminator	A terminator symbol is used to show where the flowchart starts and ends.
Process	A process shows an activity that takes place.
Decision	The outcome of a decision allows different paths to be taken through the flowchart.
Input/Output	Data is input before any processing. The results are then output after processing.
→	Arrows show the direction of flow through the flowchart.

Example

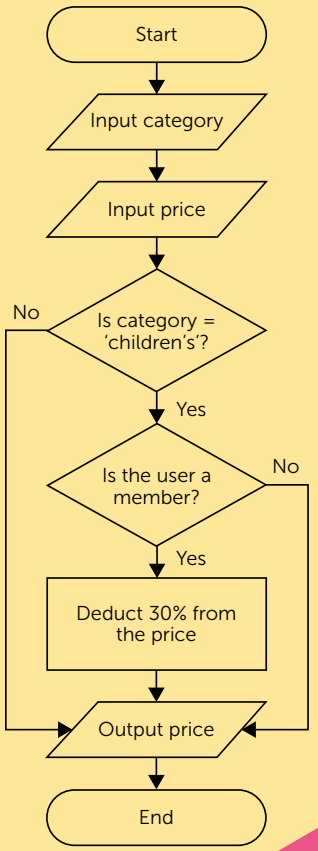
Staff at a company may accidentally delete a cloud-based file.

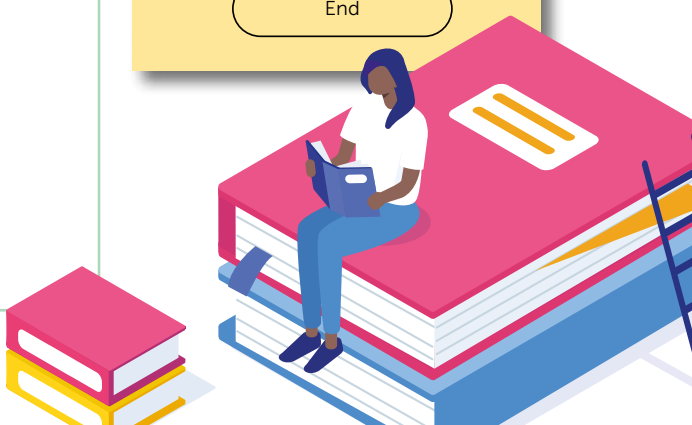
A flowchart in the company handbook outlines what to do:



Reams Bookstore offers a 30% discount on children's story books to its members.

Draw a flowchart to show the calculation process. [8]





TABLES AND WRITTEN INFORMATION

Organisations commonly use written information in letters, email and reports. It is also used on web pages and marketing communications.

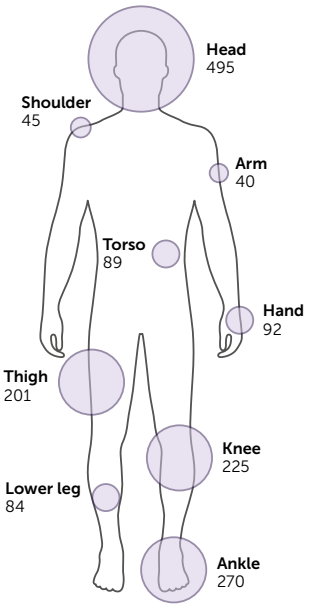
Information can be presented as written text, in a table or graphically. Bar charts or pie charts may represent information well. However, modern infographic styles are even more informative.

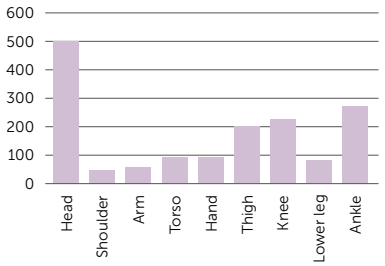
Examples

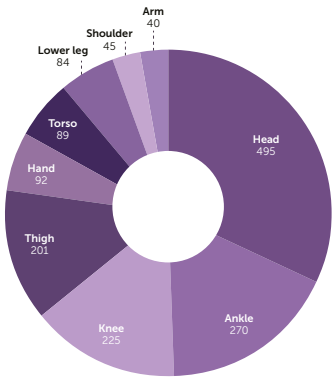
Here are some comparisons:

Annual UK school football injury report

Over the course of a year, each of the football related injuries reported in the UK were logged. The head suffered significantly greater injury than other parts of the body. This is believed to be owing to heading the ball and may include injuries to the head and neck as a result. Ankle and knee injuries were also significant and likely the result of poor tackles and twists of the ankle. Other areas suffered minor injuries.







Tables

Tables can be used to present data. The way in which they are presented and sorted can make a difference in the ease of reading and understanding.

A **UK annual school football injuries**

Ankle	270
Arm	40
Hand	92
Head	495
Knee	225
Lower leg	84
Shoulder	45
Thigh	201
Torso	89

B **UK annual school football injuries**

Head	495
Shoulder	45
Arm	40
Torso	89
Hand	92
Thigh	201
Knee	225
Lower leg	84
Ankle	270

C **UK annual school football injuries**

Head	495
Ankle	270
Knee	225
Thigh	201
Hand	92
Torso	89
Lower leg	84
Shoulder	45
Arm	40

State the sort order for each of tables A, B and C. [3]

Table A: Alphabetically by body part[1]*. Table B: Descending order of height by body part*[1]*. Table C: Descending order of injury numbers*[1]*.*

EXAMINATION PRACTICE ANSWERS

Section A1

(a) The data is accessible from any location with an Internet connection (1); It is easy to share files with others (including race competitors who want to see photos or videos) (1); backups will be made by the cloud storage provider(1); files can be synchronised with other employees that are working on them. [2]

(b) She may lose access to her files if her Internet connection is lost (1); she will need to spend time choosing the best cloud provider (1); she may have ongoing storage costs (1); she will need to check that storing the data will be secure / compliant with the Data Protection Act (1). [2]

(c) Cloud storage is scalable / can pay for more storage (1) so the amount of space available can increase as needed (1). [2]

(d) The data will be stored in more than one different physical location / redundancy (1), so if one location has a fire/flood, the data can be recovered from a server in another data centre (1). [2]

(e) The design needs to be responsive/adaptive (1) so that it can display a more appropriate design for different devices / screen orientations (1). Buttons for mobile devices need to be large enough (1) to press with a finger as this is how users will select them (1). Photos that aren't full screen will be hard to see on mobile devices (1) so an option to make them full screen will be needed (1). The website will need to cope with the fact that some features may not be available on the device being used (1) e.g. the use of the user's location data when giving a map (of race venues or her business) (1) – or any other appropriate interface design feature with a corresponding explanation of how it will differ across available devices. [4]

(f) The website/page needs to use HTTPS / Secure Hypertext Transfer Protocol (1). [1]

(g) Kate will be paying for the amount of computer processing that her website uses (1) so if there is an increase in demand, the amount of cloud computing services allocated to her site will increase / the services are scalable (1). This means that there will be more services available to cope with more users/webpage requests (1). Kate will need to pay more for the additional cloud computing services used (1). [3]

(h) They can tether their laptop to their phone (1) using Bluetooth / USB cable (1). This will allow the laptop to access the Internet using their mobile data (1). [2]

(i) The mobile coverage may be poor (1) a transmitter/base station may not be close enough (1). There may be a black spot (1) a hill / building / wall may be blocking the signal (1). The mobile network's infrastructure may be insufficient to cope with the demand of users (1). [2]

(j) The use of WPA/Wi-Fi Protected Access / a Wi-Fi access key (1) will encrypt the connection between the device and Wi-Fi access point (1) which means that if a hacker intercepts the data sent, they won't be able to understand it.(1) [2]

Section A2

(a) Have a calendar so that the correct date can be clicked (1), have the number of students as a drop down with numbers (1), have a tick-box/checkbox for the number of students (1), explain what happens, or how long they need to wait when the submit button is pressed (1). Use more friendly language for the 'Submit' button – e.g. 'Send enquiry'(1), use a larger font for the title (1), allow users to search for days that are free (1), allow accessible options (1) such as listen to this page (1) or a plus/minus button to increase/decrease the text size (1), provide more information and help to complete the form (1) e.g. which teacher needs to add their name. [4]

(b) Social media (1), live chat (1), voice communication (1). [2]

(c) Customers (1), shareholders (1), students/children (1), parents (1), employees (1). [2]

(d) Video (1) could be used to show other teenagers having fun doing the activities (1), photos/images could show the kayaking that is covered on the course (1), audio (1) could be used to allow students to say what they liked about the day (1). [4]

(e) They won't be able to use mobile phones or computers in the water so will have no interruptions from notifications (1), not have any stress from school/work (1), not need to worry about the infrastructure/mobile signal in the area (1), not need to check or reply to email/private messages (1). [3]

(f) A gantt chart (1) could show the sub-tasks of a project (1) and when they occur (1). An online/cloud calendar (1) could be used to share key events (1). Kan-ban software (1) could be used to show the stages in a project / where schools and customers are in a sales process (1). Planning/project software (1) (such as Teams or Slack) could be used to discuss the progress of projects (1). A shared to-do list (1) would allow everyone to see what tasks need doing and be updated as soon as tasks are complete (1). [4]

(g) Online / cloud office suites / productivity software (1), a blog / website / wiki (which allows multiple users to edit) (1), project software (1) that allows the sharing of information, documents for feedback (1). [1]

LEVELS BASED MARK SCHEME FOR EXTENDED RESPONSE QUESTIONS

Questions that require extended writing use mark bands. The whole answer will be marked together to determine which mark band it fits into and which mark should be awarded within the mark band. The first two bullet points are the same for all extended response questions. The final bullet depends on the type of question asked.

Level	6-mark discuss questions	9-mark assess question	12-mark evaluate question	Descriptor
	0	0	0	No answer given or none of the points are relevant to the question
1	1–2 marks	1–3 marks	1–4 marks	• Some isolated knowledge and understanding has been shown, but there are major gaps in the response • Few of the points made are relevant to the context of the question • **Discuss questions:** there is little discussion. Different aspects and viewpoints haven't been considered • **Assess questions:** there is a limited assessment with generic points. Relevant factors or events and their relative importance are not considered. This leads to a weak conclusion • **Evaluation questions:** A limited evaluation is given which leads to an unsupported or weak conclusion.
2	3–4 marks	4–6 marks	5–8 marks	• Some accurate knowledge and understanding has been shown. Only minor gaps in the response • Some of the points made are relevant to the context of the question, but the link isn't always clear • **Discuss questions:** Different aspects have been considered. How the aspects relate or connect to each other is sometimes shown • **Assess questions:** there is an assessment which considers the relevant factors or events and their relative importance. These support the final conclusion • **Evaluation questions:** A partially developed evaluation that shows different points of view even if not always in detail. This partially supports the conclusion.
3	5–6 marks	7–9 marks	9–12 marks	• Mostly accurate and detailed knowledge and understanding • Most points made are relevant to the context in the question. Clear links are made between points • **Discuss questions:** A well-developed and logical discussion is given. A range of different aspect have been considered. How the aspects relate or connect to each other is considered throughout • **Assess questions:** there is a well-developed assessment which clearly considers relevant factors or events and their relative importance. These support the conclusion given • **Evaluation questions:** A well-developed evaluation that is logical and covers different points of view in detail. This fully supports the conclusion.

The above descriptors have been written in simple language to give an indication of the expectations of each mark band. See the Pearson BTEC website for the official mark schemes used.

INDEX

Symbols

4G data 5
5G 4
24/7/365 17

A

Acceptable Use Policy 41, 54
accessibility 21, 23
access levels 35
access rights 6
ad hoc network 2
age filtering 8
alt text 21
anti-virus software 36, 44
attack
  cyber 28
  five-stage action plan 43
attribution 57
authentication 35
autocomplete 36
autosaving 8

B

backup 6, 14, 36, 39, 42, 44, 59
bandwidth 5
base station 4
behaviour analysis 38
biometrics 35
black-hat hacker 30, 38
blackspots 4
Bluetooth 2
blurring of boundaries 55
Botnet 30
broadband 4, 12
buttons 21

C

CAPTCHA 36
cellular network 4
chat 7
  chat bots 19
  chat rooms 20
cloud 5, 39
  applications 8
  computing 7
  platforms 8
  services 9, 12, 14
  storage 6
  technology 11
co-authoring 7
collaboration tools 7, 18, 23
collaborative working 14
colour blindness 21
colour schemes 21
command verbs vi
communication
  channels 19
  platforms 19, 20
  tools 18
compatibility, cloud software 12
computer platform 8
Computer Misuse Act (1990) 58
consistency, software versions 7
cookie 47
Copyright, Designs and Patents Act 1988 57
criminal use 58
cultures 16
cyber-attack 43
cybersecurity 28, 50

D

damage to public image 32
data
  centre 6, 11
  exchange 47
  flow diagrams 62
  level protection 36
  Protection Act 39, 47, 50, 56
  recovery 44
  security 11, 29
  subject rights 56
Denial of service (DoS) 30
depression 26
developed countries 4
developing countries 4
device hardening 36, 41
device synchronisation 10
digital divide 52
digital footprint 46
direct messages 19, 20
disaster recovery 11, 42
  five-stage plan 43
disclosure of data 29
dispersed data 23
distributed data 23, 39
diversity 16
dongle 4
downloads from the Internet 29
downtime 6, 12, 32, 42
dual-coding iii

E

Ebbinghaus iii
electronic
  distribution 49
  waste 48
email 19
employees 16
encryption 37, 39, 59
  WPA 3
environment, responsibilities 48
equal access 52
Equality Act 2010 52
espionage 28, 33
ethical hacking 38
external threats 30

F

face recognition 35
fibre optics 4, 5
fingerprint recognition 35
firewall 36, 50
flexible working 17, 22, 25
flowcharts 64
fonts 21
forms of notation 66

G

Gantt chart 20
Global Positioning Systems 46
graphs 67
grey hat hackers 38

H

hacking 30, 38
health 22
  and safety 48
home working 25, 26
hotspot 2
HTTPS 37

I

inclusivity 17, 21, 22
incremental backup 42
individuals 25
Information Commissioner 50
information flow diagrams 61
infrastructure 4, 24, 52
instant messaging 7
intellectual property 57
interface design 9, 21
internal threats 29
Internet Service Provider (ISP) 53
interpreting information 67
Intranet 19

K

keylogger 33
keypads 35

L

layout and design 9
legislation 58
licencing 57
live chat 19
location based data 46
logs 44
loneliness 26

M

maintenance 12
malware 31, 44, 58
man-in-the-middle attack 30
manufacture of IT systems 48
mining 48
mirror 42
mobile coverage 4
modern teams 16, 18
monitoring 54
multicultural teams 16, 22

N

navigation buttons 21
net neutrality 53
network 2
  ad hoc 2
  availability 4
  downtime 6
  open Wi-Fi 2
  security 3
notifications 10

O

obscuring data 36
offline working 10
online applications 7
online working 10
open networks 3, 4
operating system 8
outsourcing 14

P

paid for vs free services 9
password policy 41
passwords 35, 59
patents 57
penetration testing 38
performance considerations 12
performance issues, networks 3
permissions 44, 57
personal
  area network (PAN) 2
  data 56, 59
  hotspot 2
pharming 30
phishing 30
physical security 35
planning tools 18
policies 41, 49
portable storage devices 29
power saving 49
privacy 47
private message 19
productivity 26, 32
professional standards 52
public status updates 19

R

ransomeware 31
rare materials 48
recovery procedures 36
recycling 49
redundancy 11
registered trademarks 57
remote working 22, 25, 26
replacing systems 48
reporting concerns 41
responsibilities 41
responsible use of data 47
responsive design 21
retinal scanning 35
retrieval practice iii
RFID (radio frequency ID) 35
right to be forgotten 56
rootkit 31

S

sanctions, acceptable use 54
scalability 6, 8
scheduling tools 18
screen
  brightness 49
  readers 21
  sharing 7
security 11, 59
  breach, impact of 32
  controls 29
  external threats 30
  internal threats 29
  parameters 41
  physical 35
  policies 41
serif fonts 21
server outage 12
settings policies 49
sharing data 46, 47
shoulder surfing 30
sleep mode 49
social engineering 30
social media 19, 55
Software as a Service (SaaS) 8
software interface design 36
software updates 14
spyware 31, 33
staff 16
stakeholder 19
standards 52

streaming 53
symbols
  data flow diagrams 62
  flowcharts 64
synchronisation 6, 10, 14
system
  attacks 28
  data analysis 38
  diagrams 65
  security 38

T

tables 66
technologies
  modern 16
  modern, impacts of 22, 24, 25
tethering 2
text-to-speech 21
The Police and Justice Act 58
time zones 16, 20
trademarks 57
transactional data 46
transmitter 4
Trojans 31
two-factor authentication 35

U

unauthorised access 58
untrustworthy websites 29
upgrading systems 48
UPS (Uninterruptible Power Supply) 6
uptime 12
usage and settings 49
user access restriction 35

V

verification 35
version
  history 18
  recovery 11
video conferencing 7, 19
Virtual Private Network (VPN) 5
virtual storage 8
virus 29, 31
voice communication 19
VoIP (Voice over Internet Protocol) 19

W

Waste Electrical and Equipment Regulations (WEEE) 48
websites 19
wellbeing 26
white hat hackers 38
white space 21
working styles 25
worms 31
written information 66

EXAMINATION TIPS

With your examination practice, use a boundary approximation using the following table. Be aware that boundaries are usually a few percentage points either side of this.

Grade	L1 Pass	L1 Merit	L1 Distinction	L2 Pass	L2 Merit	L2 Distinction
Boundary	25%	30%	40%	50%	65%	80%

1. Read each question carefully. You will get no marks for giving an answer to a question you think is appearing rather than the actual question. Avoid simply rewriting a question in your answer or repeating examples that are already given in the question.
2. Full answers should be given to questions – not just key words or bullet points.
3. Read the context of the question carefully. Make sure your answer then matches this context.
4. Give, state and name questions require you to recall a short piece of key information. No explanation is required. There will be one mark for each point you make.
5. Where two examples are asked for, avoid giving two similar examples. For example, if you are asked to give two methods to keep data secure, avoid giving both keypads and locks as these are both examples of physical security methods. Locks and encryption would be a better answer as they are different examples.
6. Remember that explain questions have two marks for each point. You need to make a point or example for the first mark, and then expand it with a linked explanation for the second mark. To help you justify your responses, aim to include words such as 'because' or 'so'.
7. Describe questions require an answer that gives a number of steps or points. If three marks are given for the question, then three steps or points will be needed in the answer.
8. Long answer questions use the command verbs discuss, assess or evaluate. Plan these answers first. This will keep your answer focused and avoid repeating information. It will also help you to make clear links between your points and come to a conclusion where needed.
9. Be careful with vague answers. For cloud storage benefits it is not acceptable to write that it 'has more space' or 'costs less'. Better answers would be 'it allows access to a larger amount of storage capacity' or 'it allows the purchase of a cheaper computer with less storage capacity'.
10. If the question and context mention how an issue affects an organisation, make sure that the answer refers to organisations and not individuals.
11. Circle or underline key parts of the question that will help you when answering it. For instance, you may circle that the context is talking about an organisation or individual, or the number of examples that you need to give.
12. Learn the correct symbols required for flowcharts and data flow diagrams. Label all diagrams, showing the flows of data or direction of flow with labelled arrows. If a question asks you to "annotate the diagram to explain how...", then make sure that you both annotate the diagram and explain the features asked for in the question.

Good luck!

BTEC Tech Award **DIT** Component 3

ClearRevise™

Illustrated revision and practice:

- Over 400 marks of examination style questions
- 10 case studies with exemplar responses
- Answers provided for all questions within the book
- Illustrated topics to improve memory and recall
- Specification references for each topic
- Examination tips and techniques

Experience + science + beautiful design = better results

Absolute clarity is the aim with a new generation of revision guide. This guide has been expertly compiled and edited by successful former teachers of BTEC and IT courses, highly experienced examiners and a good measure of scientific research into what makes revision most effective.

PG Online have a record of significantly raising and sustaining examination results at GCSE in schools using their award-winning teaching resources.

Past examination questions are essential to good preparation, improving understanding and confidence. This guide has combined revision with tips and more practice questions than you could shake a stick at. All the essential ingredients for getting a grade you can be really proud of.

Each specification topic has been referenced and distilled into the key points to make in an examination for top marks. Questions on all topics assessing knowledge, application and analysis are all specifically and carefully devised throughout this book.

www.clearrevise.com

ISBN 978-1-910523-26-1

Schools have a ***Licence to Copy*** one chapter or 5% for teaching

CLA Copyright Licensing Agency

PG ONLINE