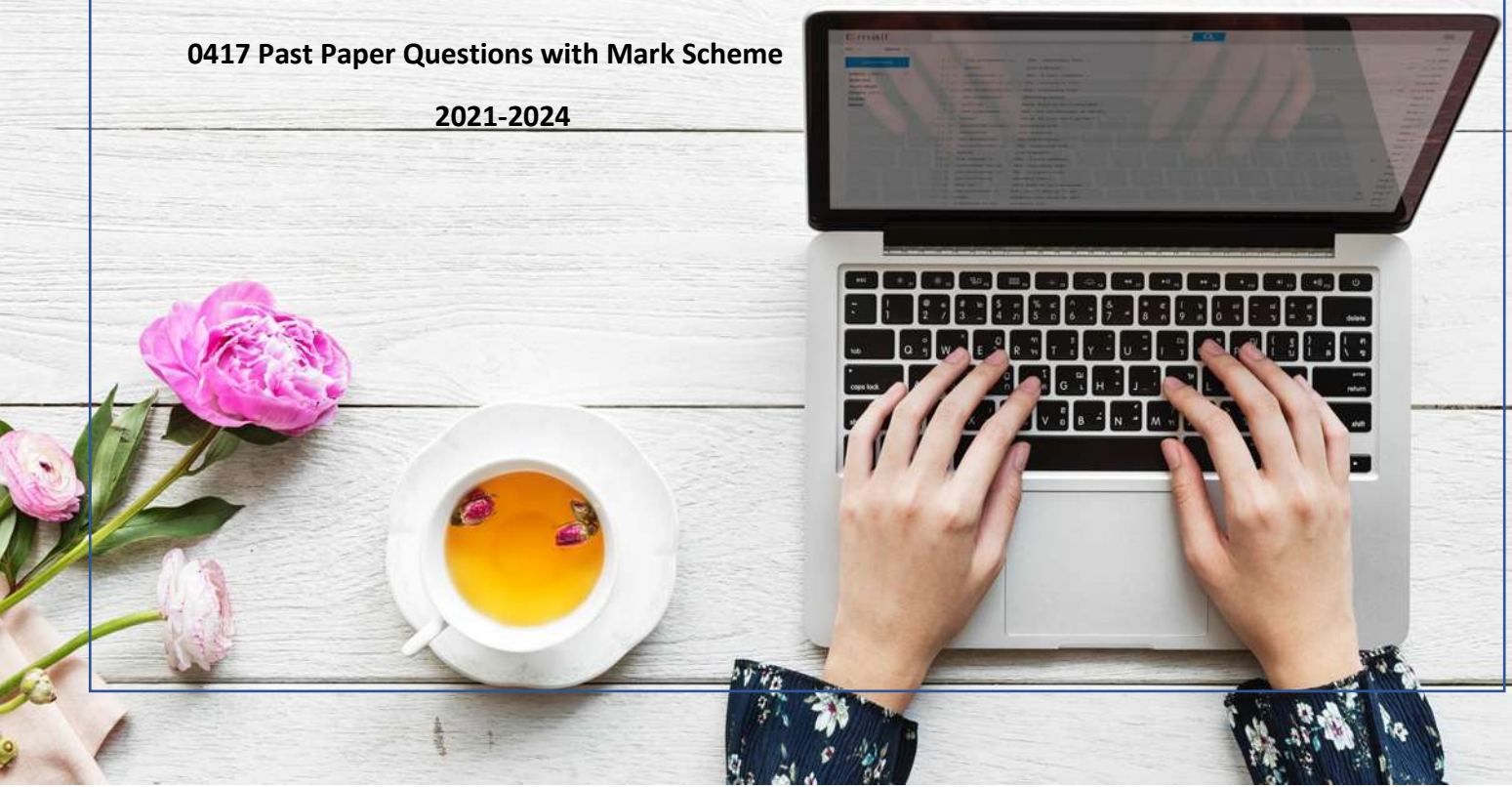# Information and Communication Technology
-0417-

Chapter Six: ICT Applications

0417 Past Paper Questions with Mark Scheme

2021-2024

1   The table shows a comparison of two different types of fitness tracker. A fitness tracker contains a microprocessor, is worn around the wrist and monitors physical readings of the wearer.

Name of fitness tracker	Flexi-byt 6	FitB 4
Battery life in days	20 days	7 days
Method of internet connection	Bluetooth	WiFi
Water resistant	100 m	10 m
GPS	Y	N
Cost	INR 22 855	INR 10 700

You have been asked to design a poster to show this data for the two fitness trackers.

Describe how you would use **six** different design features to enhance the data in this poster. The poster must be suitable for an audience of adult customers.

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[6]

2   A school is planning to introduce a contactless card system for pupils to pay for school meals. Each card contains an amount of money which is topped up by parents. Parents transfer amounts of money into the school system and pupils place the card close to a reader to upload the money onto the card.

(a) Discuss the benefits and drawbacks, to the pupils, of using a contactless card system rather than paying by cash.

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(b) The terminals in the school use electronic funds transfer at point of sale (EFTPOS).

Describe the computer processing that takes place to pay for a meal at the EFTPOS terminal using the card.

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3   Tawara school uses an optical mark recognition (OMR) system for its school register. An example of the register is shown. For each session of the school there are two lozenges to be shaded in.

Tawara School

Pupil Registration form

INSTRUCTIONS: Only use HB pencil when completing this form

Example:
Pupil present ▉ [A]   Pupil absent [P] [▉]   Pupil late [▉ ▉]

No.	Pupil Name	Mon		Tues		Weds		Thurs		Fri	
		am	pm	am	pm	am	pm	am	pm	am	pm
01		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
02		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
03		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
04		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
05		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
06		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]

At the start of the registration period the teacher shades in a lozenge [P] on the register to show that a pupil is present and shades in a lozenge [A] for each pupil who is absent. If a pupil is late then the teacher shades in both the [P] and the [A] lozenges. The register sheets are sent to the school office to be processed and the data from them is stored in the computer's database.

(a)   Describe the inputs and computer processing of the registers when they are sent to the school office, prior to them being stored on the computer's database.

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(b) The headteacher of the school is considering modernising the registration system so that pupils can register using a facial recognition system.

Discuss the advantages and disadvantages of using a facial recognition registration system rather than the OMR system they currently use.

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(c) Biometric data, like facial recognition, is an example of personal data.

Give **two** other examples of personal data that could be stored on the school registration database.

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[2]

4   Many banks have reduced the number of staff in their branches and replaced them with automatic teller machines (ATMs). These ATMs, which can be located within the bank, can be used by customers to deposit and withdraw money from their bank accounts.

(a) ATMs can be used to deposit cheques.

Describe the computer processing involved in depositing a cheque at an ATM.

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(b) Customers can visit these banks or use internet banking.

Discuss the advantages and disadvantages to a customer of visiting the bank rather than using internet banking.

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5   RockIT Airlines representatives use a computer booking system to book flights for customers.

A representative from the airline types in the customer reference number, the number of passengers, departure time, departure date, departure airport and the destination airport.

A customer is planning to take a flight from London Heathrow Airport. The representative types in a code LHR for London Heathrow Airport. One of the reasons for using a code for the airport is to improve data accuracy.

(a)   Describe **two** other advantages of using a code rather than typing out the full name.

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[2]

(b)   Describe the importance of data accuracy when making a booking.

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(c) Describe the processing and outputs involved in making the booking.

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6 A road through a village has a speed limit of 45 kilometres per hour. The police are checking and recording the speed of vehicles passing through the village using measuring hardware and software, so they can produce a report of their findings.

(a) Explain the difference between measurement and control when using microprocessors.

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(b) Describe the role of the microprocessor in this scenario.

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7   A mobile phone is used for communications, either for making phone calls or text messaging.

Chang is planning an expedition to the Southern Alps in New Zealand. There is often a limited mobile phone signal in these areas. He has set his phone up so that if there is an emergency he can communicate with the rescue teams using text messaging rather than making a phone call.

Give **two** advantages of using text messaging in this way.

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2 ....

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[2]

8   Streaming movies and music is replacing downloading or purchasing a physical copy of the files.

Describe the advantages and disadvantages of streaming files rather than using other methods.

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9   Robots are used to spray paint cars in a car production company.

(a) Describe **two** other jobs that robots can perform in car production.

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.... [2]

(b) When the spray paint can is empty it needs to be refilled. There is a sensor in the can which measures the amount of paint.

Describe the use of the sensor and microprocessor in this application.

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(c) Discuss the advantages and disadvantages of the introduction of robots rather than employing humans to spray paint the cars.

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10 Rockit Motors recently created a new car sales website. The website uses internet shopping features. Customers can ask questions of the virtual salespeople on the website, and then purchase the car on the website.

(a) Describe **two** other features of internet shopping.

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.... [2]

(b) Discuss the benefits and drawbacks of using internet shopping for Rockit Motors.

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Chapter Seven

(c) Before the website became operational it needed to be tested. The web designer created a test plan including module and whole system testing.

Explain the difference between module and whole system testing.

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11 MICR, OCR and OMR are examples of recognition systems.

Tick (✓) the most appropriate recognition system which relates to the following statements.

	MICR (✓)	OCR (✓)	OMR (✓)
This system magnetises the special characters on cheques in order to read them			
This method is used to read car number plates			
A bar code is an example of this system			
If the media from this system is photocopied it cannot be read by the recognition system			

[4]

12   **(a)** Identify **two** applications that use expert systems.

1 ....

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2 ....

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[2]

(b) Identify **three** components found in an expert system.

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[3]

13   Many customers now use contactless payment and internet banking.

(a) Describe the computer processing involved in using contactless bank cards to pay for purchases.

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.... [4]

Fewer and fewer customers now use high street banks, preferring to bank online using the internet.

(b) Discuss the advantages and disadvantages of internet banking for the customer.

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Chapter Eight

Transactions with the bank's website use a variety of technologies including SSL.

(c) Explain what is meant by SSL. Include in your answer why SSL is used.

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Chapter Ten

(d) The web address of the bank is:

https://www.tawarabank.com

Describe the following parts of the web address.

https:// ....

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tawarabank ....

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.com ....

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[3]

14   Global Positioning Systems (GPS) are used for many different applications.

(a) Describe how GPS is used by a smartphone to pinpoint its location.

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(b) Give **three** other examples of the use of GPS.

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[3]

15 Tawara School is presenting a concert. For previous concerts the booking of tickets was carried out manually using pen and paper.

For this concert they are going to use an online booking system.

(a) Discuss the advantages and disadvantages of Tawara School using an online booking system rather than the manual system.

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Chapter Seven

(b) Identify the most appropriate method of implementation of the new online booking system in this scenario.

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(c) Explain, giving reasons, why your answer to **part (b)** is the most appropriate method of implementation for this scenario.

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.... [3]

16   A customer is booking a seat on a theatre's online booking system. The customer reserves seats using the theatre's website and a debit card. The website displays the seats that are available and a database stores the customer details, the payment details and the seat details.

When the customer enters their debit card details for a seat, the theatre's computer communicates with the bank's computer.

(a) Describe **four** checks that the bank's computer will make on the customer's bank account.

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[4]

(b) Describe the processing carried out by the theatre's computer when making a booking.

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.... [4]

17 A car manufacturing company uses computer-controlled robots to manufacture its cars.

Discuss the advantages and disadvantages to the company of using computer-controlled robots rather than using humans to manufacture the cars.

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18   Discuss the advantages and disadvantages of using manual booking systems rather than online booking systems.

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19   Tawara Stores has realised that the number of people shopping for food online has increased over the past few years.

(a) Discuss the advantages and disadvantages to the customer of shopping for food online.

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Chapter Nine

(b) Tawara Stores are also aware that many current websites do not cater for older people. They intend to create a version of their website for this audience.

Describe the features of this website to meet the needs of an older audience, giving reasons for your choice of features.

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20 People can manage their banking transactions using the internet. However, if the internet signal is poor telephone banking can be used.

A person wishes to use telephone banking without speaking to an operator to transfer money from one bank account to another.

Describe the steps needed to do this.

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21 A group of students in a school are planning to publicise a school concert. They can either produce a web page which will be sent to the company that runs the school website or create a multimedia presentation and show this to students and visitors.

(a) Give **two** types of content which could be used in a multimedia presentation that cannot be used in a printed leaflet.

1 ....

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[2]

(b) Describe the advantages and disadvantages of using a multimedia presentation rather than a web page on the school website.

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.... [6]

Chapter Two

The students need to test their multimedia presentation before it can be used.

(c) Name **two** output devices they can use and for each one, write down a reason for its use.

Output device 1 ....

Reason ....

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Output device 2 ....

Reason ....

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[4]

22 In June 2000 the London Millennium Bridge opened to the public but closed shortly afterwards for repairs. The bridge was swaying as people walked across it. Before bridges are built, computer models are produced and the models are tested.

Explain why computer models are used before building a bridge.

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.... [4]

23 High street banks now offer customers access to internet banking when they are in the physical bank.

Discuss the advantages and disadvantages to the bank of using internet banking in this way.

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24   A computer model can be used to design and test a bridge before it is built.

Discuss the benefits and drawbacks of using a computer model before building a bridge.

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25   Many devices in the home can be connected to the internet so they can be controlled remotely.
These devices are called smart devices. A house contains a smart security system.

(a) Describe the benefits and drawbacks of using a smart security system.

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(b) Identify **two** sensors that could be used with the smart security system.

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[2]

(c) Part of the smart security system involves an automatic gate for vehicles approaching the house. There is a CCTV camera at the gate and the smart security system has software for recognising each vehicle's number plate.

Explain how automatic number plate recognition (ANPR) systems work.

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(d) Describe **three** problems that could occur when the ANPR system reads a vehicle number plate.

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.... [3]

26 An expert system is used to help to locate an underground water source.

(a) Describe the following components of an expert system.

(i) User interface

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.... [2]

(ii) Knowledge base

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.... [2]

(b) Explain how an expert system is used to discover locations to drill for water.

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.... [4]

27 An expert system can be used to diagnose problems.

Explain the following components of an expert system.

(a) Rules base

--- [3]

(b) Inference engine

--- [3]

28 Explain the following components of an expert system.

(a) User interface

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[3]

(b) Knowledge base

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[3]

29 An expert system can be used in medical diagnosis. An explanation system is a component of an expert system.

(a) State **three** other components of an expert system.

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[3]

(b) Explain what is meant by an explanation system.

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.... [2]

30 The ICT department in a company is writing a report.

(a) Members of the department can communicate with other members using VoIP.

Explain what is meant by VoIP.

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.... [2]

Ch.4 **(b)** The Head of the ICT department uploads the report onto the cloud.

Describe the steps that members of the department must take to share and manage their work on the report.

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.... [4]

31 A traffic management company is planning to improve traffic flow at a major road junction. A computer model is to be used before any changes are made to the junction.

(a) Describe the benefits and drawbacks of using a computer model.

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(b) The junction has four roads and uses traffic lights to control the traffic flow through the junction.

Explain how the computer model operates.

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.... [4]

32 **(a)** Describe the processing and the outputs that are used in an expert system.

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.... [3]

(b) Write down **three** examples of expert systems.

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[3]

33 The secretary of a club writes a monthly newsletter which is sent out to its members. She is considering producing an ePublication of the newsletter.

(a) State **four** characteristics of an ePublication.

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[4]

(b) Give **two** other uses of ePublications.

1 ....

2 ....

[2]

34 Schools can use School management systems.

(a) Describe the inputs, processing and outputs required by a School management system to show learner performance.

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(b) Computer Aided Learning (CAL) can be part of a School management system.

Explain what is meant by Computer Aided Learning.

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.... [2]

Mark Scheme

Question	Answer	Marks
1	**Six** from: Different size/style of font for the title/features in the table Clear font colour for the title/text in the table Clear fonts for the title/text in the table Use of bold to highlight keywords Use of italics to highlight keywords Poster fills the page Data is shown in the comparison table/chart More text than images Contrasting colours for font and background colour Use of white space Use of borders to make the text stand out	6

Question	Answer	Marks
2a	**Six** from: *Benefits* Fast throughput of pupils at the tills Fast transaction as only the card is presented If the card is stolen it can be blocked One card is less bulky than money Using the card is more secure because the money can only be used in the canteen *Drawbacks* Tendency to spend more as it is a card Difficult to keep track of your spending as no physical money If the card is damaged/lost the pupil cannot buy food/lose all their money Card needs topping up regularly Cards will need to be purchased by the pupils and can be expensive Parents can see what the pupils buy If there is an issue with the machine not easy to see mistakes Easier to misplace than cash/coins Parents can limit how much is spent on food Pupils can only spend the money in the canteen and on food **To gain full marks there must be at least one benefit and at least one drawback**	6

2b	**Six** from: The cost of the meal is totalled The reader <u>reads the details</u> from the card The amount of money on the card is checked The total is compared to the amount of money on the card If it is greater the transaction is rejected If it is less than or equal to then the transaction is accepted Checked whether card it is correct type/stolen/blocked The cost is deducted from the amount on the card The amount/total balance on the card is updated following the transaction The amount is credited to the school system The details of the receipt are prepared//The receipt is produced//Rejection slip is produced//Message is prepared	**6**

Question	Answer	Marks
3a	**Six** from: OMR sheets are scanned in using an optical mark reader//Reader reads the lozenge Data is sent to the computer A template of the register is loaded into the computer A value is assigned to each lozenge A light passes through the scanner and shows position of each filled in lozenge//Comparing dark spots with lighter areas//Use X Y coordinates The position is compared to the template/pre-determined data If the lozenge shaded is [P] then the pupil is recorded as present If the lozenge shaded is [A] then the pupil is recorded as absent If both lozenges [A] and [P] are shaded then the pupil is recorded as late. If no lozenge on a line is shaded the result is discarded	**6**

| 3b | **Eight** from:
Advantages
Faces are unique therefore greater security
Data entry is faster as it does not need to be sent to the office for entry
Data entry is more accurate the teacher could enter the wrong data on OMR sheet
Greater security as the pupil needs to be present to register
More difficult to fake biometrics
OMR data sheets can be forgotten or lost

Disadvantages
Facial injuries/facial hair/glasses/masks can affect the data entry
The cost of setting up a new system is higher as extra hardware and software needs to be purchased//Setting up the system is more expensive
Time consuming to set up all the pupils
The data will need to be updated regularly due to facial changes as pupils get older
Higher error rate
System is more complex therefore may cost more to maintain//Maintaining the system is more expensive
The environment and usage may affect the reader
Biometric systems are not 100% accurate
Less flexibility as the OMR sheets can be used anywhere in the school
Biometric data harder be reset if incorrect/if change needed
Greater invasion of privacy as biometric data has to be stored on the computer

To gain full marks there must be at least one advantage and one disadvantage | 8 |
| 3c | **Two** from:
Name
Address
Gender
Date of birth
Personal contact details, such as Email address and phone number
ID card/roll number
Race//Ethnic origin | 2 |

Question	Answer	Marks
4(a)	**Six** from: Customer is asked to enter their debit card in the ATM Customer's bank computer is contacted The card details are searched in the bank database Card is checked to see if valid/in date/stolen Customer is asked to enter their PIN PIN is compared to the PIN stored on the chip Customer is asked to deposit cheque The system checks whether the cheque is valid The cheque is scanned/read by the ATM Amount is scanned Bank account is checked for sufficient funds The image of the scan is saved The customer is asked to select the account to deposit money Money is deducted from the bank of the cheque Money is added to the account of the payee A receipt is sent to the printer at the ATM	6
4(b)	**Six** from: ***Advantages*** Retention of banks therefore all customers could use them Easier for customers to speak to a member of the banking staff Customers do not have to purchase expensive computer equipment Safer than carrying out transactions over the internet Can withdraw cash Do not need the internet ***Disadvantages*** Have to pay to travel to the bank to use the service Customers could waste time standing in queues/travelling to the bank More difficult for people who have a condition which affects their mobility Smaller customer base as it is local Potential for physical robberies Cannot keep track of the accounts as easily Not 24/7 **To gain full marks there needs to be advantages and disadvantages**	6

Question	Answer	Marks
5a	**Two** from: Uses up less memory in the computer Quicker to enter the data Quicker to search for data	2
5b	**Two** from: If the data is typed in incorrectly then the booking may be rejected If an incorrect airport code is used they may fly to the wrong airport//May miss the flight If the customer reference number is typed in incorrectly then the booking may be assigned to the wrong person If the number of passengers is incorrectly entered then number of seats will be wrong/overbooked So that the wrong booking is not made	2
5c	**Six** from: Display flights available Booking database is searched for the customer reference number Matching record is retrieved Details of the customer are displayed on the screen Booking database is searched for matching departure airport Booking database is searched for matching destination airport If flight correct, date/time found Search if seats/tickets/flight available If unavailable error message output Outputs the price If seats available, flags seat as booked If not booked then flag removed Reduces number of seats/tickets available by number booked E-ticket/ticket details are output E-ticket/ticket details sent to customer Receipt is printed//Verification email sent	6

Question	Answer	Marks
6a	Measurement is the monitoring/recording of physical variables without the microprocessor taking action Control is when the microprocessor takes action depending on sensor readings	2
6b	**Four** from: Microprocessor reads the data Data/Speed limit is stored in the computer Divides the distance travelled by time taken between the readings The speed of the vehicle is then compared to the speed limit of the road The speed is recorded It sends the data for later processing Graphs are automatically produced of the number of cars speeding	4

Question	Answer	Marks
7	**Two** from: He may be tired/injured therefore text messaging is easier than trying to talk The text message is sent even though the sender's phone is in limited signal strength Limited signal strength can result in a break of voice A text message is quicker to send	2

Question	Answer	Marks
8	**Four** from: *Advantages* Files can be larger therefore it can save physical storage space More likely to get the music you need More likely to get more up to date music Can be accessed in more places as only need the internet Don't need physical storage space Don't need optical drives to view/listen to movie/audio Can be viewed on mobile devices with internet connection Copyright owners have more control over who can watch the movie/listen to the audio as no physical copy exists to be copied/pirated Don't have to wait for the whole/large file to be downloaded before viewing Physical copies can be lost/stolen/damaged rendering them useless/have to buy again but steamed movies are always available *Disadvantages* Needs a connection to the internet Never own a physical copy of the file The playback is dependent on the internet connection therefore may not be as good a quality A subscription may be needed to be paid therefore may be more expensive **To gain full marks there needs to be advantages and disadvantages**	4

Question	Answer	Marks
9(a)	**Two** from, for example: Fit windscreens Fit the wheels Welding body panels Move cars from one place to another Fit engines	2
9(b)	**Six** from: The depth of the paint is read by the sensor The depth of paint is sent from the sensor to the ADC/microprocessor The digital data from the ADC is read by the microprocessor The microprocessor compares this data to the minimum depth of the paint/preset value If the data is less than the minimum depth/preset value, the microprocessor sends a signal to the actuator If the data is more than the minimum depth/preset value microprocessor does nothing Process is continuous	6
9(c)	**Six** from: **Advantages** They can work in areas where it would be harmful for humans They can work 24/7 Cheaper in the long run Higher productivity The finish is more consistent **Disadvantages** Expensive to purchase Skills can be lost Expensive to maintain/reprogram Expensive to start up//train staff to operate the robots **To gain full marks there must be at least one advantage and one disadvantage**	6

Question	Answer	Marks
10a	**Two** from: Menu of different types of cars Shopping basket in which to place bought items Login for username and password Create a customised car Calculates the price Checkout page for creating the order	2
10b	**Six** from: **Benefits:** Fewer staff/fewer shops therefore reduced overheads/lower costs The company can better target customers Updated more often Cheaper to publicise special offers rather than mail shots More special offers can be offered as lower overheads Broader customer base Operates 24/7 The customer can see immediately if the car is available Can be used from any location Saves cost/time of travelling to the showroom **Drawbacks:** Expensive due to the cost of setting up the website Expensive due to the cost of maintaining the website Expensive due to the need to re-train staff Internet access is needed by the customer Purchasing mistakes can be more easily made Mistakes are more difficult to rectify due to the speed of operation May be difficult to use as help is not as convenient If the system crashes during the purchase the car may not be bought The customer may experience internet/network problems Cannot test drive the car The pictures of the car may not be the same as the actual car **To gain full marks there must be at least one benefit and one drawback**	6
10c	**Four** from: Module testing tests the operation of each module Modules are tested separately Module testing tests the relationships between each module Module testing tests the data passing into and out of the modules Easier to find errors in module testing Whole system testing is carried out after module testing Whole system testing checks that the system works as it is supposed to//matches the user requirements Whole system tests the combined modules	4

Question	Answer				Marks
11		**MICR**	**OCR**	**OMR**	4
	This system magnetises the special characters on cheques in order to read them	✓			
	This method is used to read car number plates		✓		
	A bar code is an example of this system			✓	
	If the media from this system is photocopied it cannot be read by the recognition system	✓			

Question	Answer	Marks
12a	**Two** from: Mineral prospecting Car engine fault diagnosis Medical diagnosis Chess games	2
12b	**Three** from: Knowledge base Rules base Inference engine Interactive user interface Explanation system	3

Question	Answer	Marks
13a	**Four** from: The reader checks the amount to pay is less than the contactless limit The seller's bank's computer contacts the customer's bank's computer The card is checked if it is valid An authorisation code is sent to the seller The price of the purchase is deducted from the customer's account Transferred to the seller's account Message sent asking 'do you require a receipt' Receipt is sent to the printer If valid/enough money the transaction continues If not valid/enough money the transaction is terminated	4
13b	**Six** from: **Advantages** Saves time rather than travelling to the bank/waiting in queues Saves cost of travelling to the bank Customers can use international banks which could have better interest rates Better interest rates than physical banks Safer less likely to get mugged/robbed Operates 24/7 Can be used from any location **Disadvantages** Easier to press the wrong button and lose money Online security issues more of a concern Cannot deposit/withdraw cash Internet connection is required Mistakes are more difficult to rectify due to the speed of operation The customer may experience internet/network problems **To gain full marks there must be at least one advantage and one disadvantage**	6
13c	**Two** from: Secure Socket Layer Communication protocol Security technology Encrypted link… …between the server and the client Ensures all data remains private – 1 mark	3

| 13d | **https://**

One from:

This is the hypertext transfer protocol secure // ensures site is secure
Set of rules//protocol

tawarabank
This shows the domain name/company name that the company have purchased

.com
The company/domain is registered in multiple countries/USA | 3 |

Question	Answer	Marks
14a	**Four** from: The location of the smartphone is calculated using GPS software Signal is transmitted by the satellite Signal is sent almost continuously The data is saved in the smartphone The coordinates of the smartphone are shown on the smartphone screen	4
14b	**Three** from, for example: Real time aircraft/ship/drone position Tracking delivery/stolen vehicles Ploughing fields Surveying Military Sat-nav in vehicle to reach a destination	3

Question	Answer	Marks
15a	**Eight** from: **Advantages** Prevents double booking/overbooking The booking staff can see immediately if the concert is fully booked Bookings can be made 24×7 Usually cheaper as lower/fewer overheads Booking staff can more easily see the seats that are available **Disadvantages** Requires the school to purchase expensive hardware Setting up is more expensive Maintenance is more expensive Internet access is needed to run the booking system therefore the cost may be increased More reliant on hardware **To gain full marks the discussion must have correct answers for both advantages and disadvantages**	8
15b	Direct changeover	1
15c	**Three** from: Benefits are immediate Cheaper as there is only one set of staff Less chance of the new system being faulty as it is thoroughly tested Only one system in operation therefore data is not duplicated	3

Question	Answer	Marks
16a	**Four** from: Is debit card number valid/exists Does name entered match that on system Is expiry/start date valid/matches date stored on system Does security code/CVV entered match that stored on system Is there available credit/funds in the bank account Checks for unusual spending patterns Is card blocked/reported stolen/lost	4
16b	**Four** from: Computer looks up the date of performance/performance reference number Matching record is retrieved Checks/Searches if the seats are available Flags the seats to stop double booking as temporary hold Reduced number of available seats by the number booked//seats flagged as fully booked Calculate cost of seats Prints ticket/generates e-ticket E-ticket/ticket sent to customer Receipt is printed/Verification email sent Data is checked for accuracy If booking not completed, then temporarily hold flag is removed from the seat Reduce number of seats available once the booking is complete	4

Question	Answer	Marks
17	**Six from:** **Advantages** Robots can work in sterile/harmful areas which are dangerous for humans Humans would need protective clothing which would cost the company more money Robots can more easily be used for transferring large delicate items Robots can work 24/7 Cheaper in the long run Higher productivity More accurate/precise engineering More frequent checking of the equipment Fewer workers are needed therefore lowering costs Production of the cars is more consistent **Disadvantages** Expensive to buy robots Maintenance is expensive Requires backup systems, which are expensive They replace skilled workers, leading to de-skilling They need constant observation which increases the cost of maintenance crews **To gain full marks the discussion must have correct answers for both advantages and disadvantages**	6

Question	Answer	Marks
18	**Eight from:** **Advantages** The customer does not need an email address for the booking The customer can pay by cash or electronic means whereas is an online system cards/apps are needed Customers do not need an internet connection More control of the booking therefore less errors for customers Easier to cancel a booking once made It is easier for the customer to gain information/help on the purchase **Disadvantages** Manual systems can result in double booking Manual booking systems update the data less often than online systems Difficult to see if a seat is taken as the seats are not updated when booked Bookings can only be made when the booking office is open Can only book at a booking office People have to travel to the booking office to book, therefore wastes time People have to travel to the booking office to book wastes cost More difficult to change bookings Physical tickets are issued which can be lost more easily **To gain full marks the discussion must have correct answers for both advantages and disadvantages**	8

Question	Answer	Marks
19a	**Eight** from: **Advantages** No longer need to travel to the store so it saves the cost of travelling No longer need to travel to the store so it saves the time of travelling Saves time shopping as favourite lists can be produced Saves time shopping around different stores Wider range of shops Customers can shop 24/7 Customers can compare the prices of different stores without travel Shopping can take place using mobile devices anywhere there is an internet connection Regular shopping schedules can be set up Can see the physical objects in store and then have the advantages of shopping online **Disadvantages** Makes people lazy/lack of exercise Over-reliance on computers More security issues Needs a reliable internet connection Goods can take time to arrive Goods could be damaged in transit More chance of errors in the ordering More difficult to amend an order after purchase No way of checking the goods before buying There may be delivery/packaging costs **To gain full marks the discussion must have correct answers for both advantages and disadvantages**	8
19b	**Four** from: Bold colours/contrasting colours making it easier to read Larger font sizes/clear font so it is easier for people reading the text Simple navigation makes it easier to find the products Larger buttons so they can be easily seen Interactive screens/buttons/drop down menus to reduce typing Larger bold heading to make it an easy to read layout	4

Question	Answer	Marks
20	**Six** from: User telephones the bank telephone centre System asks for the long number on the credit/debit card/sort code and account number/customer Access/ID number The user taps out the number on the phone keypad and presses #/speaks the number System asks for certain characters in a password/phone banking security number The user taps out the characters asked for/security number and presses # System checks the number is correct System rejects the password/security number The user re-enters the characters/security number After three attempts the telephone connection drops System asks other security answers The user taps it in/speaks the answer System asks which service you require/options given Users tap in the number to select transfer from one account to another System asks number of account transfer from User taps in account number System connects with the bank account System asks for number of account transfer money to User taps in account number System asks amount to transfer User taps in the amount Checks the amount in the account/maximum not exceeded Approves request If amount exceeded the call is terminated/transaction declined/insufficient funds System asks when the transfer should happen The user taps in the date System asks you to confirm it/sends a text message/send email Customer hangs up to end the transaction	6

Question	Answer	Marks
21a	**Two** from: Moving images/video Sound/Audio Animation	2
21b	**Six** from: **Advantages** Easier to display to parents Can take less time to display the information Quicker to change/update content of the multimedia presentation More control over the layout of the presentation as not using a third party browser More control over the sound in the presentation as using own equipment People viewing the Multimedia Presentation will be school based Can be viewed without internet access **Disadvantages** The multimedia presentation is only available in the school during school time whereas a web page can be used in other places The visitor may not see the whole presentation The multimedia presentation may not include sound due to being shown in the school Multimedia presentations can require expensive hardware to produce and view Multimedia seen by less people Multimedia more expensive software needed to produce the presentation More specialist training needed to produce it **To gain full marks the description must have correct answers for both advantages and disadvantages**	6
21c	**Monitor/data projector** – 1 mark **One** from: To show what the presentation looks like To show the layout of the presentation **Speaker** – 1 mark To listen if the sound matches the images – 1 mark **Printer** – 1 mark To check that handout format works – 1 mark	4

Question	Answer	Marks
22	**Four** from: Fewer errors in final version of real item as errors would have been resolved in model Saves money as it saves on resources Safer to run a computer model rather than risking human life Different scenarios/what ifs can be carried out which may happen in real life/to experiment To build the bridge and test it would be impracticable due to cost/time	4

Question	Answer	Marks
23	**Six** from: **Advantages** Branches can stay open longer and offer other services More bank staff are available to help customers Less chance of hacking/fraud as system used in the banks Fewer bank tellers so more profitable for the bank As the service is quicker/more services more likely to remain **Disadvantages** Initial cost of hardware/software is expensive Need to retrain staff which can be expensive System maintenance costs will be expensive as more inexperienced people are using the system Staff numbers may increase as staff are needed to help internet banking customers **To gain full marks the discussion must have correct answers for both advantages and disadvantages**	6

Question	Answer	Marks
24	**Six from:** ***Benefits*** • Cheaper than building a physical bridge • Safer as the bridge could collapse if not tested properly • Safer to check environmental factors • Tests can be carried out with extreme weather conditions ***Drawbacks*** • Too many variables to cover them all • Requires programmers/hardware/software to create the model can increase costs • Requires extra skilled staff to maintain the model • Errors in the software can cause catastrophic effects **To gain full marks the discussion must have both benefits and drawbacks** **If a list give five marks maximum**	6

Question	Answer	Marks
25a	**Four from:** **Benefits** • Cameras can be viewed from the smartphone so intruders can be seen/reported • Increased sense of security • You receive immediate alerts if there is a security breach **Drawbacks** • You may not be able to deal with the intruders if you are a long way away • The wireless technology/data could be accessed by hackers • If access to the internet is lost then control of the system is lost **To gain full marks there needs to be both benefits and drawbacks**	4
25b	**Two from:** • Light • Temperature • Motion • Proximity/Passive Infra-red/PIR • Pressure pads • Acoustic/Sound	2

25c	**Four** from:	4
	• An image is taken of the front of the vehicle • The image is sent to the software • The software isolates the number plate from the image • Colour brightness and contrast are changed this makes the plate easier to read • Each character is read/decoded using OCR software • The number plate is searched in the database • Comparison is made with number plates stored in the database • If the number plate is identified it allows the gate to open	
25d	**Three** from:	3
	• Another vehicle/pedestrian could obstruct the view of the camera • The number plate may be too dirty to read • The number plate may be in low light/poor weather conditions • The number plate may use illegal characters/font • The number plate could be in a different position than where it should be • Characters are misread • Position of characters/grouping of characters • The number plate has not been added to the system	

Question	Answer	Marks
26a(i)	**Two** from: This is the system that displays questions for the user to answer The user answers with Y/N type answers User interface displays the results	2
26a(ii)	**Two** from: This is a collection of facts and rules Created from information provided by experts	2
26b	**Four** from: The user interface asks questions The user answers the questions with Y/N answers The expert system asks further questions based on the answers given The inference engine searches the knowledge base using the rules base Probabilities would be given of the likelihood of finding water An explanation system explains how the expert system arrives at the solution Results are displayed on the user interface	4

Question	Answer	Marks
27a	**Three** from: Uses prescribed (knowledge-based) criteria to solve a problem The criteria in the rules base are applied to the inputted data Part of the database of knowledge It contains facts/descriptions of objects Used in searching the knowledge base	3
27b	**Three** from: This determines how to apply the knowledge in the knowledge base to the facts presented at the user interface Processes the knowledge base to find the diagnoses/solution It performs this task in order to deduce new facts which are subsequently used to draw further conclusions The inference engine is the active component of an expert system It provides a methodology for reasoning	3

Question	Answer	Marks
28a	**Three** from: The user interface is the screen into which the user types the answer Outputs questions for the user to answer Outputs the results to the user Interacts/communicates with the user Allows the expert to enter information into the knowledge base	3
28b	**Three** from: The knowledge base is a database of information Collection of facts/information/rules Populated by experts It contains the rules base	3

Question	Answer	Marks
29a	**Three** from: User interface Inference engine Knowledge base Rules base	3
29b	**Two** from: Explanation system supplies/gives information/data to the user about the solution to the problem It describes the decision making process step by step Clarifies the structure of the solution to the problem	2

Question	Answer	Marks
30a	**Two** from: Voice over Internet Protocol Internet telephony Communication method over the internet	2
30b	**Four** from: Members of the team log into the cloud Access to the document is given to members of the team Members of the team edit the document Members of the team download / upload the document Each change causes the document to be automatically saved All copies of the document are synced A history of the changes can be easily created from the saved versions	4

Question	Answer	Marks
31a	*Benefits* **Max five** from: Cheaper than building the real object Can be safely tested under extreme conditions Can use it to find unexpected problems Able to easily test different scenarios Able to explore 'what if' questions Can speed things up / slow them down to see changes over long / short periods of time *Drawbacks* **Max five** from: Mistakes may be made in the programming The cost of setting up a computer model can be high Time may be needed to make sense of the results Reactions to the model might not be realistic / reliable Cannot take into account all variables The model is only as good as the data entered	6
31b	**Four** from: Data is entered into the model The computer model is run Vary the timings of the traffic lights Increase the number of vehicles at the junction Increase the number of vehicles that stop to turn right / left Consider emergency vehicles Consider different times of day Consider an increase in the number of pedestrians at the crossing To see how it affects the traffic flow Results are produced which are analysed to create the real junction Change the values to test for dangerous situations / scenarios	4

Question	Answer	Marks
32a	*Processing* Max **two** from: The inference engine searches/matches the user's answers The knowledge base is searched using the rules base *Outputs* Max **two** from: Diagnoses/probabilities of the solution/results are produced Explanation of how the solution was found is displayed The question is displayed on the screen	3
32b	**Three** from: Strategy games Financial advice Tax systems Careers Route scheduling for delivery vehicles Diagnostic systems Identification system Prospecting systems	3

Question	Answer	Marks
33a	**Four** from: Can use embedded multimedia Can auto change of pages Can be used in other documents Sections of the newsletter can be hyperlinked More up-to-date as edited versions can be uploaded quicky Readers can interact with the ePublication The system can read the ePublication to the user	4
33b	**Two** from, for example: Journals Company reports Digital catalogues/brochures eBooks Scrapbooks/articles Electronic magazines	2

Question	Answer	Marks
34a	***Inputs*** Max **three** from, for example: Student personal details Marks and grades Student behaviour Student test results Attendance data Punctuality data ***Processing*** Max **three** from, for example: Average grades are calculated Comparison made with forecast grades Class averages are created Data is saved Graphs are created ***Outputs*** Max **three** from, for example: Termly/yearly reports are printed / sent to parents Progress against forecast grades are printed / sent Statistical analysis is produced	6
34b	**Two** from: It is a method of learning It is an application / software / program Used to help students to learn about a subject It is tailored to the individual student It can take account of previous assessments when setting learning objectives	2