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INTERNATIONAL ADVANCED LEVEL

INFORMATION TECHNOLOGY

EXEMPLARS with commentaries-Unit 1

Pearson Edexcel International Advanced Subsidiary in Information Technology (XIT11)
Pearson Edexcel International Advanced Level in Information Technology (YIT11)
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Pearson

Introduction

1.1 About this booklet

This booklet has been produced to support teachers delivering the International Advanced Level Information Technology specification. The Unit 1 exemplar materials will enable teachers to support their students in the knowledge and skills required to successfully complete this course. The booklet looks at questions from the Sample Assessment Materials, showing example responses to questions and how examiners have applied the mark schemes to demonstrate how student responses would be marked.

1.2 How to use this booklet

The Sample Assessment Materials have been used for exemplar responses, and each question contains:

- Question number and question in full
- Exemplar responses for each question
- Exemplification with examiner commentary of the marker grading decision based on the Sample Assessment Material mark scheme

The exemplification highlights the achievement of the Assessment Objectives alongside exemplifications of the new format for long answer assessment through levels-based assessment bands, which centres are required to review carefully.

Centres should utilise the commentary on the exemplification of marker decisions to support their internal assessment of students and embed exam skills into the delivery of the specification.

It should be noted that the responses here have not have been completed in exam conditions. Please note that the responses are part of a small sample only and have not gone through the formal standardisation process.

1.3 Further support

A range of materials are available to download from the Information Technology page of the Pearson website to support you in planning and delivering the new specifications.

Centres may find it beneficial to review this document in conjunction with:
Sample Assessment Materials, Getting Started Guide and Specification.

Command words shown in red are further explained in Appendix 6: Taxonomy, in the specification.

Question 1 uses this context.
A regional educational centre employs teachers to work with local schools.
The teachers travel between the schools. They do not have offices in either the schools or the centre. Anika is one of the teachers.

Question 1(a) The teachers still need to work with each other and with the administrative team at the centre.

1a (i)	**Describe two** ways in which using IT can enable Anika to work effectively. (4)

Sample response 1

1. She could use a public Wi-Fi hotspot to access the internet to exchange messages with other teachers.
2. She could keep her files in cloud-based storage so that she could access them from any of the schools.

Awarded 4 marks

Commentary 1

The question asks for descriptions of two ways in which using IT helps Anika to work efficiently.
Four marks awarded for extended descriptions of two methods of using IT in the given context. In each case the description is (how IT could be used) followed by (how this enables Anika to work effectively).

Sample response 2

1. She could use email to keep in touch with other teachers.
2. She might use her mobile to keep in touch with other teachers.

Awarded 4 marks

Commentary 2

Two marks awarded for two simple descriptions of two methods of using IT in the given context. The mark points are independent. Keeping in touch without saying why or how this makes working more efficient is not enough for the second mark in either response.

1a (ii)	**Explain one** way in which this working arrangement benefits the regional educational centre. (4)

Sample response 1

They save money because they don't have to pay to provide any office space for the teachers.

Awarded 2 marks

Commentary 1

Two marks are awarded. One for the benefit of saving money meaning fewer overheads, and one for the expansion, not paying for office space. Explain in a question always requires a point and an extension.

Sample response 2

The teachers don't have to travel so much because they are not working from an office at the centre.

Awarded 0 marks

Commentary 2

This is not awarded any marks. The benefit identified is a benefit to the teachers, **not** to the centre. The expansion cannot be awarded without an identified benefit to the centre.

Question 1(b) Anika teaches music. She listens to digital recordings of her students' performances. She wants to buy new speakers.
Analogue signals must be converted to digital values before storing on a computer.

1b(i)	A sound has been recorded with a sample rate of 16 bits/44.1 kHz. **Identify** the statement that correctly describes what this means. A. The sound wave is broken down into 16-bit chunks. Each chunk is stored as a value between 0 and 44.1. B. The maximum amplitude of the sound wave is 44100 Hertz. The amplitude is measured in 16-bit segments. C. The sound wave is measured 44100 times per second. Each measurement is stored in 16 bits. D. The amplitude of the sound wave is measured 16 times per second. Each measurement is stored as a value between 0 and 44100. (1)

Sample response 1

Commentary 1

This is a multiple-choice question. The student has given the correct response. **One** mark awarded.

1b(ii)	The speakers have a frequency response of (+/-3 dB) 60-25,000 Hz. **Identify** the statement that correctly describes what this means. A. The measure of the variation in volume for each frequency in the given range. B. The margin of error for each measurement of frequency. C. The number of times the speaker cones vibrate each second with an accuracy of +/-3. D. The total number of decibels needed to represent each individual frequency between the top and the bottom end. (1)

Sample response 1

Commentary 1

This is a multiple-choice question. The student has given the correct response. **One** mark awarded.

1c	Anika has a small baby. She wants to use a new IT system to monitor the baby's health. The system uses a device inside the baby's dummy (pacifier). The dummy (pacifier): • monitors the baby's temperature and sends an alert if the temperature goes too high • can be located if lost • works with a smartphone. **Give four** ways in which the system could accomplish these tasks. (4)

Sample response 1

She could include a temperature sensor which triggers an alarm buzzer if the temperature gets too high and then sends a text message to the phone using Wi-Fi.

Awarded 4 marks

Commentary 1

Give indicates that responses don't have to be linked. Four in this case. The responses can be in continuous prose, as in this example, or as separate points 9see the example s of these in the mark scheme.

temperature sensor (1), the audible alarm (1) and the text message (1), both triggered by the temperature sensor.
The fourth mark is for the use of *Wi-Fi* (1), implying that the pacifier has a *Wi-Fi* transmitter.

Sample response 2

It could have a speaker built in that can be activated by Wi-Fi if it gets lost.
The speaker could also make noise if the temperature gets too high.

Awarded 3 marks

Commentary 2

Two marks have been awarded for the method of detecting the pacifier if it gets lost. A third mark is given for an alarm sounding when the temperature is too high. The student does not identify how the speaker would be triggered and so does not get a fourth mark.

Sample response 3

It could connect to Anika's mobile phone using an app
It could connect by Wi-Fi or Bluetooth and send an alert if the temperature goes too high

Awarded 1 mark

Commentary 3

Student has written a muddled answer but gains one mark for using an app to send an alert.

1d	Anika is training to run a marathon. She wears a device on her wrist that helps with her training. The device demonstrates technological convergence. **Explain two** benefits of technological convergence in this device. (4)

Sample response 1

Anika only has to carry one device for all the functions, so it is less weight when running and she only has to worry about keeping one thing charged up.

Awarded 3 marks

Commentary 1

The student has gained marks for the extended explanation that Anika only needs to carry one device. A further mark is gained for the explanation that only one device needs to be charged up.

Sample response 2

She doesn't need lots of different devices because the one device does everything she needs on her training runs.

Awarded 1 mark

Commentary 2

1 mark is awarded for saying that Anika only needs one device when running.

Question 2 uses this context.
An online-only bank needs to store large amounts of data about its customers.
Each customer can generate many transactions every day.

2a	It is said that using cloud storage has financial benefits. **Explain two** other reasons why the bank should use cloud storage. (4)

Sample response 1

1.The bank doesn't need to employ trained data management staff because the cloud storage company looks after the data.
2. Cloud storage is cheaper than storage in the bank's network and can be expanded without buying new hardware because the bank can just rent more storage.

Awarded 4 marks

Commentary 1

The student has gained marks for the extended explanation that the bank does not need to employ trained staff for managing the data. The second response starts with a financial argument and this cannot be awarded anything, but the extension contains two marks, one for saying that the cloud storage is expandable and one for the bank being able to rent extra storage.

Sample response 2

1. The bank will have a level of service agreement with the cloud storage company and can therefore have a guarantee that the data will always be available.
2. If it was stored in the bank's network, a network breakdown could prevent the data from being available.

Awarded 2 marks

Commentary 2

The student gains two marks for the first response, but the second response is just a reverse argument and although it expands on the first response it cannot be awarded further marks

2b	The online bank uses multi-user software licensing. **Describe** how multi-user software licensing works. (2)

Sample response 1

Multi-user licenses can be 'per seat' or 'concurrent use. With a per-seat license, the bank buys software access for each person that will use the software, each person has their own access code. With concurrent use, there is no limit to how many can use the software, but only a certain number will be able to use it at the same time.

Awarded 2 marks

Commentary 1

The student has given descriptions of two aspects of multi-user licenses. The first description, per-seat, is the better of the two, but either would gain two marks.

Sample response 2

The bank buys a group of licenses at a discount. It is given a multi-user key and is then able to give it to any of its staff.

Awarded 1 mark

Commentary 2

The student gains a mark for negotiating a price for a set of keys, but the expansion saying how the keys are used is too vague for the second mark.

2c	The bank wants to introduce multi-factor authentication to control access to its computer systems. **Describe** **one** way in which multi-factor authentication could be implemented. (4)

Sample response 1

The bank can implement a biometric method such as requiring the employee to use a fingerprint scanner to enter their fingerprint into the system. The employee would then need to put in their user name and password as well. The system would only allow access if the fingerprint was the one stored for the person with the password.

Awarded 4 marks

Commentary 1

The student has identified two factors, fingerprint and password, together with methods of input. They have also explained that the two factors most both identify the same person, so that a match is required before access is granted.

Sample response 2

The employee could enter their user name and then use a proximity (RFID) reader to read an identity card to confirm who they are.

Awarded 2 marks

Commentary 2

The student has identified a plausible second factor, using RFID to read an identity card, but has not fully described the first factor. They would need to have the employee enter a name and password, not just a name.
'To confirm who they are' is not enough for the 'matching' mark.

2d	The bank operates online only. **State** **two** factors that prevent some people from using online banking services. (2)

Sample response 1

1. Some people don't know how to use a computer
2. Some people don't have easy access to the internet

Awarded 2 marks

Commentary 2

The student has identified two factors, poor digital skills and lack of internet access. Lack of easy access instead of total lack of access is acceptable.

Sample response 2

Internet access is expensive and poor people may not be able to afford it

Awarded 1 mark

Commentary 2

The student has not stated two separate factors. The single statement is only concerned with financial barriers.

Question 3 uses this context.
A holiday camp for teenagers offers a wide range of activities.

3a	Campers retrieve their schedules from a file server. The file transfer program operates at Layer 7 (Application) of the OSI 7-Layer Model. **Describe** how the file transfer program passes data from the file server to its peer on the user's device. (3)

Sample response 1

The program passes the data down through the OSI stack. At each stage the data has extra addressing information added to it. At layer 1, the data goes through the network cables to the user's device. Then the data moves back up through the stack, with the addressing data being removed at each stage until it reaches an application on the device that can read the data.

Awarded 3 marks

Commentary 1

The student has modified a 'standard answer' about what happens when data moves through the OSI layers, but this includes the information asked for in the question and is therefore worth full marks.

Sample response 2

The data has to be moved down through the layers and then passes across the network cables to the user's device before going back up the layers there.

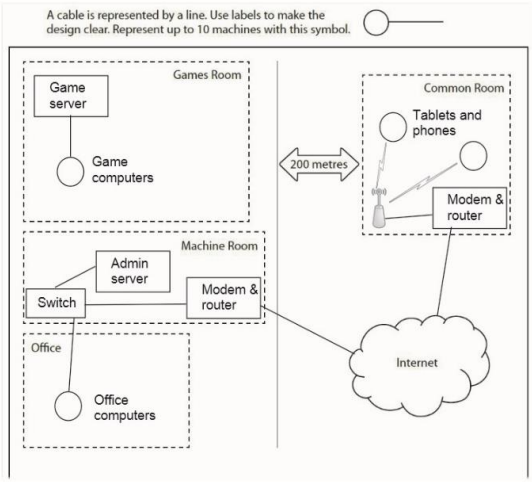
Awarded 1 mark

Commentary 2

The student has not given enough information about the movement up and down the OSI layers. One mark is awarded for the data passing across the physical media, network cables, to the second device.

3b	The camp is upgrading its network infrastructure to offer the latest in digital games and network access. The computers in the games room will be used to play multi-player games. The campers play only against each other. They cannot play with people outside the room as the computers cannot connect to the internet. The games require a very quick network response time. The computers in the office are used by the administration staff. All of the camp's files are stored centrally on the site. The administration team generates a great deal of network traffic between themselves. The network traffic generated by the administration team must not slow down the rest of the camp's network. The common room is a separate hut 200 metres away from the main building. Campers can use their own tablets and phones to access the Internet in the common room. There is a machine room with air conditioning close to the office. **Complete** the diagram to show a design for a network infrastructure that will meet these requirements. (9)

Sample response 1

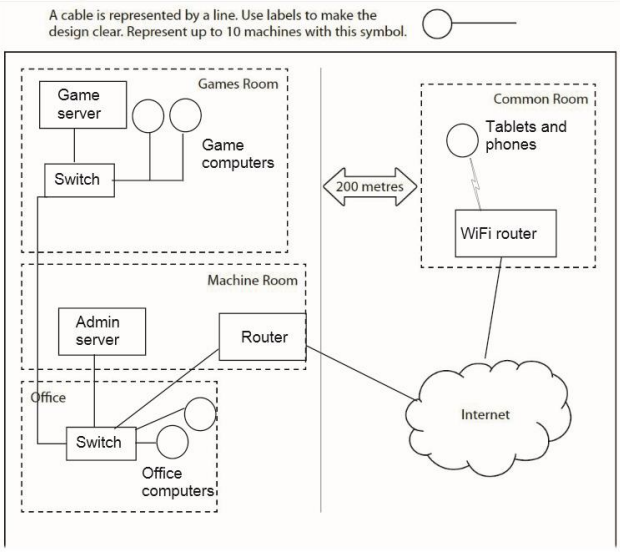


Awarded 8 marks

Commentary 1

The student has met all of the marking points except for putting a switch between the game computers and the game server. This is a common error, especially when multiple devices are represented by a single symbol. The student has combined the router and modem. This is acceptable as this type of multi-function device is in common use.

Sample response 2



Awarded 6 marks

Commentary 2

The student has met most of the marking points but has made some simple errors. The internet connection requires a modem as well as a router, combined router-modems are common but cannot be assumed; a Wi-Fi router in the Common Room is not enough for the wireless access point mark; the Games Room and Office switches should not be joined.

3c	The holiday camp wants an online booking system. Customers will be able to select arrival and departure dates, choose their accommodation type, enter their address and contact details and register their preferences. **Explain** how scripting would be used for the online booking system. (6)

Sample response 1

The booking system will require a back-end database and will need server-side scripting to make and update bookings. Server-side scripting runs on the camp's admin server and would be written in a language like Python. Server-side scripts allow the camp to use active web pages on their website.
The server-side scripts would allow customers to use the database without giving them direct access, this helps with data security. It also means that staff are not needed to handle the bookings. The scripts would let customers do things like select available dates and accommodation types.
The website could also use client-side scripts. These are downloaded with the web page and run on the customer's computer. They can be written in a language such as JavaScript. This is less safe for the customer than server-side scripting and some people block scripts from running so the website may not work properly.
Client-side scripts could be used for things like validation of forms.

Awarded 6 marks

Commentary 1

This is a levels-based question. The work meets the descriptor for a level 3 answer. The work describes both types of script and gives valid examples of the languages used and the type of tasks that could be performed. There is also relevant information about security aspects although this is not a specific requirement of the question.

Sample response 2

The website could use JavaScript in its pages. This would let the downloaded web pages be active and allow customers to make bookings.
The JavaScript would let the pages use forms that can be checked by the script before sending them back to the booking system. The script would reject incorrect entries such as invalid email addresses or postcodes.
This called client-side scripting.

Awarded 2 marks

Commentary 2

This is a levels-based question. The work meets the descriptor for a level 1 answer. Only client-side operations have been described and the description is incomplete and has some inaccuracies.
The student has given a valid client-side scripting language and some valid operations.

Question 4 uses this context

A hotel uses a relational database to manage room bookings, customer details and housekeeping.

4a(i) **Explain** the difference between 'data' and 'information'.

(2)

Sample response 1

Data is a collection of facts such as temperatures. Information is the result of data being processed e.g. when temperatures are processed to give information about likely high and low temperatures during each month.

Awarded 2 marks

Commentary 1

The student scores one mark for indicating the difference between data and information, and one mark for an expansion. In this answer the expansion takes the form of an example.

Sample response 2

Information is what you get when data like dates is processed into a structured form such as a graph or table.

Awarded 1 mark

Commentary 2

The student scores one mark for showing that they understand that data must be processed to give information, but has misunderstood the term structured. Using graphs and tables may put the data into a structure but such data may still not be information.

4a (ii) **Figure 3** shows customer details.

idcustomers	lastname	firstname	creditCardNumber	email
41163	Hartley	Henry	151515151515151	hhartley@somewhere.com
49684	Jones	Joseph	4545454545454	jj@somewhereelse.com
55006	Weidmann	Wendy	7129286127513409125	weidmannw@somewhere.com
93210	Scott	Sarah	6937461968162	sscott@somewhere.com

Figure 3

Give **one** example of data and **one** example of information relating to the customer details.

(2)

Sample response 1

Data is Hartley
Information is the customers last name is Hartley

Awarded 2 marks

Commentary 1

The student scores one mark for data, the content of any single cell.
They also score one mark for information, relating the cell content to a field name to give the customer's name.

Sample response 2

Data is Hartley and the information is the email address - hartley@somewhere.com because it links the name to somewhere.com

Awarded 1 mark

Commentary 2

The student scores one mark for data, the content of any single cell.
They have misunderstood the term information and selected an email address as being a name linked to something else, rather than an email address linked to the field name.

4b	The hotel has a housekeeper table, a room table, and a cleaned by table in the database. Example tables are shown.

tbl_housekeeper

idhousekeepers	workinghoursperweek	phone	hourlyrate	lastname	firstname
3842	35	52468975316	10.45	Jones	Joe
6723	20	21928374657	7.50	Wilson	Will
9464	40	12234567890	9.75	Jones	Joan

tbl_room

idcleanedby	room	housekeeper	date
1	312	9464	2016-11-10
3	534	3842	2017-12-11
5	211	6723	2015-10-01
7	101	6723	2017-12-10
9	275	9464	2016-03-11
11	312	6723	2017-12-16
13	534	3842	2017-12-14
15	211	9464	2017-12-10

tbl_cleanedby

idRooms	smoking	maxOccupancy
101	1	2
211	1	2
275	0	6
312	0	4
534	0	2

Figure 4

Write an SQL query that ranks housekeepers by the number of rooms cleaned for the month of December 2017.

(6)

Sample response 1

```
select firstname, lastname, count(*)
from tbl_cleanedby, tbl_housekeepers
where month(date)=12 and idhousekeepers=housekeeper
group by housekeeper
order by count(*) desc;
```

Awarded 6 marks

Commentary 1

This is one possible query that would give the required result.

The student scores one mark each for:

- required fields, first and last names of housekeepers
- counting the number of records, count(*)
- identifying the matching fields, month and housekeeper and having a join is present between tbl_housekeeper and tbl_cleandby
- grouping by housekeepers
- use of the month function to find December records, month(date)=12
- ranking the results. Using count(*) desc to put the records into descending order

Sample response 2

```
select firstname, lastname,
from tbl_cleanedby inner join tbl_housekeepers
 where month(date)=12 and idhousekeepers=housekeeper
 group by housekeeper
 order desc;
```

Awarded 4 marks

Commentary 2

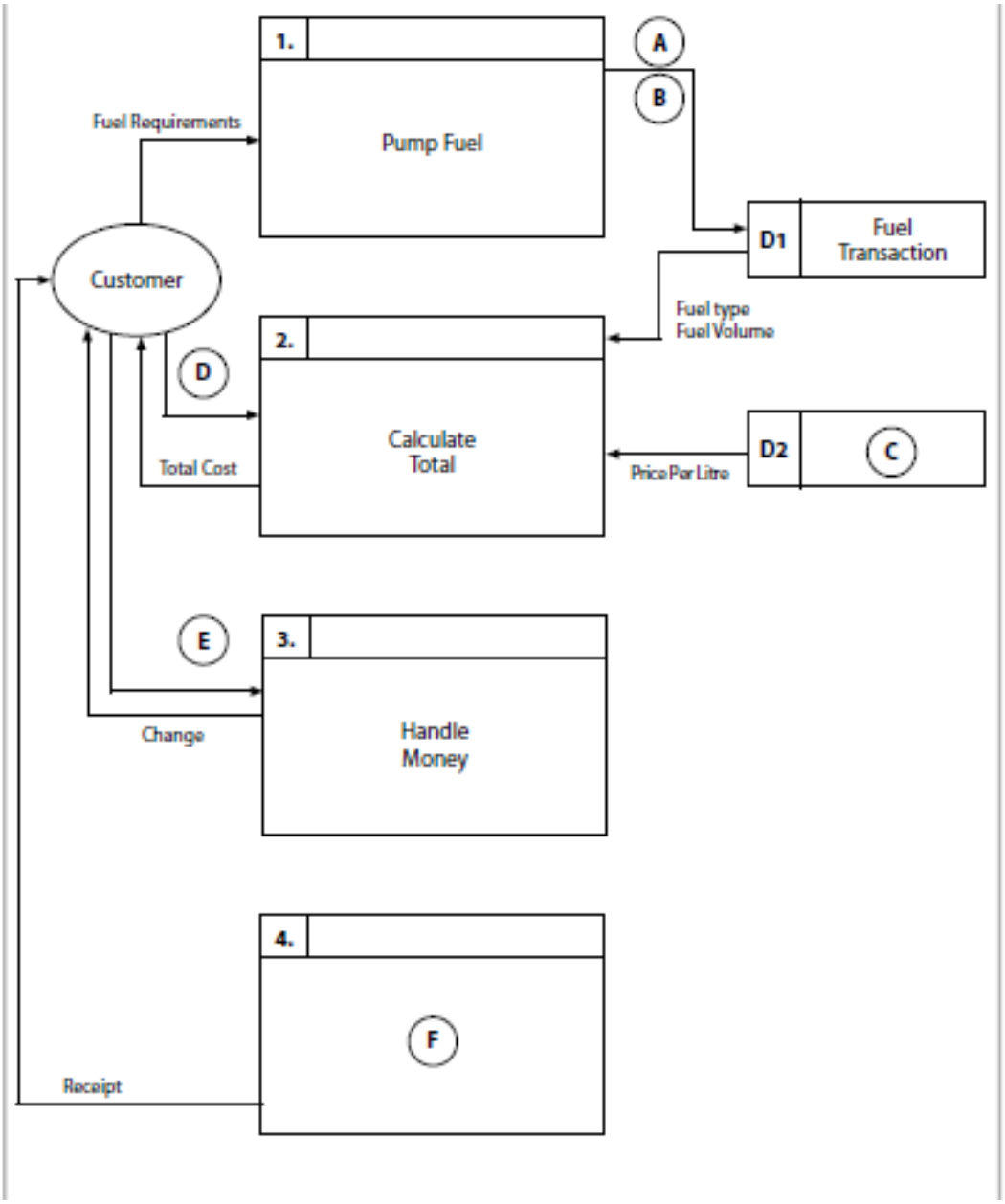
This query is incomplete and would not give the required result but does contain some correct parts of an SQL statement.
The student scores one mark each for:

- required fields, first and last names of housekeepers
- identifying the matching fields, month and housekeeper. An inner join is specified between cleaned by and housekeepers
- grouping by housekeepers
- use of the month function to find December records, month(date)=12

The student has misused the order function and has no method of counting the required records.

Question 5 is based on this context.
A service station has four self-service fuel pumps, numbered 1 to 4. Each pump can dispense petrol and diesel fuel. The pumps measure the volume of fuel dispensed in litres. Customers pay for the number of litres shown on the pump display.

5a Here is a partially complete data flow diagram for purchasing fuel.



Complete the table to show names for the items labeled A–F.

(6)

Sample response 1

Label	Name of item
A	Fuel type
B	Fuel volume
C	Price per litre
D	Pump number
E	Payment
F	Produce receipt

Awarded 6 marks

Commentary 1

The student has correctly identified the six items. In most cases they have used words from the question. The use of price per litre instead of price, payment instead of cash/money, and produce instead of print are all acceptable variations to the terms in the mark scheme.

Sample response 2

Label	Name of item
A	Set the fuel type
B	Measure the fuel volume
C	Prices
D	Request for invoice
E	Money
F	Create invoice

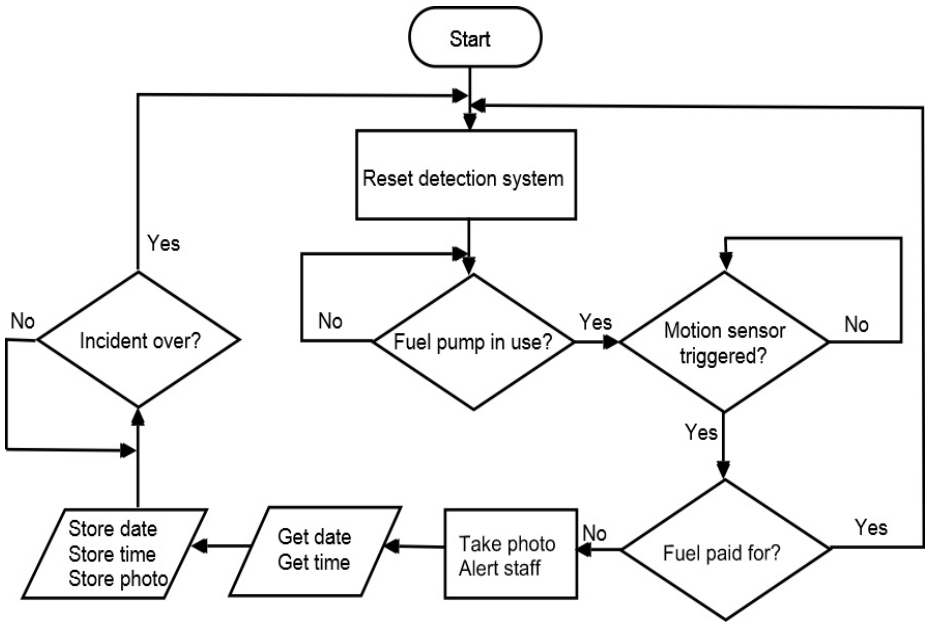
Awarded 3 marks

Commentary 2

The student has correctly identified three items, prices, money, and create invoice. Although items 1 and 2 are related to the correct data, they are not actual data items. Item D is incorrect.

5b	Sometimes, customers leave without paying for the fuel. In order to stop this, the service station puts a camera and a motion sensor on each of the four pumps. The service station will have a date- and time-stamped photograph of all vehicles using the service station. **Draw** a flow chart to describe this process. (6)

Sample response 1



Awarded 6 marks

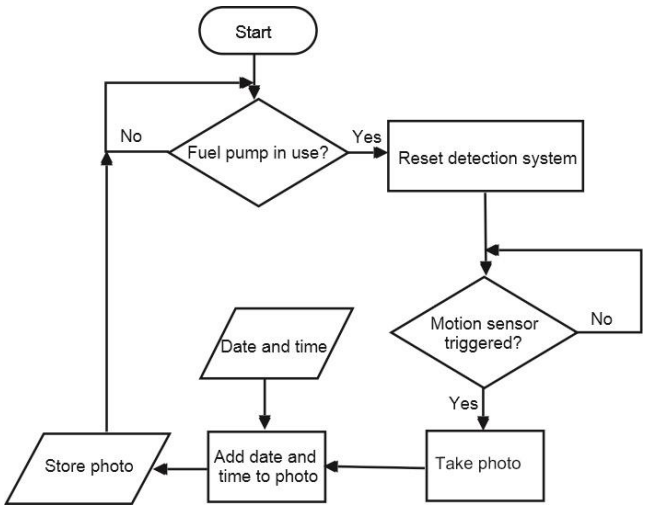
Commentary 1

This is a practical task. The student scores four marks for solution involving:

- setting the sensor system
- triggering an event, with a loop
- capturing the photo, date and time-stamp
- storing the data

There are two further marks for using the correct symbols and producing a workable system.

Sample response 2



Awarded 4 marks

Commentary 2

This is a practical task. The student scores three marks for solution involving:

- triggering an event, with a loop
- capturing the photo, date and time-stamp
- storing the data

There is one further mark for using the correct symbols

The system would not work entirely as intended so there is no mark for a functional process.

6	Dylan has found his first job in an IT department. He is deciding whether to join an online community of other IT professionals. **Evaluate** the advantages and disadvantages of Dylan joining an online community for IT professionals. (12)

Sample response 1

Advantages
Dylan will be able to us the online community for networking. He will be able to make links with other people who are:

- *in a similar situation, forming a mutual support group*
- *have been in his situation and have now progressed. These people may be able to give advice on problems that are new to Dylan.*
- *Possible future employers and people who work for them. This may give Dylan an advantage when changes jobs in the future.*

He will be able to create a public profile which will advertise him. It can contain details from his CV, education, skills, training courses taken, plus selected personal information such as interests and non-IT qualifications. This profile may attract offers from recruiting agencies or prospective employers.

Disadvantages
Other people may try to take advantage of Dylan's network of contacts, using it to:

- *push adverts or dubious training courses*
- *give themselves a large network so that their own account looks more authoritative*
- *spread misleading information about Dylan, perhaps because they are competing with him in their work.*

His public profile is public, he may change or delete material from it, but it's all still out there somewhere. This may cause problems later if something that he is doing now becomes unpopular or even illegal, in the future. There is also a danger of him accidentally revealing personal or sensitive information without meaning to. Cyber criminals often trawl social sites to find information that allows identity theft or gives answers to 'secret questions' used for financial sites.

Other points.
The operators of the community website may be using the community to gain income. This may happen in several ways, some of which could be an advantage, others a disadvantage, depending how Dylan looks at it.
There may be a joining fee. This costs Dylan money but he may think it worth it for the service being provided.
The operators may push advertising on the site. This could be annoying and may even carry malware, but Dylan may benefit from offers on items tailored to him, where the advertising system has analysed his profile and messages to place relevant adverts.
The operators may have a ranking system for members, based on things such as number of posts or 'helpful' votes by other members. A high ranking could be useful to Dylan but it may be difficult for him to climb the ranking ladder as he is new to IT.

Overall, the community is more likely to benefit Dylan than not. The disadvantages from networking and a public profile are to a large extent under Dylan's control. As an IT professional, he should be aware of the risks and able to take steps to reduce them. The possible problems that website operators may cause are less in Dylan's control, but if he feels that he is at a net disadvantage, he has the option of moving to a different community and is able to ask his contacts to keep in touch by other methods.

Awarded 10 marks

Commentary 1

This is a levels-based question. The work meets the descriptor for a level 3 answer. The work has looked at two aspects in detail, networking and profiles, giving several advantages and disadvantages of each. The third section, other points, deals with advantages and disadvantages deriving from actions by the website operators. This has some relevant points but they could have been expanded upon.
There is a sensible conclusion that offers an opinion on Dylan's membership and suggests how disadvantages might be remedied.

Sample response 2

Advantages:

1. *employers could find his details and offer a job*
2. *he could find out about training courses*
3. *he can find other people who are like him and get help from them if he has problems*
4. *he can do networking with other IT professionals*

Disadvantages

1. *people could find his details and try to scam him*
2. *his employers would be able to see things about him that he doesn't want them to know*
3. *he will have to pay membership fees*
4. *he doesn't know how reliable other members are and may get bad advice without knowing it*

Awarded 2 marks

Commentary 2

This is a levels-based question. The work meets the descriptor for a level 1 answer. The student shows limited awareness of the situation. The points raised have little or no extension and some are only marginally related to an IT community.

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