

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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Pearson Edexcel International Advanced Level

Time 2 hours

Paper
reference

WIT13/01

Information Technology

International Advanced Level

UNIT 3

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Calculators are **not** allowed.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Answer ALL questions.

Write your answers in the spaces provided.

1 A company owns and operates airports in several countries.

The company collects large amounts of data and uses Big Data techniques to analyse it.

(a) One characteristic of Big Data is the volume of data collected.

(i) Give **two other** characteristics of Big Data.

(2)

1

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2

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(ii) High capacity storage devices are required to handle Big Data.

State **one other** infrastructure requirement for Big Data.

(1)

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(b) The company relies on a suitable infrastructure (devices and connections) to make use of the data it collects.

The infrastructure may develop a bottleneck.

A bottleneck could be slow storage media at the company's data centre.

A solution for this bottleneck would be to upgrade the storage media from mechanical hard drives to solid state drives.

Give **one other** possible infrastructure bottleneck and a solution.

(2)

Bottleneck

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Solution

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(c) The company collects and stores data at airports in several countries.

- (i) One method of controlling data storage is to use a database management system (DBMS).

A DBMS is not suitable for this Big Data system.

Explain why a DBMS may not be suitable.

(2)

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- (ii) The company uses symmetric encryption to keep data secure during transmission between countries.

Describe how symmetric encryption works.

(2)

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- (iii) An alternative to symmetric encryption is asymmetric encryption.

Explain **one** reason why the company uses symmetric encryption rather than asymmetric encryption for data transmission.

(2)

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(d) The company's Big Data operations use a distributed system.

(i) Describe what is meant by the term **distributed system**.

(2)

(ii) One problem with distributed systems is controlling concurrency.

Give **one** consequence of poor concurrency control in a distributed system.

(1)

(e) The company uses natural language processing to provide a translation service for passengers at an airport.

The service uses a keyboard and screen to provide a chat link to a help desk.

(i) Give **one** reason why a passenger may need to use the language translation service.

(1)

(ii) Give **one** benefit to the company of providing the language translation service.

(1)

(iii) Give **one** drawback of the language translation service to passengers.

(1)

(Total for Question 1 = 17 marks)



- 2 Tania has just started her final year at university. She works part time for a company that has a number of mobile phone stores.

Her goal is to work in a senior management position for the company after she graduates.

She has written objectives using SMART criteria to help her achieve her goal.

One of Tania's objectives is 'I will gain promotion to assistant manager status by completing the required training in the next six months, and applying for the role before completing my university course.'

- (a) Complete the table to show how this objective fits the SMART criteria.

One row has been completed for you.

(4)

Objective	
Gain promotion to assistant manager by completing the required training in the next six months and applying for the role before completing my university course.	
Criteria	How the objective meets the criteria
Specific	Tania has set the specific objective of being promoted to assistant manager.
Measurable	
Achievable	
Relevant/ Realistic	
Time-bound	



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QUESTION 3 BEGINS ON THE NEXT PAGE.



3 A garage customises cars.

For example, customisation might:

- add different effects on the paintwork
- change the wheel size
- install an entertainment system.

When a customer books a customisation with the garage the staff open a new project. This task list has been completed for a customisation project.

Task list Booked on 1 July			
Task	Task description	Date due	Notes
1	Discuss project with customer and create a plan	5 July	
2	Create parts and paint list	8 July	Start after plan is agreed with customer
3	Order paint	9 July	Start after parts and paint list is ready
4	Order parts	11 July	Start after parts and paint list is ready
5	Unpack and check parts/paint	25 July	Needs 3 to 14 days for delivery
6	Customise car with new parts	28 July	Start after first parts arrive
7	Customise car with new paint	31 July	Start when parts are all fitted, could start up to 1 week early



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(a) Create a Gantt chart in the boxed area for the tasks listed.

Your chart should indicate any dependencies.

Your chart should indicate any constraints.

You should assume that the garage operates seven days a week.

(6)

Task details		July																														
Task no.	Constraint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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3																																
4																																
5																																
6																																
7																																



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(c) A possible customisation is an augmented reality module.

This module allows a driver to effectively see through some of the solid parts of the car, making it easier to manoeuvre in tight spaces.

Describe how the augmented reality module could work.

(3)

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(Total for Question 3 = 15 marks)



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- 4 A delivery company uses an intelligent transportation system (ITS) for fleet management.

Each vehicle has an onboard computer that sends telemetry such as location and distance driven to the ITS.

- (a) One use of the ITS is to keep track of vehicle maintenance.

Maintenance of the vehicles may be:

- corrective, based on:
 - a routine fault report from a driver when a vehicle returns to the depot
 - results of monthly inspections carried out by a vehicle inspector
- preventative, based on:
 - a manufacturer's recommended service schedule
 - the distance covered by each vehicle
 - recommended replacement intervals for consumable parts
- emergency, for when a vehicle is on a delivery and has:
 - an accident, reported by the onboard computer
 - a breakdown, reported by the onboard computer
 - an unsafe vehicle report, sent by the driver or the onboard computer, that means the vehicle is unsafe to drive.

The ITS outputs a work priority list for the company's fleet manager.

Create an information flow diagram in the space on the next page to describe the maintenance process.

(9)



Draw your information flow diagram here.

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(b) The delivery company also uses the ITS to organise its deliveries.

Each vehicle may deliver to one or more locations.

The ITS needs to know the total weight of each delivery so that vehicles are not overloaded.

Discuss what **other** information the ITS would need in order to organise deliveries.

(6)

Dotted lines for writing the answer.

(Total for Question 4 = 15 marks)



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QUESTION 5 BEGINS ON THE NEXT PAGE.



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5 Evan runs a shoe shop. He sells handmade shoes.

The shoes are made to order but Evan keeps a selected range in stock for customers to see.

(a) At present Evan uses a spreadsheet to keep track of his stock.

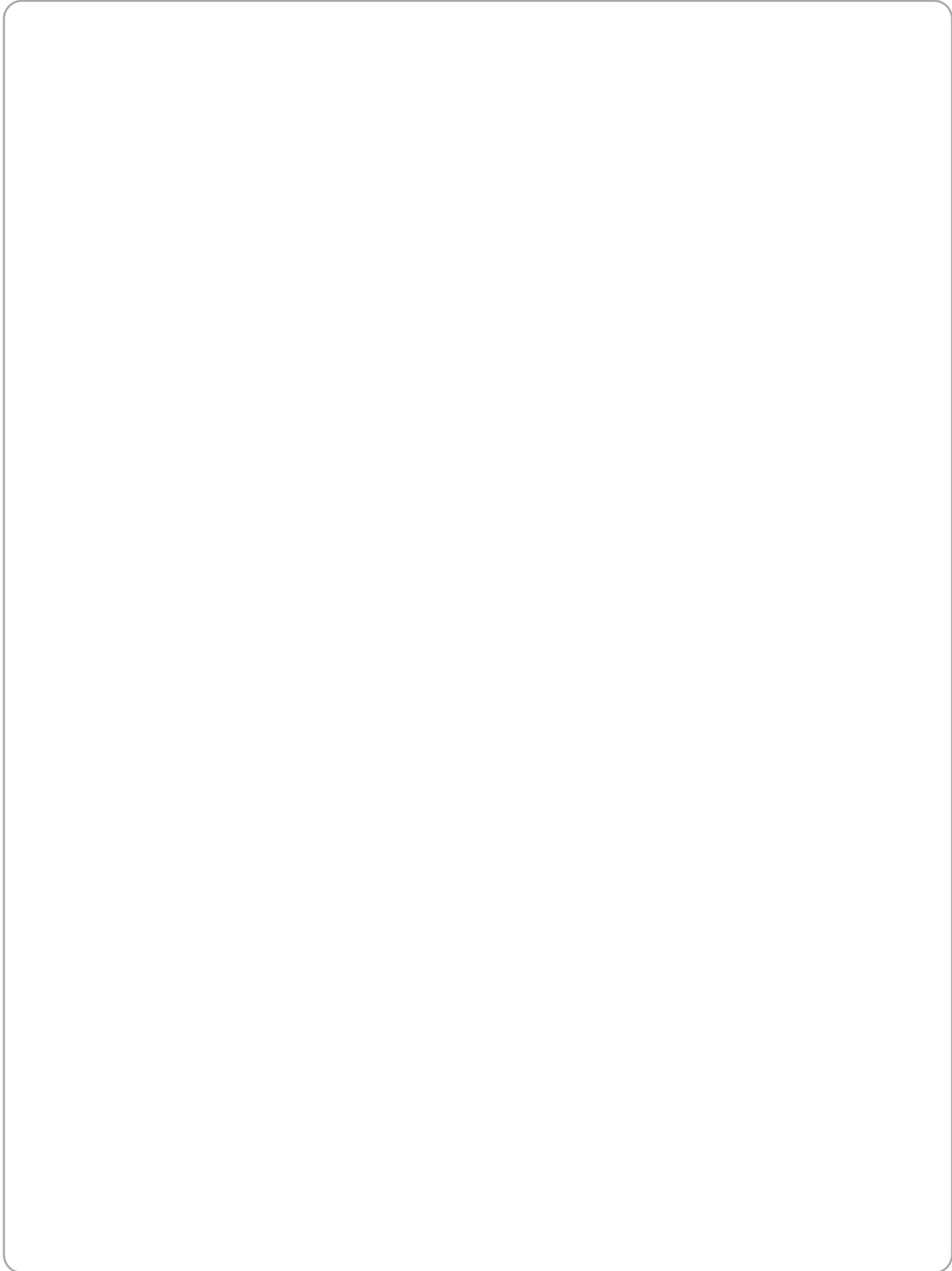
The table shows an extract from the spreadsheet.

Shoe model	Company name	Company telephone	Company email	Order time	Colours in stock
Melody	Dezi Hillams	7700 900430	dezi@hillams.com	7 days	black, green, red
Symphony				9 days	blue, red, yellow
Concerto				5 days	black, white
Orchid	Snugfoot Shoes	01632 960072	sales@snugfoot.com	10 days	grey, canary
Lily				2 weeks	pearl, white
Peony				10 days	crimson, green
Tulip				12 days	aqua, pearl
Metro	Stefan Mannan	7700 900147	Smannan@hotmail.com	2 weeks	smoke, tan
Urban				2 weeks	bronze, stone



Evan wants to replace his spreadsheet with a database.
You must develop a normalised database solution for him.
Create entities showing the database in third normal form.
Identify all primary keys (single attribute or composite) and foreign keys.

(9)



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(b) A company uses a Database Management System (DBMS).

One function of a DBMS is to manage security.

The DBMS requires users to login with a username and password.

Describe **one other** way that a DBMS could be used to manage security in a database.

(2)

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(Total for Question 5 = 11 marks)



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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 80 MARKS



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