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Candidate surname

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Pearson BTEC Level 3  
Nationals Certificate,  
Extended Certificate,  
Foundation Diploma,  
Diploma, Extended  
Diploma

Centre Number

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Learner Registration Number

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**Tuesday 19 January 2021**

Morning (Time: 1 hour 45 minutes)

Paper Reference **31769H**

**Computing**

**Unit 2: Fundamentals of Computer Systems**

**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 learner registration 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.*
- You may use a calculator.

### 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 R.F.I.G. events is an event venue that hosts live music, theatre and corporate events.

R.F.I.G. events uses a range of computer systems to support the work that it does.

Customers are issued with a ticket when they book for an event. The customer can choose a physical ticket or an e-ticket. **Figure 1** shows an example ticket.



Figure 1

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(a) Staff use a smartphone when checking a customer's ticket.

Explain **two** features of a **smartphone** that make it suitable for checking a ticket.

(4)

Feature 1

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Feature 2

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(b) Customers can book tickets for events by visiting the box office at the venue.

When customers book tickets the system must check the ticket database to make sure that there are tickets available for the chosen event.

The ticket database is held on a server.

If tickets are available then the customer can reserve the number they need and then ticket(s) are issued.

The customer can choose to receive a physical ticket or an e-ticket by email.

Draw a diagram to show how the ticket system works.

The diagram should include:

- devices and systems that could be used
- devices to be connected and the connection type(s) used
- the flow of data through the system
- annotations showing the information and data to be passed between systems, devices and users.

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Use this space to draw your diagram. The first device has been added for you.

(6)



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(c) The venue uses wireless microphones. The microphones use a simplex communication channel.

Explain why simplex is the most appropriate communication channel for the microphones.

(2)

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The venue uses large screens to show videos during events.

The videos are used for:

- feeds of live performances on stage during concerts
- additional effects and information during other types of event.

The venue uses lossless compression for the videos.

(d) Give **three** benefits of using lossless compression.

(3)

1 .....

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(e) Explain **one** drawback of using lossless compression.

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- (f) The venue uses forward error correction (FEC) when transferring the video data between the camera, computer systems and the screen.

Explain why FEC is a more appropriate choice for error correction than automatic repeat request (ARQ) for live performances.

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**(Total for Question 1 = 20 marks)**

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2 Luciano is a scientist. He studies animals and the environments they live in.

Luciano collects and processes large amounts of data. He is currently studying foxes in urban areas.

(a) Luciano would like to collect data on sightings of foxes by members of the public. He has created a questionnaire.

Describe **two** ways Luciano could use software to distribute this questionnaire.

(4)

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(b) Luciano backs up the data he collects from the questionnaire to a cloud-based third-party provider.

Explain **two drawbacks** of using cloud-based backup.

(4)

Drawback 1

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Drawback 2

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(c) Luciano has some files that he wants to backup. **Figure 2** shows the files and their size in bytes.

File	Size in bytes
File 1	1,238,291
File 2	419,430
File 3	3,407,872

**Figure 2**

Calculate the total size of the files in **megabytes** to two decimal places.

You must show your calculations.

(3)

Total size .....



As part of the study Luciano is collecting data that includes:

- number of foxes seen over a seven-day period
- the areas in which foxes are sighted
- the time of day foxes are sighted
- if the fox seen is an adult or pup.

**Figure 3** shows two arrays of data Luciano has collected.

```
foxesArea1 = [11, 11, 12, 19, 1, 4, 8]
foxesArea2 = [13, 'ten', 12, 8, 10, 9, 13]
```

**Figure 3**

(d) Luciano uses a computer program to calculate the total and average number of fox sightings. He uses the data from the arrays in **Figure 3**.

Explain why the program would produce an error.

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(e) Analyse how Luciano could make use of validation when collecting and processing his data.

You should support your analysis with examples that are relevant to the scenario.

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(Total for Question 2 = 20 marks)

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3 Anaya is a freelance software developer. She develops applications for personal computers and mobile devices as well as web-based solutions.

(a) Describe how the cache in the central processing unit (CPU) of Anaya's computer would aid performance.

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(b) Anaya has noticed that her computer is running slowly.

Analyse how Anaya could increase the execution speed of her computer and the implications that this may have.

You should support your analysis with examples that are relevant to the scenario.

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(c) Anaya performs a number of different tasks throughout the day.  
These tasks include:

- writing programming code
- producing assets for use in the software she develops
- transferring files to web-based servers
- communicating with clients
- building and maintaining e-commerce sites (webstores) for clients.

Discuss the data transmission protocols that Anaya could use when completing her daily tasks.

You should support your discussion with examples of specific protocols.

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(Total for Question 3 = 18 marks)



4 Lucy is an independent travel agent. She needs to keep and use a range of personal and financial data about her customers.

The data she holds includes:

- personal information such as name, date of birth, address
- passport information
- bank and payment card details.

(a) Discuss how Lucy could use **computer software** to help protect data.

You should support your discussion with examples that are relevant to the scenario.

(10)

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(b) Lucy wants to set up a server to help run and manage her software and data. She has decided to use a virtual cloud-based server instead of a physical server. Evaluate her decision to use a virtual cloud-based server.

Your evaluation should:

- consider the benefits and drawbacks of each option
- reach a supported conclusion about Lucy's decision.

(12)

Area with horizontal dotted lines for writing the evaluation.

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Handwriting practice area with horizontal dotted lines.

**(Total for Question 4 = 22 marks)**

**TOTAL FOR PAPER = 80 MARKS**





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