

Qualification accredited



Sample assessment material

# Cambridge Advanced National in Cyber Security and Networks

Cambridge OCR Level 3 Alternative Academic Qualification  
Cambridge Advanced National in Cyber Security and Networks

Extended Certificate | H137  
For first teaching in 2026

**F194: Fundamentals of networks**

Version 1.0 | May 2026

[ocr.org.uk/cambridge-advanced-nationals](https://ocr.org.uk/cambridge-advanced-nationals)

CAMBRIDGE  
ADVANCED  
NATIONALS

## Introduction

This is Sample Assessment Material (SAM) which has been produced for the Cambridge OCR Level 3 Alternative Academic Qualification Cambridge Advanced National in Cyber Security and Networks (Extended Certificate).

The SAM is an example exam paper that we publish alongside a new specification to help illustrate its intended style and structure when a qualification is first launched. We wanted to share the story of our assessment approach with you so when you look through the paper you will find we have pointed out certain features and explained the decisions we have made.

Resources to help support in teaching different areas of content can be found on the Cambridge OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Cyber Security and Networks webpage under '[Teaching](#)'.

Our exam papers are developed with accessibility in mind. The Understanding the assessment guide tells you a little more about the principles and rationale underpinning our approach for the qualifications. The 'Command Words' are in both the [Understanding the Assessment guide](#) and the specification. These tell you what we mean by each command word and how students should approach the question and understand its demand.

**Appendix B** of the specification: **Command Words**, gives detail about what is expected of each command word that will be included in exams and mark schemes. You can include teaching around the expectations of these as part of your teaching.

## You said, we did

During the development of these qualifications, we talked extensively with teachers, subject experts, higher education institutions and our senior assessment teams to influence their structure, content and assessment materials. We then shared our final materials with teachers to make sure that they met their needs.

You told us that you wanted the exam to take similar approaches to the exam in the current Cambridge National in Information Technology qualification. We have tried to do this by using a familiar tone and style of questioning.

You told us to keep this exam as short as possible but retain time to allow students to read the scenario and respond to questions. We have done this by reducing the number of available marks to 60 and setting this exams duration to 1 hour 15 minutes.

You told us that you wanted the exam to be based on a single context, that develops through the paper, so that is what we've done.

You told us that scenarios used in the exam should be accessible and easy for students to understand. We have done this by only using scenarios with things that students will have encountered.



All students will sit this exam at the same time on the same day.

The time allowed is designed to give students approximately one minute per mark plus reading time.

The exam may have short answer questions with calculation/working. A calculator can be used to respond to this style of question.

If students require additional space to write their response(s), lined paper may be available at the end of the exam paper in a live exam. Remember the question number(s) **must** be clearly shown.

<<Date>> - <<Morning/Afternoon>>

### Level 3 Alternative Academic Qualification Cambridge Advanced National in Cyber Security and Networks

H137 Unit F194: Fundamentals of networks

Sample Assessment Material (SAM)

Time allowed: 1 hour 15 minutes

You can use:

- A calculator

Please write clearly in black ink. Do not write in the barcodes.

Centre number       Candidate number

First name(s) \_\_\_\_\_

Last name \_\_\_\_\_

Date of birth

#### INSTRUCTIONS

- Use black ink.
- Write your answer to each question in the space provided. You can use extra paper if you need to, but you must clearly show your candidate number, the centre number and the question numbers.
- In the live exam there might be lined pages at the end of the question paper for you to use if you need extra space. Remember, you must clearly show the question numbers.
- Answer **all** the questions.

#### INFORMATION

- The total mark for this paper is **60**.
- The marks for each question are shown in brackets [ ].
- This document consists of **16** pages.

#### ADVICE

- Read each question carefully before you start your answer.

This unit is part of the Extended Certificate qualification. It is **not** included in the Certificate qualification.

This exam will always be set and marked by us. Exams will be available in January and June each year. Students can resit this unit and the best result will be used to calculate the certification result.

This exam will always have 60 marks. There are no sections in this exam.

In this exam **all** questions are mandatory. Question types include:

- Forced choice/controlled response questions. These are typically worth 1 to 4 marks.
- Short answer closed response questions. These are typically worth 1 to 4 marks.
- Short answer questions with calculation/working. These are typically worth 1 to 4 marks.
- Extended constructed response questions with points-based marks schemes. These are typically worth 1 to 4 marks.
- Extended constructed response questions with levels of response marks schemes. These are typically worth 6 or 9 marks.

These allow us to assess the following Performance Objectives:

- PO1 – Show knowledge and understanding
- PO2 – Apply knowledge and understanding
- PO3 – Analyse and evaluate knowledge, understanding and performance.

The questions will sample content from across all topic areas. At least one question (or sub-part) will relate to each topic area. Sub-content topic areas will be sampled across exam papers, over time.

1 City Tours produce interactive walking tours of cities. They have recently moved to a new office and need to set up the network infrastructure.

Some employees work in the office and others are visiting cities taking photos and videos for new tours.

The photos and videos are used to create the interactive walking tours which are available in a variety of app stores.

The office is also used for a range of other tasks including:

- app development
- marketing
- storing customer details
- storing employee details.

All questions in this exam will relate to a single scenario. The scenario will always be introduced at the start of this exam and will develop throughout.

(a)

(i) What is the **most** appropriate type of network model for City Tours to use?

..... [1]

(ii) State **two** characteristics of this network model.

1.....

.....

2.....

..... [2]

This question assesses PO2 (apply knowledge and understanding) as it specifically refers to '**City Tours**'. The student responses must be applied to the scenario.

In this exam, there will be between 15 and 25 PO2 marks.

The scenario will develop throughout this exam.

The number of points needed will always be written as a word in **bold**.

(b) City Tours has decided to use a star topology.

Explain **two** advantages for a business of using a star topology.

1.....

.....

.....

.....

.....

2.....

.....

.....

.....

.....

This question assesses PO1 (show knowledge and understanding) as it refers to advantages for **a business** rather than advantages **for City Tours**. Student responses will not need to be applied to the scenario.

In this exam, there will be between 20 and 30 PO1 marks.

[4]

The number of marks for each question will always be given at the end of the question and will always be right aligned.

Where context is given, this will be kept as short as possible and will only include information needed for the questions.

(c) City Tours need the network to provide a range of services. These services include:

- domain controller
- voice
- email
- firewall.

The number of ticks (✓) required to answer an MCQ question will always be written as a word in **bold**.

(i) Which **two** are roles of the domain controller?

Tick (✓) **two** boxes.

Enforces security policies

Routes traffic based on its IP address

Turns domain names into IP addresses

Validates the user

[2]

This is an example of a **2 mark** multiple choice question (MCQ). The response options will always be in alphabetical order consisting of two correct answers and at least two distractors.

Students should use a single tick (✓) in two boxes to show their response to this question. If more than two boxes are ticked, zero marks are awarded.

(ii) State **one** role of a firewall.

.....

..... [1]



2 City Tours has expanded and created the following departments:

- Application Development
- Finance
- Human Resources
- Marketing.

The expansion of City Tours has increased the number of employees. This has led to additional devices on the network and a higher volume of network traffic.

City Tours has decided to create a subnet for their Class C network.

(a)

(i) Explain **one** advantage of creating a subnet for a network.

.....

.....

.....

..... [2]

(ii) What would the **default** subnet mask be for a **Class C** network?

..... [1]

(iii) How many **hosts** would the subnet mask for a **Class C** network allow?

..... [1]

(b) City Tours has established that the maximum number of hosts they need is 62.

Calculate the subnet mask that would be required.

Show your working.

.....

Subnet mask required..... [3]

Where a question asks students to explain, they must show (PO1) their understanding. It is not enough to recall knowledge alone.

In this question students need to show their understanding (PO1) by explaining one advantage of creating a subnet mask for a network. Student responses will not need to be applied to the scenario.

Key words will be in **bold**.

This is an example of a 3 mark **calculate** question. A correct response will be given full marks. If the response is incorrect up to 2 marks can be given for correct working.

Students **should** write their workings here.

Students **must** write their final response here.

- (c) With additional employees and devices, City Tours needs to increase the number of access points to the network. City Tours has decided that the access points will be hard wired. The office consists of a number of small areas each separated by stone walls. The new cabling must run their current services and any additional ones they may need in the future. There is no requirement to add additional power sockets. The power and data cables are separate.

Explain **two** reasons why City Tours should use Unshielded Twisted Pair (UTP) cable.

Where a question asks for a specific number of points, we will always put numbers or headings against the lines to show where students should write each point.

1.....  
.....  
.....  
.....  
.....

2.....  
.....  
.....  
.....  
.....

[4]

This is an example of a 4 mark PO2 (apply knowledge and understanding) explain question. 2 marks are available for each reason explained. 1 mark is for identifying a valid reason and the second mark is for explaining how/why the reason applies to City Tours.

Student responses need to be applied to the scenario.

A maximum of 2 marks can be given for each reason explained.

3 City Tours wants to introduce wireless networks into the office.

This **state** question assesses PO1 (show knowledge and understanding).

(a) State **one** item of hardware needed for a wireless network.

..... [1]

(b) City Tours wants to run both 2.4 Ghz and 5 Ghz wireless networks for both their staff and for visitors.

(i) Identify an appropriate name for the City Tours Service Set Identifier (SSID) for the 5 Ghz visitor network.

..... [1]

Appendix B in the specification contains a glossary of **Command Words** which could be used in this exam. The glossary tells you what we mean by each command word.

(ii) State **one** method that could be used to secure a SSID.

..... [1]

(iii) Describe **two** reasons why a pre-shared key authentication method (WPA-PSK) is **not** secure.

1.....

.....

2.....

.....

[2]

This is an example of a 2 mark PO1 (show knowledge and understanding). **describe** question. 1 mark is available for each reason described. Student responses do not need to be applied to the scenario.



- 4 When a customer places an order, City Tours store their details on a database server. Data stored on the server includes:
- name
  - address
  - language spoken
  - information about the tour they purchased.

Explain **two** ways that City Tours could use the details stored on the database server.

1.....  
.....  
.....

2.....  
.....  
.....

[4]

This is an example of an extended constructed response question. Students will provide a shorter style extended response.

We will use extended constructed response questions to assess a range of performance objectives. They will enable students to show and/or apply knowledge and understanding.

5 City Tours needs to increase the bandwidth on their internet connection.

(a)

(i) What is bandwidth? ..... [1]

This short answer closed response question assesses PO1 (show knowledge and understanding).

This is an example of a 2 mark **calculate** question. A correct response will be given full marks. If the response is incorrect 1 mark can be given for correct working.

(ii) City Tours has been offered a connection speed of 64 Mbps.  
If a video is 88 MB, how long in **seconds** would it take to upload the video?  
Show your working.

..... [2]

Students **should** write their workings here.

Number of seconds: ..... [2]

Students **must** write their final response here.

**6** When an employee takes a photograph for the tour, the Global Positioning Service (GPS) coordinates of the location are recorded.  
City Tours uses the GPS coordinates to plot the location on a map. The location is used to give directions to the customer to find the viewpoint where the photograph was taken.  
Each employee is asked to wear a GPS tracker so that City Tours knows their location and where they have been whilst working for them.

**(a)** Explain how GPS works.

.....  
.....  
.....  
..... [2]

**(b)** Identify **one other** use of GPS for City Tours.

.....  
..... [1]

The number of lines given for a question indicates the approximate length of the response needed.

This **identify** question assesses PO2 (apply knowledge and understanding). Student responses **must** be applied to the scenario.



This is an example of a **discuss** question. The question is assessing PO3 (analyse and evaluate knowledge, understanding and performance).

8 Some of the employees who take photographs and videos have expressed an interest in creating tours. This would require them to have access to the same version of the specialist software and training on how to use it. The hardware used by employees varies greatly in terms of platform and performance.

Discuss whether you would recommend that City Tours use application or desktop virtualisation for employees to complete the training and create their own tours.

In your answer you must write about:

- the advantages and disadvantages of using application virtualisation
- the advantages and disadvantages of using desktop virtualisation
- whether you would recommend that City Tours use application or desktop virtualisation **and** your reasons.

[9]

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This exam will have one level of response (LOR) question worth 9 marks. This needs an extended written response. This question assesses PO3 (analyse and evaluate knowledge, understanding and performance) requiring discussion. The question topic may be drawn from any relevant aspect of the unit's teaching content.

Extended response questions give students an opportunity to show the extent of their knowledge and understanding of the subject.



# Summary of updates

This table outlines updates made in various versions of this resource. For the latest version of our resources, please visit [Teach Cambridge](#).

Section	Change	Version	Date
All	Original content	1.0	May 2026

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