# Edexcel GCE

# Applied Information and Communication Technology

## Unit 9: Communications and Networks

10–28 January 2011
**Assessment window 3 weeks**
**Time: 10 hours**

Paper Reference
**6959/01**

**You must have:**
Short treasury tag, cover sheet

### Instructions

- Complete your candidate details on the cover sheet provided.
- All tasks must contain your name, candidate number, centre number and activity number.
- At the end of the examination:
  – *All printouts should be placed in the correct order.*
  – *Use a treasury tag to attach your printouts **(as shown)** to Page 2 of the cover sheet.*

### Information

- There are **five** activities in this examination totalling 88 marks. **2** further marks are allocated to Standard Ways of Working, giving a total mark for this paper of 90 marks.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

### Advice

- Read through the Scenario carefully.
- Work through the activities in order.
- Attempt **ALL** activities.
- Label your printouts clearly as instructed.
- Printing must be undertaken within the examination period.

*Turn over* ▶

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**Scenario**

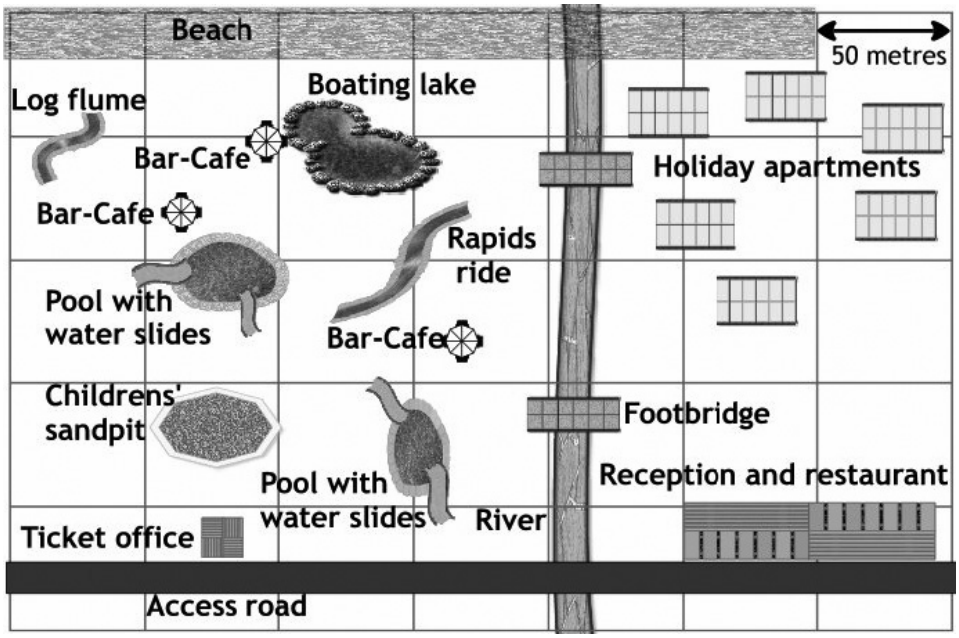
**Water Wonders Holiday Park**

The Water Wonders company is based in London. It owns six sites in Spain. The sites contain swimming pools, water slides and other water-based rides, as well as facilities such as bar-cafes. They open daily and are popular tourist attractions.

Last year, the company bought a holiday apartment complex next to a Water Wonders site. The company is now in the process of combining them to form a Water Wonders Holiday Park.

The project manager is Janet Cartwright. She has hired you to advise her on the design and construction of the I.T. system for the holiday park. Janet also wants you to provide appropriate networks and communications training materials. These will be used by trainee site managers as they need an understanding of the systems on their site.

The layout of the holiday park is shown on the sketch map.




The I.T. system for the original Water Wonders site is in the ticket office. It consists of:

- ❑ three network-enabled ticket machines with integrated credit card readers
- ❑ a PC
- ❑ a router with a broadband Internet connection to the Spanish telephone system
- ❑ a networked, black and white laser printer
- ❑ an eight port switch.

The I.T. centre for the holiday apartments was located off-site and connected by a WAN. The connection and much of the I.T. equipment was removed when the property was sold. The remaining equipment consists of:

- four PCs in reception
- a shared colour laser printer
- a PC in the manager's office next to the reception area
- a network-enabled black and white laser printer in the manager's office.

The existing equipment on both sites will be retained and will form part of a new Water Wonders Holiday Park LAN. The new I.T. centre for the holiday park will be in the reception block.

Janet wants the LAN to be made up of two copper cabled star networks, one in each half of the holiday park, joined by a multi-mode fibre optic cable.

During your first meeting with Janet you discussed an access and payment system. She outlined some of the issues that need to be considered.

1. The holiday park will be open to day visitors as well as residential guests. Some form of electronic access control will be required at the footbridges to keep the day visitors out of the apartment area.
2. Residential guests will have free use of all the rides (log flume, rapids ride and boating lake.) Day visitors will pay as they go.
3. The rides, bar-cafes, and the ticket office must be connected to the LAN.
4. A residential guest must be able to obtain items at the bar-cafes and charge the cost to their account.
5. People are likely to be wearing only a swimming costume.
6. Residential guests will include children who may use the Water Wonders facilities unaccompanied. Parents must be given a method of restricting a child's privileges, e.g. what they may purchase and which rides they may use.
7. Any access or payment device used in the system must be waterproof, shockproof and robust. It must use contactless technology. (No direct contact between the reading device and the object being read.)
8. There should be a common method of operation for all access and payment points.

Janet asks you to think about these issues and to present her with some options in a few days time.

**Instructions to Candidates**

**All documents MUST have a header and a footer. The header must contain the activity number. The footer must contain your name, candidate number, and centre number.**

**A minimum font size of 10 should be used in all word processed documents, using a font type suitable for business purposes.**

**Diagrams should be large enough for the detail to be read.**

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***Activity 1 - Research, network design and benefits. (Suggested time 1 hour 30 minutes)**

At your next meeting with Janet, she asks you to present your ideas for the access and payment system which **address the eight issues raised in the first meeting** (see scenario.)

She wants three alternatives:

- a touch and go / proximity system where the guest touches or swipes a device against a terminal
- a walk past / vicinity system where the guest only needs to move a device near a terminal
- a third contactless option of your choice.

Research the technologies and produce a set of notes for Janet.

The notes should:

- include diagrams to illustrate your explanations
- outline how the proximity and vicinity methods work
- highlight the difference between a proximity and a vicinity system
- outline how a third contactless option works
- recommend which method she should use
- explain the reasons for your recommendation.

Pay particular attention to the quality of your written communication.

**Evidence to be submitted**

On no more than **two** word processed A4 pages:

❑ a set of notes for Janet.

**Marks will be awarded for the Quality of your Written Communication.**

**(Total for Activity 1 = 12 marks)**

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**Activity 2 - Transmission media and network management task. (Suggested time 1 hour 30 minutes)**

Janet wants the LAN to be made up of two copper cabled star networks, one in each half of the holiday park, joined by a multi-mode fibre optic cable.

She asks you to produce some training material explaining how the fibre optic connection works.

The content must be suitable for the trainee site managers who have little or no technical expertise in networking.

(a) The content must include an explanation of how:

(i) signals are transmitted **within** the fibre optic cable.

**(3)**

(ii) a connection is made between the fibre optic cable and the LAN.

**(3)**

(iii) the signal is converted when passing between the copper and fibre optic cables.

**(3)**

(b) Your material should be designed as **two** A4 pages that can be printed back to back on a single A4 sheet. It must be fit for purpose.

**(3)**

**Evidence to be submitted for (a) and (b)**

On **two** word processed A4 pages:

❑ suitable training material designed to fit on the back and front of a single sheet of A4.

The submitted material need NOT be printed double sided.

**(Total for Activity 2 = 12 marks)**

**Activity 3 - Components of a network. (Suggested time 2 hours)**

**Payment and access control system. For Activity 3 you should assume that whichever system you recommended in Activity 1 will be used and that it is compatible with your LAN design. There are no marks for specifying it again in this activity.**

During a meeting with Janet you confirm the following points about the LAN.

1. It will be made up of two copper cabled star networks, one in each half of the holiday park, joined by a multi-mode fibre optic cable.
2. The I.T. centre for the Water Wonders Holiday Park will be in the reception block.
3. All current cabling and data outlets will be replaced.
4. The network software will be upgraded from Windows XP / Server 2003.
5. There are already adequate numbers of power outlets and cable conduits.
6. All **PCs** on both sites will need a VoIP facility.

**On the Water Wonders site.**

7. Each ride (boating lake, log flume, and rapids ride), will need a PC.
8. Each ride will be connected to the payment / access control system.
9. Each bar-cafe will have a PC.
10. Each bar-cafe will be connected to the payment / access control system.
11. The ticket office equipment will remain where it is.
12. The ticket office will be connected to the payment / access control system.

**On the apartments site.**

13. The present PCs and printers will be retained in their previous roles.
14. A broadband Internet connection will be required.
15. The restaurant will need a PC and printer.
16. An Internet cafe will be provided in the reception block for the use of residential guests.
17. Each footbridge will have a gate connected to the access control system.

(a) Produce a table for Janet which identifies the **new** hardware and cabling components to be used on the **Water Wonders site**, giving a reason for each component.

**(7)**

(b) Produce a table for Janet which identifies the **new** hardware and cabling components to be used on the **apartments site**, giving a reason for each component.

**(9)**

(c) Produce a table for Janet which identifies the **new** software components to be used on the **whole site**, giving a reason for each component.

**(5)**

**Evidence to be submitted for (a), (b), and (c)**

On no more than **two** A4 pages, produce tables for Janet that:

- ❑ identify the new hardware, software, and cabling components to be used in your design.
- ❑ state and justify the quantity of each hardware and cabling component to be used in your design.
- ❑ give a reason for the use of each component in your design.

**(Total for Activity 3 = 21 marks)**

**Activity 4 - Network design. (Suggested time 3 hours)**

Having talked to Janet about her requirements and decided upon the hardware and software, you now need to design an appropriate network solution for the Water Wonders Holiday Park.

(a) Use network design software to produce a network design for the complete project.

**(16)**

(b) Explain and justify any decisions that you have made regarding the positioning of network devices and equipment.

**(6)**

**Evidence to be submitted for (a)**

On **one** A4 page of computer output:

❑ Your network design.

**Evidence to be submitted for (b)**

On **one** word processed A4 page:

❑ Notes justifying each major decision made with regard to the network design.

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

**Activity 5 – Network addressing and protocols. (Suggested time 2 hours)**

In order to communicate with each other, each network device must have a unique identifier.

You suggest to Janet that the Water Wonders Holiday Park LAN should be a Class C TCP/IP network, using I.P. addresses in the range 192.168.1.0 to 192.168.1.255

(a) When configuring the network, devices will be allocated static or dynamic addresses.

For each type of device in your network, state whether you would recommend a static or dynamic address. Give reasons for your recommendations.

**(8)**

Janet tells you that the Water Wonders Head Office in London uses the same set of addresses and that she is worried there will be problems when the two networks are connected via the Internet.

(b) Explain to Janet why having two similar Class C networks will not cause a problem.

**(5)**

Janet wants the staff to make full use of the facilities offered by the VoIP system when communicating, both within the site and with other Water Wonders sites.

(c) She asks you to produce a table of common VoIP features with a brief description of how staff could use each feature when conducting company business.

**(8)**

**Evidence to be submitted for (a), (b), and (c)**

On **one** word processed A4 page each, produce:

- ❑ an identification scheme including justifications for your decisions.
- ❑ an explanation for Janet about why the Class C addresses will not cause a problem.
- ❑ a table of common VoIP features and a brief description of how staff could use each feature when conducting company business.

**(Total for Activity 5 = 21 marks)**

**Standard ways of working.**

**All printouts must contain the activity number, your name, candidate number and centre number.**

**Pages must be securely fastened to the cover sheet and in the correct order.**

**Minimum font size of 10 should be used for all word processed documents**

**(Standard ways of working = 2 marks)**

**TOTAL FOR PAPER = 90 MARKS**

Write your name here

| Surname | Other names |
|---|---|
| | |

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| Centre Number | Candidate Number |
|---|---|
| | |

# Applied Information and Communication Technology

## Unit 9: Communications and Networks

**COVER SHEET**

| 10–28 January 2011 | Paper Reference **6959/01** |
|---|---|

**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.
- Punch a hole in the top left corner of each printout.
- Ensure your printouts are in the correct order and attach them to Page 2 of this cover sheet using a treasury tag.

*Turn over* ▶

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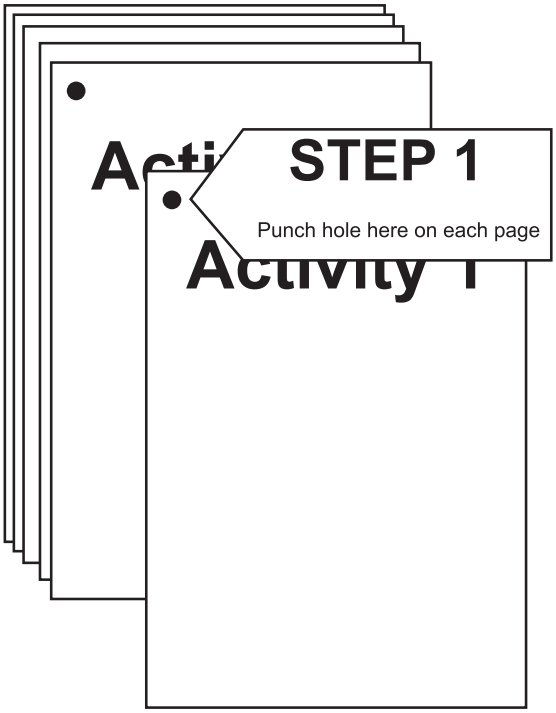
Put 'treasury tag' through this hole




**STEP 2** **Arrange your pages in this order, face up.**

Activity 1
Activity 2
Activity 3
Activity 4
Activity 5

**STEP 3** Put a 'treasury tag' through all your pages

**STEP 4 (last)**

**FOR EXAMINER'S USE ONLY**

| | |
|---|---|
| A1 | |
| A2 | |
| A3 | |
| A4 | |
| A5 | |
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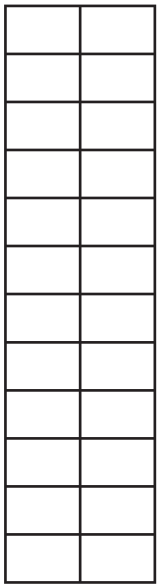
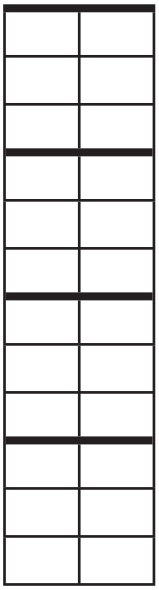
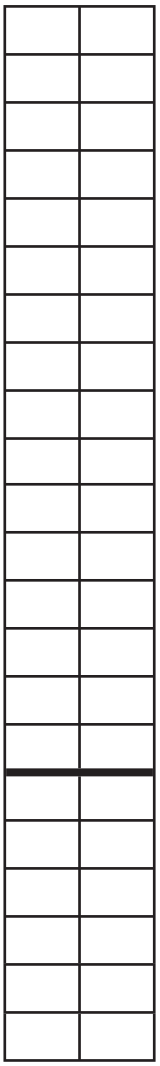


A1



A2

A3



A4

A5

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