

Pearson Edexcel GCE

Applied Information and Communication Technology

Unit 9: Communication and Networks

5 May – 23 May 2014

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 printouts 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

- The total mark for this paper is **90**. There are **five** activities in this examination totalling 88 marks. **2** further marks are allocated to Standard Ways of Working.
- The marks for **each** question, within an activity, 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.

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Scenario

Bankside College

Bankside College is a school for 800 pupils aged from 11 to 18. It was founded by a Victorian philanthropist and is housed in a building that was built in 1876. Extra wings were added as the school grew and a separate classroom block was constructed in the 1980s. The layout of the school is shown in the diagram at the end of the scenario.

The Information Technology (IT) department occupies a few rooms in the main building. The department is very short of space and much of the network is showing its age.

The school governors have been aware of the situation for some time and have been raising money for a new Technology block. The block is currently under construction and is scheduled for completion in December this year. The IT department will share the new block with the Design and Technology (D&T) department. Both departments will get new equipment and improvements will also be made to IT provision in the rest of the school. This includes a scheme to equip all staff and pupils with some form of mobile computing device.

Unfortunately, a number of problems have arisen.

The Head of IT is suffering from arthritis and is in urgent need of surgery to replace both knee joints. He has been scheduled for a first operation in early November and has been told that the whole process could take up to a year. He was due to retire in three years time but has now decided to take early retirement at the end of October. The governors expect to appoint a new Head of IT to start in January.

The Network Manager has recently announced that she is delighted to have become pregnant. She will take maternity leave from the end of November. At this stage she is unsure if she will return to work afterwards. She has two IT technicians working for her who also look after the D&T equipment. They pride themselves on being able to fix anything that has a plug attached and are happy to be involved with running the new system. Neither of them wants to take on a managerial role.

There is a squeeze on finances. This is nothing unusual but the governors are under pressure to keep costs down.

The governors have decided to take a fresh look at the project. They have formed an IT committee, chaired by the Deputy Headteacher, Ms. Aileen MacAllister. The committee members are effective users of IT but have been chosen more for their commercial and management expertise than their technical knowledge.

The current Head of IT and the Network Manager have provided a briefing on the current system. They both feel that a new person should be hired as a technical adviser to the committee. You are the new person. You will report to Aileen and provide documents to inform and assist the committee in making their decisions.

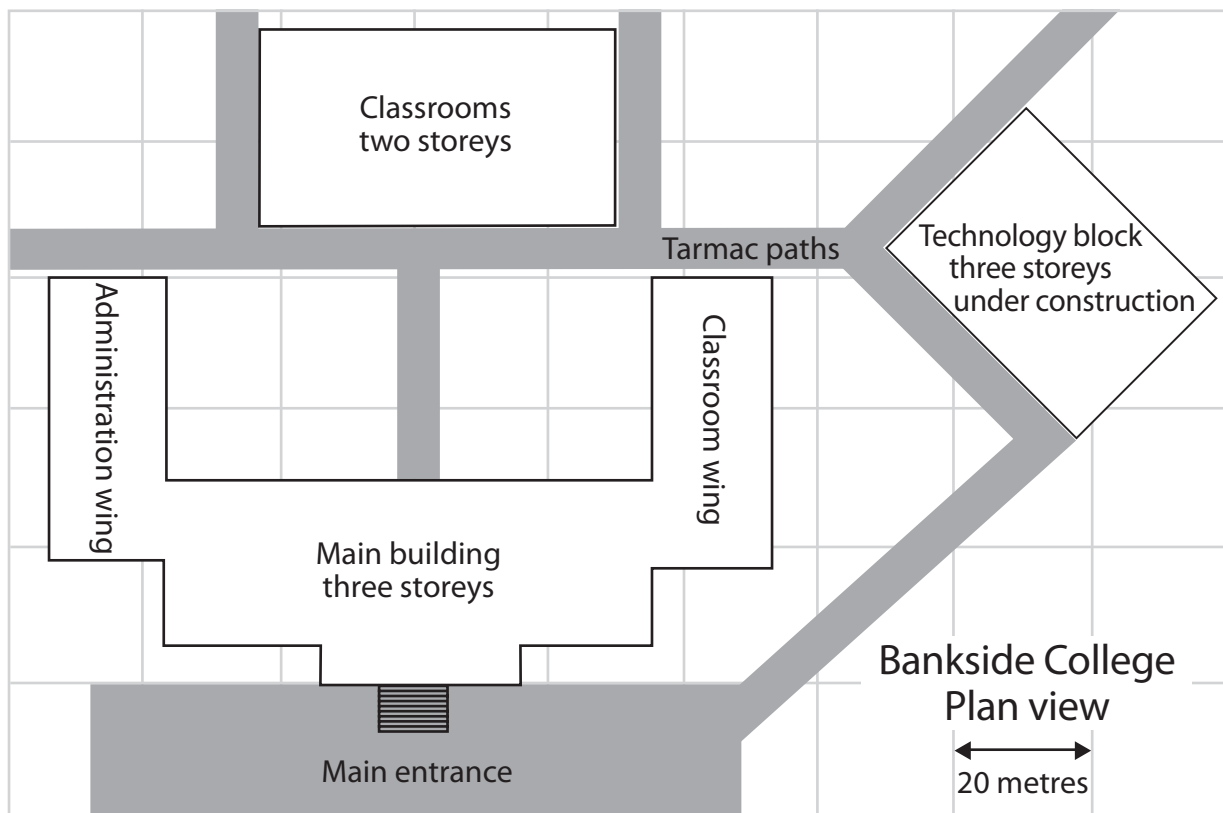
Briefing on current system

The Bankside LAN has two sub-domains, Admin and Teaching. These have their own domain controllers, running Server 2003. Both domain controllers are in the IT department. Each sub-domain has a network attached storage (NAS) device and several networked printers.

The Teaching sub-domain services the IT and D&T departments. It has 80 computers in the IT department, arranged in three classrooms. There are a further 10 computers in the D&T department. All of the Teaching computers use Windows XP. The departments make minor purchasing decisions, such as replacing a dead computer.

The Teaching sub-domain computers are scheduled for complete replacement, although some may be reused elsewhere. The governors make major purchasing decisions such as this.

The Admin sub-domain contains all the other computers in Bankside College. These include those in the administration offices, the staffroom, staff offices and anywhere else where computers have been set up over the years. The Admin computers vary in make, age and specification. They use Windows 7, Vista or XP and are replaced or added to when the need arises. The Head of IT and the Network Manager give advice but purchasing decisions are made by the School Bursar.



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.

Activity 1 – Network management tasks (suggested time 2 hours and 40 minutes)

The governors are under pressure to keep costs down.

They have often discussed using open source software to save money but have always rejected it. They see open source as 'not proper software' and think it would not work with existing files.

Aileen thinks that this might be a good time to take another look at open source software and asks you to prepare two briefing documents.

- (a) For the first document, she wants you to concentrate on the most commonly used software in the college: operating systems, office packages, art and graphics packages and, for the D&T department, CAD packages.

Produce a document for Aileen that:

- (i) describes the advantages and disadvantages to the college of open source software compared to proprietary software. (4)

- (ii) discusses the compatibility between open source and proprietary file formats. (4)

- (iii) recommends named open source software for use in the college, with a reason in each case, for:

- an operating system
- an office package
- an art and graphics package
- a CAD package. (4)

(b) For the second document, Aileen wants you to look at possible changeover processes in the Admin sub-domain if open source software is adopted.

Produce a document for Aileen that discusses, in the context of Bankside College, the benefits and drawbacks of:

(i) direct changeover (3)

(ii) parallel operation (3)

(iii) pilot changeover (3)

(iv) phased changeover. (3)

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

On no more than **one** word processed A4 page each:

- A briefing document on open source software.
- A briefing document on changeover processes.

(Total for Activity 1 = 24 marks)

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***Activity 2 – Research, network design and benefits (suggested time 1 hour and 40 minutes)**

The proposal includes a scheme to equip all staff and pupils with some form of mobile computing device.

Tablet PCs and netbooks have both been mentioned as suitable devices. The governors are aware that technology changes very quickly so they have not yet made a decision.

Note: The definition of a netbook often depends on what name a manufacturer gives to a product. For this activity, a netbook is a small laptop-style computer with a screen size less than 12 inches.

Aileen asks you to prepare an analysis of netbooks v tablets at two price points, sub £200 and sub £300.

Research the technology and produce the analysis for Aileen.

The analysis should cover:

- ability to use the open source software mentioned in Activity 1
- use in typical school situations
- total cost of ownership, assuming normal school-related usage.

Pay particular attention to the quality of your written communication.

Evidence to be submitted

On **one** word processed A4 page:

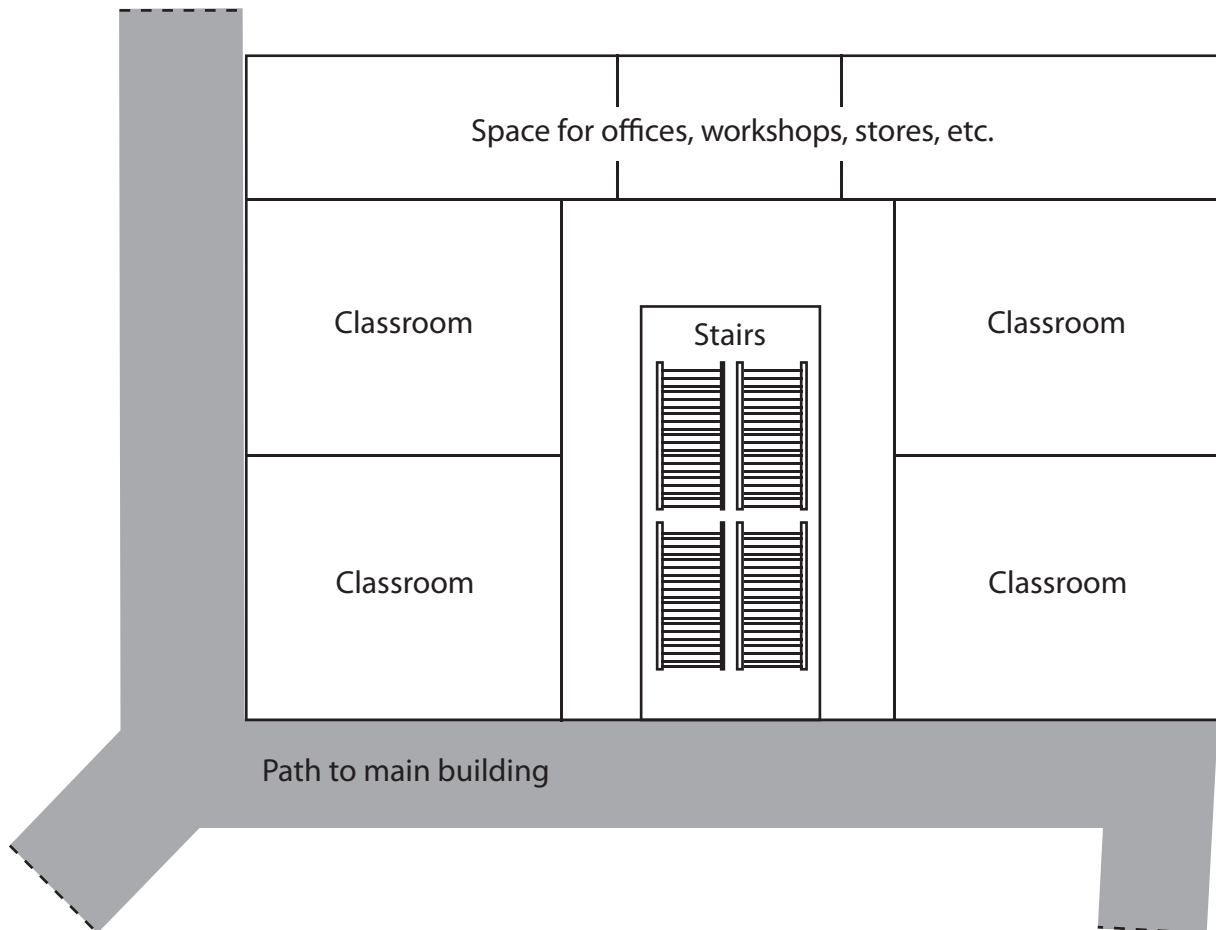
- An analysis of netbooks v tablets for Aileen.

Marks will be awarded for the quality of your written communication.

(Total for Activity 2 = 12 marks)

Activity 3 – Components of a network (suggested time 1 hour and 30 minutes)

The diagram shows the layout of one floor of the Technology block. All three floors have the same floor plan. There are 12 classrooms in total. The top floor is for IT; the bottom floor is for D&T; the middle floor is shared.



During a meeting with Aileen you agree these points for redeveloping the Bankside LAN.

1. The Admin sub-domain will be converted to use your recommended open source software. This will be a gradual process, performed as items require replacing. You will not be involved in this.
2. The Admin sub-domain server and network attached storage (NAS) device will be moved from the old IT department to the administration wing.
3. The current Internet access system will be retained. This consists of a fibre optic connection to an ISP supplied router, located in the administration wing.
4. The Teaching sub-domain server and NAS device will be moved from the old IT department to the Technology block.
5. The 80 computers in the old IT department will be replaced by new machines in the Technology block; two classrooms of 25 plus five spares.
6. Lessons in the other IT department classrooms will rely on students using mobile computing devices.

7. The best 20 of the existing PCs will be reused in the D&T department for CAD/CAM work. The Head of D&T wants the PCs to be movable, so that they can be used in any of the D&T rooms. Other aspects of D&T lessons will rely on students using mobile computing devices.
8. Each floor in the Technology block will require two new networked, colour laser printers.
9. Each classroom in the Technology block will require a WiFi-networked data projector.
10. Existing printers will be redeployed to the Admin sub-domain and you do not need to include them in your plans.
11. The IT and D&T department offices will each have a PC.

The governors would like to see your recommendations for the Teaching sub-domain in the Technology block and in the rest of Bankside College.

You should include the connection(s) to the Admin sub-domain server. Do not include any other parts of the Admin sub-domain.

Do not include power sockets or power cables.

Produce a table, which details the hardware, cabling components and other essential equipment to be used in the Teaching sub-domain. Ensure you give quantities and a reason in context for each component.

Evidence to be submitted

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

- A table which details, with quantities and reasons, the hardware, cabling components and other essential equipment for the Teaching sub-domain.

(Total for Activity 3 = 14 marks)

Activity 4 – Network design (suggested time 2 hours and 40 minutes)

The governors would like you to design an appropriate network solution.

- (a) Use network design software to produce a network design for the Bankside College network.

You should include the Admin sub-domain server and connection(s) to it, but **do not** need to include any of the Admin sub-domain PCs or printers.

You should include the network structure for the IT rooms that have PCs, but **do not** need to show all of the PCs.

Where multiple rooms in the Technology block have a similar network structure, you need only show detail for one. The number of similar rooms must be indicated.

You **do not** need to show the mobile computing devices, unless you are illustrating a specific point about them, in which case it should be explained in part (b).

(18)

- (b) Explain any major decisions that you have made with regard to 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 explaining each major decision made with regard to network devices and equipment.

(Total for Activity 4 = 24 marks)

Activity 5 – Network addressing and protocols (suggested time 1 hour and 30 minutes)

The server for the Teaching sub-domain is configured as a Dynamic Host Configuration Protocol (DHCP) server.

(a) Describe the role of a DHCP server. (2)

(b) Devices on the Teaching sub-domain could have static or dynamic IP addresses. State, with a reason, which type of address should be used for the:

- colour laser printers
- wireless access points
- PCs in the IT classrooms
- movable PCs in the D&T department
- WiFi-networked data projectors
- mobile computing devices.

(6)

(c) Describe how the DHCP server should be configured in terms of address ranges, reservations, and leases.

(6)

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

On **one** A4 page:

- An explanation of DHCP, including address types for the different network devices and server configuration.

(Total for Activity 5 = 14 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.

A minimum font size of 10 should be used for all word processed documents.

(Standard Ways of Working = 2 marks)

TOTAL FOR PAPER = 90 MARKS

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Write your name here

Surname	Other names
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Pearson
Edexcel GCE

Centre Number

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Candidate Number

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Applied Information and Communication Technology

Unit 9: Communications and Networks

COVER SHEET

5 May – 23 May 2014

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.

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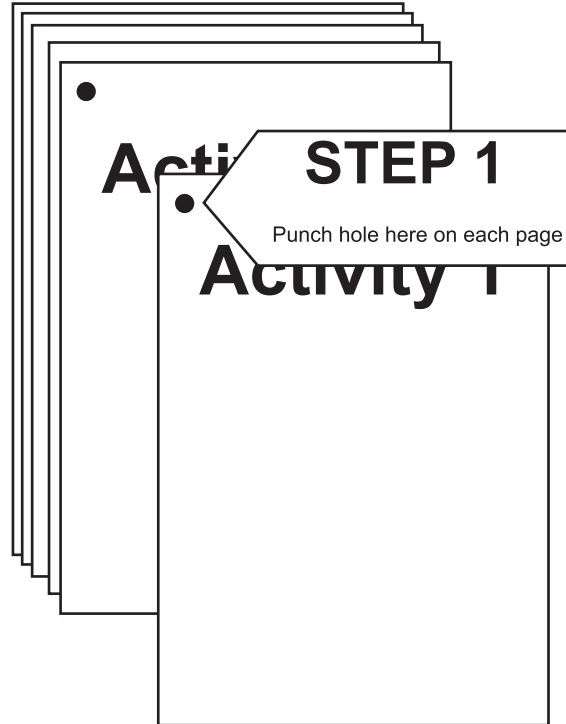
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Turn over ►

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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

Activity 1			
(a)(i)	1		
	2		
	3		
	4		
(a)(ii)	1		
	2		
	3		
	4		
(a)(iii)	1		
	2		
	3		
	4		
(b)(i)	1		
	2		
	3		
(b)(ii)	1		
	2		
	3		
(b)(iii)	1		
	2		
	3		
(b)(iv)	1		
	2		
	3		
Total			

Activity 2			
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MB2			
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Activity 3			
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Activity 4			
(a)	1		
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	18		
(b)	1		
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Total			

Activity 5			
(a)	1		
	2		
(b)	1		
	2		
	3		
	4		
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	6		
(c)	1		
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SWW		
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A1		
A2		
A3		
A4		
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