OCR
RECOGNISING ACHIEVEMENT

GCE

Applied ICT

Advanced GCE

Unit **G055:** Networking Solutions

Mark Scheme for January 2013

Oxford Cambridge and RSA Examinations

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

Annotation	Meaning
^	Something vital to the mark point has been omitted.
BOD	Benefit of the doubt given.
NBOD	Benefit of the doubt **not** given.
CON	Candidate contradicts him/herself.
NAQ	Candidate has not answered the question as set.
MTP	Candidate has missed the point of the question.
W	Candidate is working towards a mark but has not given enough to receive credit at this point.
NE	Not enough for the candidate to receive credit.
TV	Answer is too vague to receive credit.
FTC	Follow-through credit. When an earlier wrong answer has been penalised, this may be used to show that credit can now be given to a part of the script which depends on that earlier wrong answer. This avoids penalising a candidate twice for the same error, but **should only be used where specified by the PE**.
MAX	Shows that the maximum number of marks for a part-question or question has been awarded (even though the answer may contain further correct points).
R	The point repeats one already awarded credit.
JE	Candidate has *just* given enough to be awarded a mark.

Subject-specific Marking Instructions

There are 100 marks available for this test. They are allocated as follows:

- Tasks 2 and 3 30
- Section A of the test paper 50
- Section B of the test paper 20

OGD = Orca Graphic Designers Ltd

Task			Answer	Marks	Guidance
2			**Table** ***Three*** *from:* • Switch (1) – used to segment network (1) allows individual connections (1) to shared storage/internet connection (1) • Router (1) – manages traffic between the OGD network and the internet (1) allows connection between switch and modem/ADSL socket (1) • Hub (1) – simple connection for computers (1) allows individual connections (1) between computers and the server/router (1) • Wireless router (1) – provides internet connection for computers with wireless capability (1) allowing communication between computers and the internet connection (1) • Wireless hub (1) – connection point for computers with wireless capability (1) allowing communication between computers and the shared storage/router (1) • Modem (1) – connection point for internet (1) deals with transfer of data on internet connection (1) between internet and router (1) • VLAN switch (1) – one central point of connection (1) for two or more separate networks (1) employee and freelance (1) • Bridge between buildings (1) separating staff networks (1) e.g. employee and freelance(1) .	9	**Allow two switches only if each is explained in terms of its specific use.** **Max 3 marks for each device.**
			Diagram **Refer to Task 2 Diagram example on next page** Each item *from table* is placed on diagram in a sensible position (ie in the IT room or in the main area for the computers it connects). Each item is shown as connected to the rest of the network in a way that would work. Each item has a method of connection shown on the diagram (eg cable, wireless, connection to ADSL socket)	9	1 mark for each item 1 mark for each connection (may just be a label) 1 mark for each method (must indicate that a line is a cable, may give cable type)
			Evaluation Some comment is made on method(s) used (1) A strength <u>or</u> a weakness of the method(s) used is identified (1) A strength <u>and</u> a weakness of the method(s) used is identified (1)	3	

Task 2 Diagram example

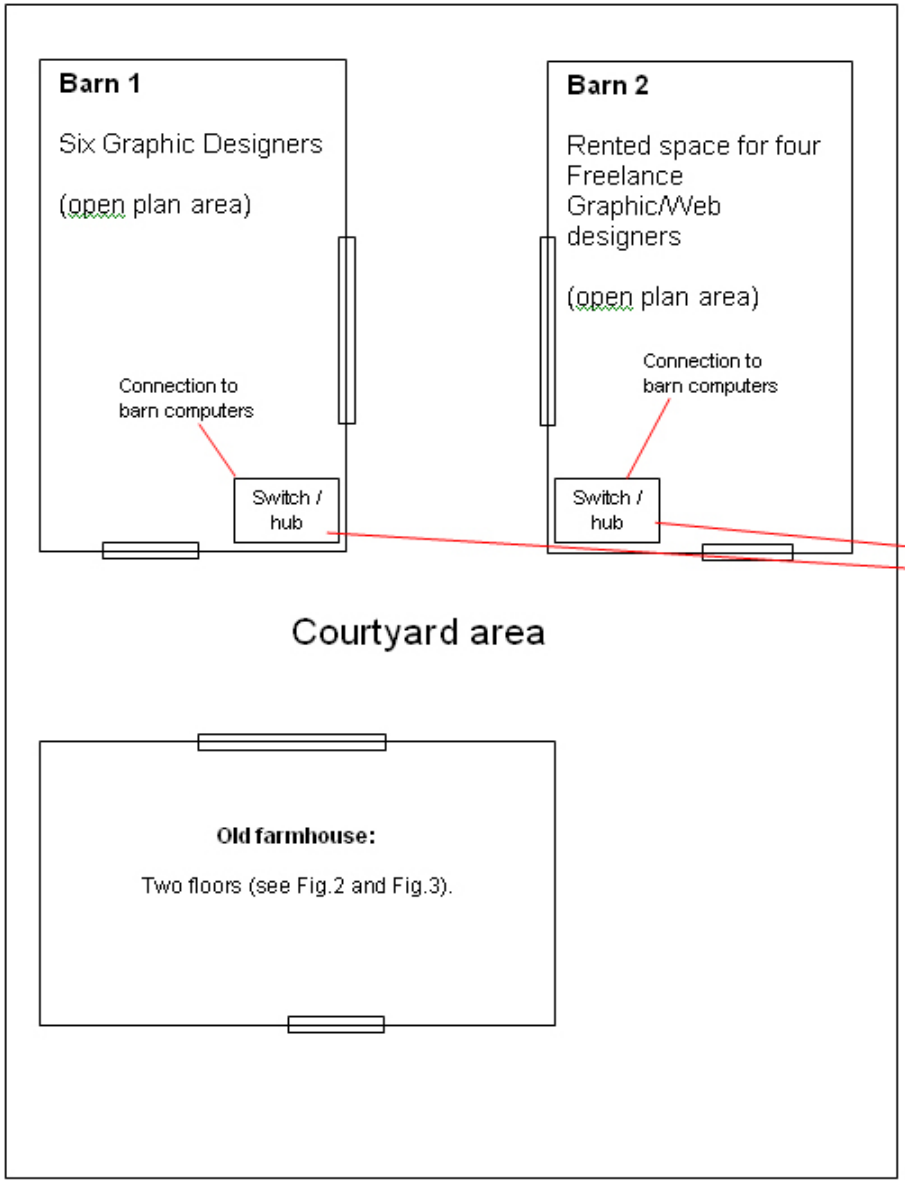


Fig.1

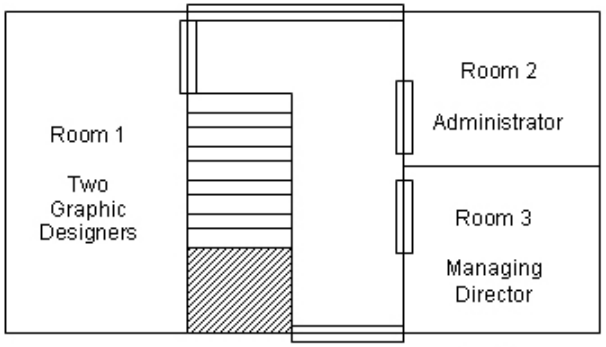


Fig.2

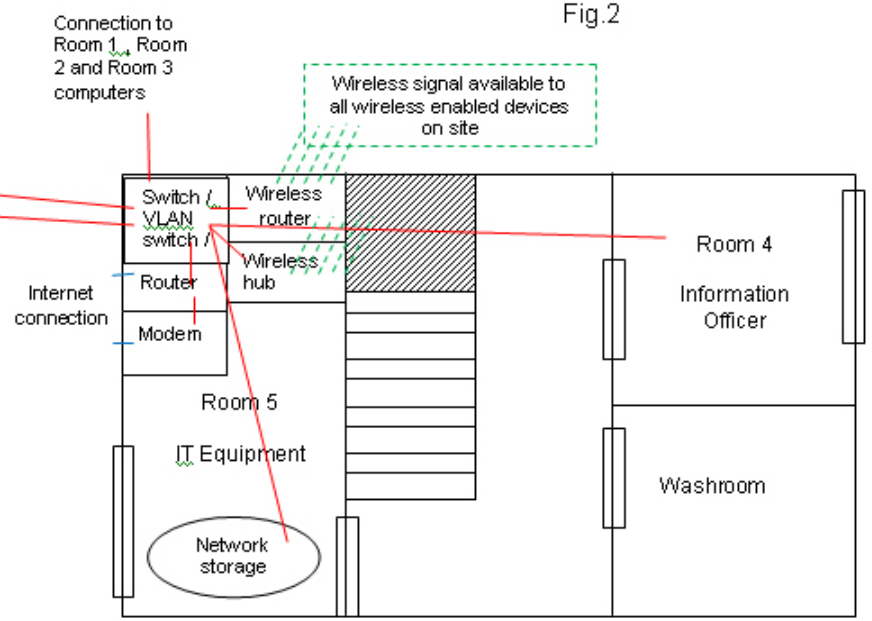
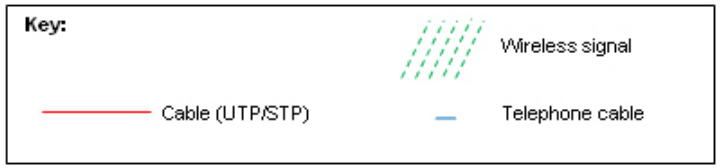
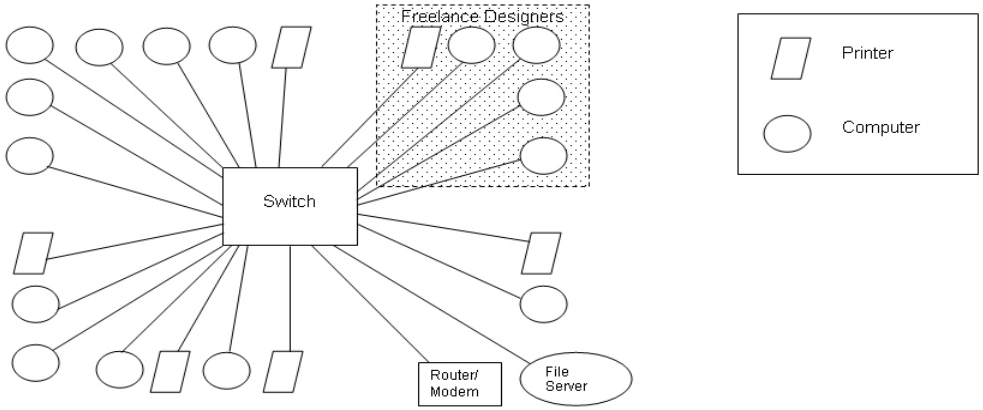


Fig.3



Task			Answer	Marks	Guidance
3			**Answers may include:** How a VPN may be used: • VPN software installed on network computers • Graphic Designers given a username and password and software for their home computers • Graphic Designers can connect from any IP address • A firewall could be used to ensure connection from particular IP addresses is not allowed • Graphic Designers required to sign contract for acceptable use • A Graphic Designer can work as if on the computer in the office with same access • Fast broadband connection would allow this to happen without unacceptable loss of speed.	9	**H (7–9)** The candidate will show a clear understanding of the task by giving a detailed explanation, with full reference to VPN technology. The explanation will cover the way a VPN would be set up (ie need software but not hardware), the security issues and how these would be resolved, and which parts of the network a Graphic Designer would have remote access to. The explanation will be wholly relevant to OGD. The information will be presented in a structured and coherent form. There will be few, if any, errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly. **M (4–6)** The candidate will show an understanding of the task by giving a general explanation of VPN technology and making reference to how it can be used in the OGD network. The explanation will make some reference to Graphic Designers and remote access to their own work on the network, and will be mostly relevant to OGD. The information will be presented in a structured format. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. **L (0–3)** The candidate will demonstrate a limited understanding of the task by providing a description of VPN technology with passing reference to how it would enable Graphic Designers to work remotely on the main network. Little or no reference will be made to OGD. Information will be poorly expressed and there will be a limited, if any, use of technical terms. Errors of grammar, punctuation and spelling may be intrusive.

Question			Answer	Marks	Guidance
1	(a)		**One** from: All Graphic Designers can access the same artwork (1) from any network computer/can be accessed simultaneously (1). Central file storage is easier to update than a DVD (1) can read and write individual files (1). No need to move storage media physically from one computer to another (1) do not have to request from Information Officer (1).	2	Both marks must come from the same mark point for each part.
	(b)		**One** from: Could be security issues (1) device is readable and writable (1). There is a set up cost (1) and cost for maintenance (1). Supervision of the data is needed (1) OGD would need to employ someone to do this (1).	2	Both marks must come from the same mark point for each part.
2			**One** from: No need for a central server (1) reduces set up costs (1) can give Freelance Designer computers only access to internet/printer (1). Freelance Designers will configure their own computers to access the network (1) each user has ownership over their part of the network (1) which reduces management responsibility for OGD (1).	3	Full marks only if at least one mark awarded for a point relevant to case study.

Question			Answer	Marks	Guidance
3	(a)		**See diagram** A correct logical topology diagram for a star network (1) Correct number of computers shown (15 or 16 if file server included) and connected to central connection device (1) Correct number of printers shown (6 in total) and connected to central connection device (1) File server shown and connected to central connection device (1) Router/modem shown and connected to central connection device (1) Diagram shows separation of Freelance Designers computers from the rest of the network through a VLAN switch (1)	6	A general star topology diagram may be awarded up to 3 marks if it includes a file server and router connected to a central connection device.
			Logical topology diagram for a star network  		

Question			Answer	Marks	Guidance
	(b)		**One** from: Only one connection device (1) so reduced cost for company/so easier to manage for information officer (1). Only one point of failure/network will not fail if an individual node fails (1) so only the user of a failed node loses access to network storage (1).	2	At least one mark is awarded for relevance to OGD.

Question			Answer	Marks	Guidance
4		(i)	UTP cable/STP cable/wireless	1	
		(ii)	UTP – carries data 100m (1) without loss (1) **OR** twisted pairs of wires (1) reduces effect of noise (1). STP – as above **OR** shielded cabling (1) reduces electrical interference (1). Wireless – non physical connection (1) flexible (1).	2	Answer must relate to the answer given in 4(i). Maximum 2 marks per transmission media.
		(iii)	UTP/STP **three** from (eg): • OGD site is no larger than 100m (1) cable can reach all areas of site (1) without degradation of signal (1) • cable is flexible for wiring around corners (1) small enough to fit in trunking (1) it can be used between the buildings (1) • its existing computers are likely to have on-board LAN connections already (1) as will the freelance designers (1) this means no extra expense for connection (1). Wireless **three** from (eg): • computers are already using wireless (1) some of the equipment is already there (1) no extra expense for connection (1) • wireless signals will cover entire site (1) no signal would need to travel further than 45m (1) which is within range (1).	3	Answer must relate OGD.
5			Browser (1) **Two** from: Displays web pages (1) requests web pages from hyperlinks (1) allow employees to search for images using search engines (1) allows employees to go to specific web pages for research (1).	3	Question asks for type of software.

Question			Answer	Marks	Guidance
6			**Three** services from: Email (1st) communication with clients/other designers/OGD (1) there is an automatic record of the communication (1) doesn't need to be simultaneous (1). Conferencing (1st) can hold meetings with multiple clients (1) can collaborate with other designers (1) can show ideas in a video conference (1). File exchange (1st) can deliver artwork electronically (1) can receive files for update (1) electronic delivery of invoices/cheaper than paper and postage (1). Access to WWW (1st) for research of ideas (1) for information about contacts (1) access to thousands of images immediately (1). Access to public domain software (1st) that can be used for image production (1) freely available (1) and easy to download (1). Access to discussion forums (1st) to discuss new ideas (1) for inspiration (1) to share solutions to problems (1). Web based advertising and marketing (1st) ability to deal with third party advertisers online (1) can pay for advertising services online (1) access to online directories (1).	9	Up to 3 marks for each service. Only mark if 1st mark awarded.

Question			Answer	Marks	Guidance
7	(a)	(i)	**One** from: (One) print server (per printer) Use network printers	1	
		(ii)	**One** from: Connect the printer to the server (1) install print server software on the server (1) and printer drivers on all computers using that printer (1). Connect each printer to the network (1) configure each computer to print to the relevant printer (1) install printer drivers on all computers using that printer (1).	3	**Must relate to the answer to part (a)(i)** For full marks there must be a complete description.
	(b)		**Two** from (eg): Freelance designers won't need to pay for access to individual printers (1) so costs will be lower (1). There will be only a small number of users for this printer (1) so wait times should be reasonable (1). Costs of printing can be monitored and charged to each designer (1) so that the pricing is fair and related to use (1).	4	

Question			Answer	Marks	Guidance
8			**Answers may include:** Hardware Bandwidth Security Benefits (B): • less hardware will be required • one main modem/router • lower installation costs/running costs • only one piece of equipment to maintain regardless of how many users. Drawbacks (D): • dependence on one piece of equipment • dependence on one connection • if connection fails everyone in the company is affected • financial implications • bandwidth will become narrower with more simultaneous users • faster broadband will be needed at a higher cost • some of cost will need to be passed to freelance designers • need to control all usage tightly.	9	**H (7–9)** The candidate will show a clear understanding of the question by giving a detailed evaluation, with full reference to the requirements of the connection at OGD. The evaluation will cover both benefits and drawbacks of sharing an internet connection in this context. There will be an evaluative statement/reasoned conclusion. The information will be presented in a structured and coherent form. There will be few, if any, errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly. **M (4–6)** The candidate will show an understanding of the question by describing benefits and drawbacks of sharing an internet connection in this context. The evaluation may be one-sided and will make some reference to OGD and the Freelance Designers. There will be an attempt at an evaluative statement/conclusion. The information will be presented in a structured format. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. **L (0–3)** The candidate will demonstrate a limited understanding of the question by identifying general benefits or drawbacks of sharing an internet connection. Little or no reference will be made to OGD or the Freelance Designers using the network. Information will be poorly expressed and there will be a limited, if any, use of technical terms. Errors of grammar, punctuation and spelling may be intrusive.

Question			Answer	Marks	Guidance
9	(a)		A unique identifier for a host on the internet. Four numbers separated by dots.	1	
	(b)		Any valid IP address (decimal or binary)	1	Check that no octet outside the range 0–255.
	(c)	(i)	Class C	1	Only answer.
		(ii)	Any valid IP address with first octet between 192 and 223 Eg 192.168.10.3	1	Check that none of the second, third or fourth octets are outside the range 0–255.
10			**Three** from (eg): Transfer of files from host to host on a TCP network or internet (1) uses FTP server and FTP client (1) allows authenticated or anonymous connection (1) uses ports 20 and 21 (1) supports data streaming or transfer in blocks (1) supported by many browsers (1).	3	Award marks for any three, in any order.
11			**Two** from (eg): Data transmitted as light pulses (1) on and off to represent 1 and 0 (1). Data travels up to 10km (1) without loss (1). Insulated glass core (1) allows light transmission (1). Non-corrosive material (1) suitable for outside use (1).	4	Both marks must relate to same feature.

Question			Answer	Marks	Guidance
12			Software (S): Server OS Client OS Network adapter software Protocol software Network service software Answers may include (+): <u>Server OS</u> needed on one computer that will act as a server manages user accounts manages connected hardware one copy of this software is needed. <u>Client OS</u> needed on all computers that will connect the server allows users to login manages file requests to server requests other services such as IP allocation. <u>Network adapter software</u> needed on all computers in the network controls access to the network media uniquely identifies attached computer. <u>Protocol software</u> must be same on all computers allows effective communication by setting rules for starting, continuing and ending transmission eg TCP/IP, NetBIOS. <u>Network service software</u> on computers that will provide that service, such as print server and drivers that communicate with server.		**H (7–9)** The candidate will show a clear understanding of the question by considering the full range of software and providing a detailed explanation of where and why the software is needed. The information will be presented in a structured and coherent form. There will be few, if any, errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly. **M (4–6)** The candidate will show an understanding of the question by considering a range of software and providing explanations, of where or why the software is needed. Some explanations may be limited. The information will be presented in a structured format. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. **L (0–3)** The candidate will demonstrate a limited understanding of the question by describing some relevant software. Information will be poorly expressed and there will be a limited, if any, use of technical terms. Errors of grammar, punctuation and spelling may be intrusive.

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