# OCR
## Oxford Cambridge and RSA

**GCE**

**Applied ICT**

Unit **G055:** Networking Solutions

Advanced GCE

**Mark Scheme for June 2014**

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

1.     **Annotations**

| Annotation | Meaning |
|---|---|
| BP | Blank Page – this annotation **must** be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response. |
| ^ | 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. |

2.     **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

| | Task | Answer | Marks | Guidance |
|---|---|---|---|---|
| **2** | **TABLE** | See Task 2 Table Example<br><br>1 mark for each type of software (up to 3 types of software)<br>1 mark for each appropriate purpose (up to 3 marks)<br><br>Up to 2 marks for each of three explanations of purpose (max 6 marks)<br><br>1 mark for each correctly identified installation location (up to 3 marks)<br>1 mark for each correctly identified number of copies (up to 3 marks). | 18 | |
| | **EVALUATION** | Some comment is made on method(s) used (1)<br>A strength <u>or</u> a weakness of the method(s) used is identified (1)<br>A strength <u>and</u> a weakness of the method(s) used is identified (1) | 3 | |

**Task 2 Table Example**

| Type of network software | Purpose | Explanation of the purpose of software | Where installed | Number of copies required |
|---|---|---|---|---|
| Server operating system | eg: To manage user accounts To manage access to shared resources | eg: allocates access rights to users (1) in order to control access for students and staff appropriately (1)<br><br>controls simultaneous access to learning materials (1) so that all students can access at the same time (1) | all servers | 5 |
| Email server software | eg: To manage mail accounts | accesses and manages mailboxes (1) in response to requests from email clients(1) | mail server | 1 |
| Web browser software | eg: To request pages from a web server | provides access to learning materials (1) so that students can interact with web pages (1) | all workstations | 50 |
| Other examples:<br>Client operating system, email client software, printer sharing software, network printer driver software, FTP software, web authoring software, database software, graphics software, security software, back up software, protocol software, web server software, remote terminal software, etc)<br><br>Number of copies:<br>Whole network – 55 copies, workstations only 50 copies, individual server software – 1 copy, specialist software for staff – 20 copies max | | | | |

| Task | | | Answer | Marks | Levels of Response |
|---|---|---|---|---|---|
| 3 | | | Answer may include:<br><br>*Requirements* eg:<br>• need switches capable of 1000Mbps data transfer speeds<br>• staff switch must have at least 24 fast ports or 48 fast ports if servers and workstations on same switch<br>• student switch must have at least 48 fast ports<br>• need routers with fast ports<br>• Cat 5e/6/7 cable<br>• need to ensure that on-board LAN is compatible or buy NICs if not.<br><br><br>*Consequences* eg:<br>• network will be as slow as the slowest part<br>• if one part uses slower technology then all will be at that speed through that part of the network<br>• other technology may not be compatible<br>• if switches have limited number of ports the network will not be scalable using the existing equipment | **H**<br>7-9 | The candidate will show a clear understanding of the task by discussing a comprehensive range of equipment necessary. The candidate will demonstrate a full understanding of the implications of not having all equipment conforming to the same standard in terms of speed and compatibility. The discussion will be wholly relevant to OES.<br><br>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**<br>4-6 | The candidate will show a good understanding of the task by discussing some necessary equipment. The candidate will demonstrate an underlying understanding of the implications of not having all equipment conforming to the same standard in terms of speed and compatibility. The discussion will have some relevance to OES.<br><br>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**<br>0-3 | The candidate will demonstrate a limited understanding of the question and will identify relevant requirements with little explanation of consequences. Little or no reference will be made to OES.<br><br>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 | | | one of eg:<br><br>• email (1) all users to have similar email addresses (1) addresses can be looked up/files can be attached (1)<br>• messaging system (1) tutors message a group of students in one go (1) and receive replies from individuals (1) | 3 | All marks must come from the same mark point |
| 2 | | | eg:<br><br>multiple students can use the connection (1) without unacceptable loss of speed (1)<br><br>can have access to wider range of services eg video streaming/conferencing (1) without interruption of service (1). | 4 | |
| 3 | | | eg:<br><br>animation viewing software (1) runs educational animations (such as Flash animations) (1)<br><br>PDF viewing software (1) displays and allows annotation of PDF files in a reader (1) | 4 | Both marks must come from the same mark points<br>Accept browsing software with second point related to case study |

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| **4** | a | | eg:<br>• could use VLAN switching (1) to separate staff and student networks (1)<br>• reduced costs for OES (1) due to only one central connecting device<br>• connection failure does not affect entire network (1) students can move to another computer (1) | 4 | |
| | b | i | eg:<br>• more connecting devices needed (1) increased cost to OES (1)<br>• reliance on backbone/central connection device (1) students not able to access materials/exams (1) | 2 | |
| | | ii | one of eg:<br>• student PCs may be on one branch, administration PCs on another to keep them separate (1) for extra security (1) complicated VLAN switching would be needed on a star network (1)<br>• traffic will be routed to the correct part of the network (1), student traffic will be kept on the student branch (1) without slowing down the rest of the network/not possible in a star network (1). | 3 | |

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| **5** | a | | eg:<br><br>malware attack such as virus, Trojan, worm introduced through the network (1) which may destroy important course data on the web server (1)<br><br>user error (1) caused by a member of staff locking a shared file or corrupting data in the file while updating course materials (1) | 4 | |
| | b | | eg:<br><br>careful management of security / keeping staff and student user lists up to date (1) so that only valid, current users are allowed access (1)<br><br>run security software and update regularly (1)<br>to ensure that course data is protected from malicious software (1)<br><br>strong/secure passwords changed regularly (1) reduces risk of staff passwords being guessed (1) | 4 | |

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| **6** | a | | eg:<br><br>In order to control all traffic between student and staff computers and internet (1) and to hide individual devices from internet (1) situated between the network and the internet connection (1) | 3 | |
| | b | | eg:<br><br>receives requests for web pages from students' computers which it then requests from the internet (1) so that internal IP addresses are hidden (1)<br><br>caches pages for later access (1) so that it can send cached pages rather than accessing internet / because it is quicker to send from cache (1)<br><br>checks integrity of data received (1) before sending to requesting device (1) | 4 | |

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| **7** | | | eg:<br><br>place network equipment in a locked/alarmed room (1st) such as the IT Equipment room / with access to authorised users only (1) so that there is limited physical access to equipment (1)<br><br>lock computer workstations to desks (1st) with cable locks / with bolting equipment (1) so that they can't easily be removed / and small items can't be removed (1). | 6 | |

| Question | | | Answer | Marks | Levels of Response |
|---|---|---|---|---|---|
| 8 | | | Answer may include:<br><br>*Positive implications* eg:<br>• could increase student numbers<br>• students often prefer to work in their own time and at their own pace<br>• can recruit students from further afield<br>• increased income<br>• reduced staff to student ratios due to online nature of courses<br>• can use existing internet connection and web server so no extra cost | **H**<br>7-9 | The candidate will show a clear understanding of the question by giving a detailed discussion of the positive and negative implications of providing courses remotely. The discussion will be fully relevant to OES.<br><br>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. |
| | | | *Negative implications* eg:<br>• students are isolated and so new services will be needed such as discussion boards to allow students to collaborate<br>• there may be copyright problems as students can download learning materials, careful security management is needed<br>• secure online connections are needed to ensure integrity of assessment, VPN software can be used but adds to expense | **M**<br>4-6 | The candidate will show an understanding of the question by discussing positive and negative implications of providing courses remotely. The discussion will have some relevance to OES and may be one-sided.<br><br>The information will be presented. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. |
| | | | *WAN services* eg:<br>• discussion boards, email, video-and tele-conferencing, data file exchange, commercial transactions | **L**<br>0-3 | The candidate will present a description of a limited range of implications. Descriptions may be listed points.<br><br>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. |

**Section B**

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| **9** | | | Any two of:<br><br>• address associated with hosts in software<br>• layer 3 addressing<br>• example – eg 192.168.40.0 or 10.100.0.38<br>• can be static / dynamic<br>• can be classful / classless | 2 | |
| **10** | | | one of eg:<br><br>• router operates at layer 3 (1) switch operates at layer 2 of OSI (1)<br><br>• router uses IP addressing (1) switch uses MAC addressing (1) | 2 | |
| **11** | | | one of eg:<br><br>• runs applications for clients (1) so that they don't need their own processing power (1)<br>• allows clients to download applications as they need them (1) with no need to store the application locally (1)<br>• allows one copy of an application to be shared (1) in order to keep licensing costs down (1) | 2 | Both marks must come from same mark point |

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| **12** | a | | Any three of:<br><br>• date/time<br>• problem description<br>• solution<br>• technician<br>• device | 3 | |
| | b | | records all reported problems and their solutions (1) in order to identify recurring problems/identify faulty equipment/identify training needs(1) | 2 | |

| Question | Answer | Marks | Levels of Response |
|---|---|---|---|
| **13** | Answer may include:<br><br>*Problems* eg:<br>• potential loss of security<br>• loss of speed<br>• cost of purchase and set up<br>• maintenance and supervision costs<br><br>*Effect on organisation* eg:<br>• potential increase in data protection issues<br>• individual users will spend longer on tasks due to network transfers.<br>• extra personnel will be needed to run the network<br>• reliance on the network can be problematic if key components fail | **H**<br>7-9 | Candidate shows a clear understanding of the question by giving a detailed explanation of the problems associated with networks including how these problems affect the organisation and how they can be reduced.<br><br>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. |
| | *Ways to minimise problems* eg:<br>• invest in firewall/anti-virus network wide security software to keep system secure<br>• allow some local processing so that there is less reliance on network<br>• incorporate ongoing costs into budget such as maintenance contracts and wages for extra staff | **M**<br>4-6 | Candidate shows an understanding of the question, by providing some explanation of the problem(s) associated with networks and how these can be reduced. Some consideration of how the problems might affect the organisation will be evident.<br><br>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**<br>0-3 | Candidate describes problem(s) associated with networks and identifies ways to reduce problems with little or no explanation of the effect(s) on the organisation. Answers may be a list of points.<br><br>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. |