Computer Systems

December 2015

Sample Exam Marking Scheme

This marking scheme has been prepared as a **guide only** to markers. This is not a set of model answers, or the exclusive answers to the questions, and there will frequently be alternative responses which will provide a valid answer. Markers are advised that, unless a question specifies that an answer be provided in a particular form, then an answer that is correct (factually or in practical terms) **must** be given the available marks.

If there is doubt as to the correctness of an answer, the relevant NCC Education materials should be the first authority.

Throughout the marking, please credit any valid alternative point.

Where markers award half marks in any part of a question, they should ensure that the total mark recorded for the question is rounded up to a whole mark.

Marker's comments:

Moderator's comments:

Mark:	**Moderated mark:**	**Final mark:**

Penalties applied for academic malpractice:

Answer ALL questions

Marks

Question 1

a) Recommend THREE (3) ways of how to categorise computer systems. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***Computational power***
- ***Physical size***
- ***Price***
- ***Number of users supported,***
- ***Portability***
- ***Typical applications***
- ***Other sensible suggestions***

b) State THREE (3) different types of computer system. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***Supercomputer***
- ***Mainframe***
- ***Server***
- ***Mini-Computer***
- ***PC***
- ***Laptop***
- ***Netbook***
- ***PDA***
- ***Smartphone***
- ***Tablet***
- ***Games Console***
- ***Embedded System***

Question 1 continues on next page

c) For TWO (2) different types of computer system listed in (b), briefly describe TWO (2) defining characteristics of each technology. **4**

The maximum number of marks awarded to this question is 4. Award up to 2 marks for an accurate description for each technology. For example:

- ***Supercomputers are defined by their high price, low portability, often application-specific design and use on scientific and other computationally-intense problems for big business and academia.***

- ***Net-books are defined by the ir small size, portability, low price and retail focus – such as web browsing, social media and e-commerce applications.***

Total: 10 Marks

Marks

Question 2

a) State THREE (3) primary benefits of networking individual computers. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***Sharing storage space***
- ***Sharing printing facilities***
- ***Data sharing***
- ***Email***
- ***Other sensible comments***

b) List FIVE (5) network classifications based on physical size, ranked in order from the smallest (desktop) to the largest (global). **5**

***Award 1 mark for each bullet point up to a maximum of 5 marks. It* must be in strict order (one mark each):**

- ***Personal Area Network (PAN)***
- ***Local Area Network (LAN)***
- ***Metropolitan Area Network (MAN)***
- ***Wide Area Network (WAN)***
- ***Internet***

c) What fundamentally differentiates the largest type of network from all the others? **2**

Award 1 mark for each bullet point up to a maximum of 2 marks:

- ***The Internet is a network of networks***
- ***The others are networks of individual machines***

Total: 10 Marks

Marks

Question 3

a) State THREE (3) sub-components typically located *within* the CPU/Processor. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***ALU***
- ***Control Unit***
- ***Cache***
- ***Registers (PC, IR, MAR, MBR etc.)***
- ***Buses (Data, Address or Control)***

b) State THREE (3) components of a computer located *outside* of the CPU/Processor. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***RAM***
- ***ROM***
- ***Hard disk***
- ***Fan***
- ***CD/DVD drive***

c) Provide TWO (2) examples volatile storage **and** provide TWO (2) examples of non-volatile storage. **4**

The maximum number of marks awarded to this question is 4. Award 1 mark for each bullet point up to a maximum of 2 marks:

<u>Volatile storage</u>

- ***Registers***
- ***Cache***
- ***RAM***

Award 1 mark for each bullet point up to a maximum of 2 marks:

<u>Non-volatile storage</u>

- ***ROM***
- ***Hard disk***
- ***CD/DVD***
- ***Pen drive***

Total: 10 Marks

Marks

Question 4

a) Briefly explain what is meant by the term *peripheral* in relation to a computer system. **2**

Award up to 2 marks for each bullet point:

- ***A device that is attached to a computer***
- ***A device that is physically separate from the computer***
- ***Is partially or wholly dependent upon the computer***
- ***Provides data into or receives data from the computer***

Note: Award 1 mark for a partially correct explanation.

b) Name TWO (2) input peripherals. You should also state ONE (1) advantage of **each** device. **4**

Award 1 mark for listing a peripheral and 1 mark for correctly stating an advantage up to a maximum of 4 marks:

- ***Keyboard (fine for small amounts of text, familiar)***
- ***Mouse (cheap, intuitive, easy to use)***
- ***Digital camera (can work unattached and independent of computer)***
- ***Scanner (flexible – can capture images, text)***

c) Name TWO (2) output peripherals. You should also state ONE (1) advantage of **each** device. **4**

Award 1 mark for listing a peripheral and 1 mark for correctly stating an advantage up to a maximum of 4 marks:

- ***Monitor/Screen (reliable/familiar, CRT-type = bulky, newer LCD = thinner but more expensive)***
- ***Printer (gives permanent quality output, higher (total) running costs due to ink/toner)***
- ***Plotter (gives very large-scale permanent output, but more expensive and has ink costs etc.)***
- ***Plus Speakers (if not built-in – provides audio at relatively low cost)***

Total: 10 Marks

Marks

Question 5

a) Briefly explain what is meant by a *computer file*. You should also outline what can be held in a file **and** how files are normally stored. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***A file is a collection of related data often, but not always, in a record/field format***
- ***Files may store both data (user or system) and program logic (code/instructions)***
- ***Most file systems/OS use hierarchical directories/sub-directories to store & locate files***
- ***Each file must have a unique name within a directory but not across the whole file system***

b) State THREE (3) pieces of meta-data that are captured when a computer file is stored. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***File name***
- ***File type***
- ***Date stamps (when created, when modified, when last accessed etc.)***
- ***File ownership details***
- ***Security and access rights***
- ***Physical address of file location (via a pointer)***

c) Identify FOUR (4) different access rights or permissions that may be applied to a file. **4**

Award 1 mark for each bullet point up to a maximum of 4 marks:

- ***Create – the user is allowed to set up/create a brand new file***
- ***Write – the user can open an existing file and write data to it***
- ***Read – the user can open an existing file and read its contents***
- ***Delete – the user can permanently remove/destroy an existing file***
- ***Copy – the user can make a duplicate of an existing file***
- ***Execute – the user can invoke & run a file (holding program code)***

Total: 10 Marks

Marks

Question 6

a) Briefly describe FOUR (4) types of change that create the need for software maintenance. **4**

Award 1 mark for each bullet point up to a maximum of 4 marks:

- ***Adaptive:* changes made to the software to meet different conditions or requirements**
- ***Corrective:* changes made to remove identified defects in the (flawed) software**
- ***Perfective:* changes made to improve or extend the existing (working) software**
- ***Preventive:* changes made to reverse deterioration or avoid future problems**

b) Briefly discuss THREE (3) routine software maintenance tasks. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- ***Disk defragmentation:* to coalesce tiny blocks of unused disk space into larger blocks**
- ***Disk clean-up:* to remove unwanted temporary and deleted files from the disk**
- ***Security updates:* constantly apply the latest anti-virus updates**
- ***OS updates:* for example Windows updates**
- ***Application updates:* for example Adobe or browser updates**

c) State THREE (3) forms of common hardware upgrade **and** provide ONE (1) reason for each upgrade. **3**

Award 1 mark for each bullet point up to a maximum of 3 marks:

- **Memory upgrade: adding more RAM will increase system performance**
- **Graphics upgrade: graphics/games-heavy applications need high-speed processing**
- **Hard disk upgrade: you can never have too much storage – could also add external HDD**
- **NIC upgrade: every computer needs fast network access so better NIC will be needed**
- **Monitor upgrade: bigger, flatter, less flicker screens reduce eye strain**

Total: 10 Marks

Marks

Question 7

a) What are the main stages of the Software Development Life-Cycle (SDLC)? **2**

Award ½ marks for each bullet point up to a maximum of 2 marks.

Stages include: Initiation Feasibility, Planning, Requirements Analysis, Design, Development, Integration & Testing, Implementation, Maintenance (Operational), Upgrade or Termination.

b) State FOUR (4) reasons why the requirements elicitation stage may have problems. **4**

Award 1 mark for each bullet point up to a maximum of 4 marks:

- ***The client does not know what they want or need = unclear mission***
- ***The client changes/extends the original requirements = mission-creep***
- ***Conflicting or hidden agendas between different client parties***
- ***Lack of 'buy-in' or support from key staff***
- ***Lack of client knowledge on what is (technically) possible / desirable***
- ***External factors may push the mission off course – legal, regulatory, financial***

c) Briefly discuss TWO (2) selection strategies that may be used to pick a solution. **2**

Award 1 mark for each bullet point up to a maximum of 2 marks:

- ***Selection committee – comprising all key stakeholders and technical experts. Contains all power and expertise but its size can lead to slow and inefficient decision making.***
- ***Senior Individual – the reciprocal of the committee – fast decisions but may well lack enough technical knowledge and/or influence.***
- ***Small working group – the best of both worlds – small enough for efficient decision-making but large enough to hold enough knowledge and power.***

Question 7 continues on next page

d) List TWO (2) criteria that may be used to judge a solution's suitability **2**

Award 1 mark for each bullet point up to a maximum of 2 marks:

- ***Response times (processing speed, network speed, printing performance)***
- ***Availability (reliability & uptime – do you need 24x7x365?)***
- ***Scalability (can you grow the system with the business?)***
- ***Compatibility (does new/upgraded system integrate with other systems?)***
- ***Cost***
- ***Delivery time***

Total: 10 Marks

Marks

Question 8

a) Outline THREE (3) computer system problems that could harm people **and** propose THREE (3) ways to avoid the problem. **6**

The maximum number of marks awarded to this question is 6. Award 1 mark for each bullet point up to a maximum of 3 marks.

Examples of issues the candidate might cover include:

- ***Electrical shock***
- ***Handling hot components***
- ***Lifting & carrying hardware***
- ***Trip hazards***

Award 1 mark for each bullet point up to a maximum of 3 marks.

Suggestions the candidate may propose are:

- ***Ensure computer is unplugged and wait for capacitors to discharge***
- ***Turn off machine and wait for it to cool or wear gloves***
- ***Get manual handling training and/or assistance***
- ***Keep floors & work areas clean and tidy***

b) Briefly describe TWO (2) computer system problems that could harm computers **and** suggest TWO (2) ways to avoid the problem. **4**

The maximum number of marks awarded to this question is 4. Award 1 mark for each bullet point up to a maximum of 2 marks.

Examples of issues the candidate might cover include:

- ***Electrostatic discharge***
- ***Power surges***

Suggestions the candidate may propose are:

- ***Wear an electro-static discharge wrist band and/or mat.***

Turn off power & unplug machine first.

Total: 10 Marks

Marks

Question 9

Provide TWO (2) examples of each of the following type of software:

a) Operating system **2**

Award 1 mark of each type of software up to a maximum of 2 marks

<u>Operating System</u> – MS Windows, UNIX, Linux, Mac OS, iOS, and Android.

b) User interface **2**

Award 1 mark of each type of software up to a maximum of 2 marks

<u>User Interface –</u> WIMP-based, Form-based, Web-based, and command-line.

c) Utility and System software **2**

Award 1 mark of each type of software up to a maximum of 2 marks

<u>Utility & System Software</u> – anti-virus, firewall, disk-management, compilers, and translators.

d) Application software **2**

Award 1 mark of each type of software up to a maximum of 2 marks

<u>Application Software</u> – word-processing, spreadsheet, email clients, databases, and web browser

e) Open source software **2**

<u>Open-Source Software</u> – Apache, MySQL, PHP and the whole XAMPP model amongst others

Total: 10 Marks

Marks

Question 10

You are a software testing specialist and have been asked by the Head of Quality Assurance to advise the IT department on how to guarantee the highest standards throughout the whole software development lifecycle. **10**

Identify FIVE (5) types of testing **and** state at which stage in the development lifecycle it is applied.

The maximum number of marks awarded to this question is 10. Award 1 mark for identifying a form of testing and 1 mark for correctly stating its position in relation to the development cycle:

- ***Compliance Testing** – done during development for design verification purposes*
- ***Production Testing** – done during the manufacturing stage as a QA process*
- ***Acceptance Testing** – once installed & commission by the end user – does it work?*
- ***Service or Repair Testing** – fault finding and diagnostics*
- ***Regression Testing** – making sure the whole product still works even after upgrade*

Total: 10 Marks

End of Examination Paper

Learning Outcomes matrix

Question	Learning Outcomes assessed	Marker can differentiate between varying levels of achievement
1	1	Yes
2	1	Yes
3	1	Yes
4	1	Yes
5	1	Yes
6	2, 4	Yes
7	2	Yes
8	4	Yes
9	1	Yes
10	3	Yes

Grade descriptors

Learning Outcome	Pass	Merit	Distinction
Understand the function of computer systems	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Be able to design computer systems	Provide adequate design to address the specification	Provide detailed and appropriate design to address the specification	Provide wholly appropriate and innovative design that meets the specification
Be able to build and configure computer systems	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Be able to undertake routine maintenance on computer systems	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard