6.1 Hardware and software part 2 Mark Scheme

Mark schemes

Q1.

(a) Medium: Magnetic hard disk
A Hard Disk (1)
Justification: Random access device;
Sufficiently high data transfer rate;
Sufficiently high storage capacity;
R Magnetic disk is fast enough (1)

2

(b) (i) Processing is faster; **A** System runs faster
Loading on main processor can be reduced;
CODEC has its own processor;
R Faster on its own;
A Faster with justification

1

(ii) Movie needs to be compressed to fit storage capacity of DVD-R;

1

(c) Backing up (data stored on magnetic disk drive);
Archiving (data);
R Storing video once editing complete

1

[5]

Q2.

(a) (i) Electrical/electronic/physical components/parts of computer;
I any example **I** ' … can touch … '

1

(ii) Programs/sequences of instructions (which run on the hardware);
A code;
R application

1

(b) Software;

1

(c) Hardware;
A correct term circled;
R abbreviations

1

[4]

Q3.

(a) OS hides complexities of hardware from the user;

1

(b) Any three @ 1 each
Processor(s)/cpu(s);
Memory/IAS/Main memory;
Disk (space)/backing store; **A** Hard disk/drive //Floppy disk (drive)//

Secondary storage
I/O devices//peripherals; **R** examples
File space;
A files
R data
R programs

Max 3

[4]

Q4.

NO PRODUCT NAMES

(a) (i) Physical/electrical/electronic components/parts/devices/circuits (of the computer);
R things you can touch **R** actual components **R** examples (questions asks for meaning of)
R physical machinery connected to computer *(t.o.)*

Max 1

(ii) Programs (which run on the computer/hardware); sequences of instructions /codes;

Max 1

(b) (i) **R** what runs on computer
layer of software which enables users to operate computer; interface between user and computer software which allows user to communicate with / manage hardware; software to run applications/hardware/programs/computer/packages; software to make computer/hardware work / used to maintain hardware;
A operating system;
R platform
R software used to run the system / it

Max 1

(ii) Operating system *(if not given in (i));*utility programs / library programs / compilers/ assembler / interpreter / file manager / bootstrap loader / hardware driver / BIOS / spooler / communication software / device manager / memory management / GUI / screen saver; **R** kernel *or an example of a utility program;* eg defragmenter; compression software; text editor; virus checker;
NO PRODUCT NAMES: **R** winzip / notepad etc

Max 1

(iii) Application Software; bespoke software;
A generic software;
R generic system **R** dedicated package **R** utility program
R general purpose software
R off the shelf software **R** any type of system software word processor / spreadsheet / DTP / Game /image processing software;
A browser *any suitable bespoke example e.g. payroll;*
R integrated package

No link between (iii) and (iv) i.e. no follow through

[6]

Q5.

(a) System software / program which controls the computer hardware;
Manages computer (system) / hardware;
Interface between user and computer;
Runs programs; handles input/output;

Max 1

(b) (i) Executes instructions/programs/code; **R** data
Performs calculations/instructions
R controls…
R processes…

1

(ii) Stores/holds program /instructions / data;
R permanently
R files

1

(c) **Data bus**; (1)
carries the data/instructions to/from component; **R** holds Address bus; (1)
carries identification/address about where the data is being sent to /fetched from; **R** holds (1)
Control bus; (1)
to send control signals; whether process is read or write; (1)
carries timing signal;
R holds
R controls flow of data

1 mark for name 1 mark for example × 3

6

[9]

Q6.

(a) (i) Layer of software which enables users to operate computer; software to make hardware work; operating system;

Max 1

(ii) Program written to perform end user task; problem-oriented program to enable user to do specific task; program produced by end use;

Max 1

(b) (i) Operating system / utility programs / library programs / compilers / assembler / interpreter;

1

(ii) Word processor / DTP / Spreadsheet / Database / stock control / payroll / web browser / or other suitable

1

[4]

Q7.

(a) A server provides services required by client computer/workstation/ terminal/client application (**NOT** USER, **NOT** CLIENT on its own); such as printing, file/data storage, file server, communications-e-mail server, Web access server, Internet server, ISP, database, controlling logging in; (any one example providing services required by.)

2

(b) *Any 4 points × 1*
No marks for a point which references just data when it should reference a program.
Backing store is **NOT** acceptable as a substitute for disk (must be a direct access device)
Accept partitions as a substitute for pages (but **NOT** portions)

A memory management technique;
Transparent to the user/programmer which permits;
The execution of a process/processes where the total virtual address space exceeds the physical MAIN memory capacity;
Execution of a program which is not entirely in main memory/less than the full virtual address space of a process resident in physical memory/ execution of partially loaded processes/lets user think there is more main memory/RAM;

Disk is used as RAM;
Physical memory is conceptually divided into a number of fixed size pages/segments;
The virtual address space of a program/process is divided into a number of fixed size pages;
Page table indicates which pages of a process are loaded and where;
The program and data reside on disk and are swapped into memory and out of memory as required.(DISK THRASHING);

NB Allow an answer which uses segmentation. No marks for answers describing overlay techniques
NOT computer fooled into thinking more main memory

Max 4

[6]

Q8.

(a) Software which carries out tasks which aid the functioning of the computer, as opposed to user tasks or applications

1

(b) *Any two suitable examples, e.g.*

Operating System (accept Windows or Unix, but not both)
File manager
ScanDisk or other disk manager
Defragmenter
Formatter
Disk copier
Backup / Restore utility
Virus checker
Peripheral driver

NOT compiler etc (language systems are not system s/w)
Etc – examples must be distinct
NOT utilities (too vague)

1 mark each × 2

2

[3]

Examiner reports

Q1.

Candidates performed well on most of this question. Part (b)(i) was less well answered across the candidature. If the CODEC has its own hardware then the loading on the main processor can be reduced. Consequently, compression and decompression of videos will be faster.

Q2.

A version of this question has appeared before and most candidates obtained the 4 marks on offer. At this level, answers such as 'Hardware is parts that you can touch', 'Software is parts that you can't touch' are not acceptable. Candidates should also be aware that answers for 'Hardware' which implies that it is synonymous with 'Peripherals' will not gain credit. The difference between a set of instructions and a sequence of instructions should also be noted, with only the latter being a description of a program.

Q3.

Many candidates were able to give meaning to the phrase "to provide a virtual machine". The examiners were expecting candidates to identify this role as hiding the complexities of hardware from the user.

Most candidates were able to name at least one type of resource managed by the operating system and many named three, correctly.

Q4.

This was well answered by most candidates.

(a) There is still a widely held view that 'hardware' means 'peripherals'. A correct definition is 'physical components of the computer'. A list of examples of hardware was not sufficient.

(b) (i) 'System software is software that runs the system' may be a correct statement but it did not gain credit since it merely repeated the question. 'Layer of software which enables users to operate the hardware' was a creditworthy response.

(ii) 'Operating system' was the commonest correct answer though often candidates lost the mark by giving a proprietary brand, e.g. Windows ME.

(iii)(iv) Most candidates could name Application Software as another software classification and gave a suitable example such as a word processor.

Q5.

(a) The idea that an operating system was an interface or that it controlled the computer was well known.

(b) The functions of a processor and main memory were often answered in too general terms. Too many candidates thought the processor was in overall control or giving timing signals. At this basic component level, candidates need to appreciate that the processor executes instructions, such as logical or arithmetic operations on data

(not information). Main memory is volatile and stores the instructions and data of the programs currently running. Many candidates confused main memory with backing store and implied that data and software are stored there permanently.

(c) Most candidates correctly named the address, data and control buses. Far fewer could express clearly enough their use. Many answers attributed too much intelligence to a bus. “The address bus decides where the data should go” is not an appropriate answer. Many candidates imagined the bus to be moving carrying data and the control bus acting as a control rather like a set of traffic lights to stop other buses colliding. Good answers could explain that the address bus carries the address of where the data is being sent to or fetched from; that the data bus transfers the data between main memory and the processor; and that the control bus transfers control signals such as whether the memory access is read or write and the timing signal.

Q6.

Most candidates have a good understanding of the differences between system software and applications and the functions of both. Some candidates found it very difficult to express themselves clearly enough and comments such as “system software is software which helps run the system” is rather too vague, as is “Application software is software designed for a purpose”. All software is designed for a purpose. System software is software which enables users to operate the hardware. Application software enables the user to do a specific task. Most candidates gave examples by quoting names such as ‘Microsoft Word’ rather than the generic term ‘word processor’. Although this was accepted in this first examination, centres are reminded that proprietary names are not usually accepted.

Q7.

(a) Many candidates experienced difficulty in explaining the meaning of the phrase *client-server operation.* Some responses were far removed from the correct context. For example, “client server operation is when a client rings up a mailing order company and is served over the phone” gained no credit. Very few candidates were able to state that a server provides services required by client computers or a client application although many were able to gain credit by quoting an example of client-server operation such as a file server.

(b) The operation of *virtual memory* was fairly well explained by many candidates. Some candidates failed to gain credit because their answers lacked precision. In particular, many candidates referenced memory rather than main memory and therefore did not distinguish between secondary and primary memory. Other candidates focussed on data only and ignored the fact that it is a memory management technique applied to programs.

Q8.

Definitions of system software were very sketchy and frequently wrong - it refers to far more than the operating system. “Software that runs the system” is tautologous and got no credit. The best answers suggested a bridge between applications or useful tasks and the computer hardware, although strictly the term embraces housekeeping routines as well. Many candidates could not think of examples other than naming two different operating systems, although good candidates came up with an amazing variety of device drivers, defragmenters, backups, file managers, formatters, and so on. Encouragingly, Windows is no longer the only operating system in the known universe - OS/2, RiscOS and several flavours of Unix (such as Solaris and Linux) all put in an appearance, although no mainframe systems were mentioned.