SECTION A

1. (a) Give *[1 mark]* for each of the following answers:

    1   user documentation;
    2   system documentation.

    (b) Give *[1 mark]* for a valid answer (up to *[2 marks]*):

    User documentation

    Examples include:
    –   description of the overall purpose of the system;
    –   instructions on how to perform specific tasks when running various programs;
    –   trouble shooting hints that explain what needs to be done when problems arise;
    –   hardware requirements for program(s) use;
    –   identifies the files required;
    –   describes how the input data is to be entered;
    –   how to execute the program(s);

    Give *[1 mark]* for a valid answer (up to *[2 marks]*):

    System documentation

    Examples include:
    –   describes type of storage media (and possible methods of access);
    –   file security measures;
    –   data flow diagrams/structure diagrams/designs that illustrate the overall system;
    –   program listings with good internal documentation (comments, identifier names, indentation *etc.*);
    –   a list of files and record structures and the database design.

2. *[2 marks]* for each complete/clear answer; *[1 mark]* for a partial answer:

    syntax means the rules of the structure (creation) of a programming language
    (the rules of the format of the source code)

    semantics means the interpretation or meaning of the statements in a programming language.

3. Give *[1 mark]* for any valid software utility, up to *[3 marks]*:

    Examples include:
    –   data compressor;
    –   virus checker;
    –   file manager;
    –   defragmentation software.

4.   An example solution is:
Software production is normally cyclical because the software will be used for several years and will probably require some modification as time passes. For example, in programs developed for complex projects, there will usually be obscure bugs that do not become apparent until after the program has been in use. Also, other modifications may be required due to changes in the computer hardware and system software, or the program can be modified in order to improve its performance, add new features, and so on.

OR

In the months and years after a new system has been implemented, the system is reviewed on a regular basis to determine whether it is meeting the needs of its users. As a result of these reviews, old programs are modified, new programs are written and additional hardware may be added as the system evolves. Eventually the system will reach a point where further changes will do little to enhance its performance. Therefore the system analysis stage for a new system begins.

Award *[1 mark]* for idea of review/error finding/reason for modification. Award *[2 marks]* for a clear answer, *[1 mark]* for an incomplete or vague response. Total *[3 marks]*.

5.   *[2 marks]* for a complete/clear answer; *[1 mark]* for a partial/vague answer.

Example:
A bus is a pathway through which the processor communicates with other parts of the system *[1 mark]*. Data, (or addresses or control signals) can be transmitted *[1 mark]*.

6.   Give *[1 mark]* for each valid task, up to *[3 marks]*:

Examples include:
–   translates high level language to machine code;
–   generates error message;
–   accesses built-in routines provide by the high level language used;
–   creates a separate machine language program;
–   performs lexical analysis;
–   performs syntactical analysis.

7.   Give *[1 mark]* for each of the answers below:

(a)   a scanner;

(b)   optical character recognition (OCR) system.

8. Give *[1 mark]* for a valid point:

Examples include:
- the staff must be trained to use the new hardware (and software);
- some staff may no longer be needed (as the computer filing system lessens the amount of manual work to be done);
- The way in which they do their work may change. (People used to frequently moving about in the office may now spend long periods sitting in front of a computer.)

9. Give *[2 marks]* for a complete/clear answer (*i.e.* one that indicates the idea of rules must be the same to send and receive data).

Example answer:
Protocols are rules for communication over a network. Since devices transmit data using various methods and speeds, any two devices that wish to exchange data must be operating under the same protocols.

10. Give *[4 marks]* for identifying and comparing both: *[2 marks]* for identifying both without comparing.

Example:
When using sequential access, records are accessed in the order in which they are stored. If a program is searching for the 50th record in a file, it must read the first 49 records in order to reach it (the 50th), whereas when using direct access, each record in the file can be accessed by referring to its address (location) within the file. The 50th record in a file can be found immediately without accessing any other records in the file.

SECTION B

11. (a) Award a maximum of *[4 marks]* for part (a).
An answer along the lines of:
Coaxial cable is the most suitable since it is for local data transmission with a physical link. Microwave transmission and telephone lines/modems are for long distance links, not within an office/building.
Fibre optic cable is also local (and faster than coaxial) but is more expensive at present and not needed for 10 PCs.
Similarly, fibre optic cable could be justified because it is faster, or can handle more traffic, or is better if network is going to get larger than coaxial cable.

[In general, give: *[1 mark]* for coaxial or fibre optic **only** if one valid reason is given.
[1 mark] **each** for a valid point against microwave, telephone/modem and 'other' local link in comparison. (Note, same reason might be given for microwave **and** telephone/modem together as in example above – give *[2 marks]* for this.) Make sure the 'other' local link is given a disadvantageous comparison as question asks for; maximum *[4 marks]*. If "**either** coaxial or fibre optic" is stated, *[3 marks]* is the maximum (*i.e.* cannot get final comparison mark).]

(b) Give a maximum of *[2 marks]* for a good answer and *[1 mark]* for a partial answer with some credit.
Examples:
– Data needs to be converted between computer's internal format to/from network format (protocol) (when sending/receiving data). This is done by the software;
– Data conversion including speed matching with possible buffering and bit pattern formatting are done by the software;
– The software can have the client's address embedded within it which is required to identify data sent for that computer;
– To accept user-ID (and password) and send to server to log on;
– *etc.*

(c) For **each** of the two answers, give *[1 mark]* **only** if the answer refers to recovery from error (*i.e.* retransmission, error-correcting code, *etc.*) rather than prevention.
Give *[2 marks]* for each clear description and *[1 mark]* for a partial description.
Examples include:
– system should be able to detect errors;
– when an error is detected, error conversion method is to be used or data should be retransmitted *[2 marks]*;
– data should be protected from unauthorised use (only users who have specified IDs can access certain data) *[2 marks]*.

12. (a) Award up to *[2 marks]* for a full description of each disadvantage; up to *[4 marks]* max. Award only *[1 mark]* (each) if the disadvantage is only stated or if an incomplete/vague answer is given.
Examples:
– capital expenditure of a large computer system is enormous;
– more staff will have to be employed/trained to use the computer, which is time consuming/costly;
– the computer may be down when information is needed quickly;
– regular activities may be suspended/disrupted while the change is being made.

[Reward other suitable responses.]

(b) Award up to *[2 marks]* for a full explanation of each advantage; up to *[4 marks]* max. Award only *[1 mark]* (each) if the advantage is only stated or if an incomplete/vague answer is given.
Examples:
– common features of crimes can be quickly cross-referenced to find similarities, much faster than using manual system;
– computer can search database of crime details and past convictions to draw up a suspect list, much faster than a manual system;
– the separate agencies can pool (and cross-reference) information, *i.e.* share database(s) and this cannot be done manually;

[Reward other suitable responses.]

(c) Award *[1 mark]* for a suitable point and the second mark for it being due to computer usage.
Examples:
– There might be a fear that civil liberties could be infringed in that computer may store **any** data about people, not just actual crimes, but suspicions, membership of organisations, *etc.* Most countries have laws to protect against this, but the public may still have grave doubts;
– With so much information stored, there is more of a possibility of it being misused, *e.g.* hacking, corrupt police officers *etc.*;
– (Maybe) with more staff using computers in buildings, there will be less police officers on the street leading to lack of public confidence.

13. (a) Award *[1 mark]* for the answer below; up to *[1 mark]* max.

mina

(b) Award *[1 mark]* for the answer below; up to *[1 mark]* max.

5

(c) Award *[1 mark]* for the answer below; up to *[1 mark]* max.

nat

(d) Award *[1 mark]* for the answer below; up to *[1 mark]* max.

Examat

(e) Award *[2 marks]* for a full explanation; *[1 mark]* for a partial explanation; up to *[2 marks]* max.

There must be a method of indicating the end of required string, *e.g.* a sentinel value (do not accept 'space'). Length will count the number of characters up to it, or return the array size if no sentinel is found.

(f) Award *[2 marks]* for a full explanation; *[1 mark]* for a partial explanation; up to *[2 marks]* max.

it is easier for a programer to consider one variable than individual elements of array/many variables.
it is easier to deal with a string as a single unit than as a group of individual characters.
a string is a logical structure for any program that requires the use of words, names, *etc.*

(g) Award *[2 marks]* for a full explanation; *[1 mark]* for a partial explanation; up to *[2 marks]* max.

Examples include:
-   there are only 11 characters in TITLE and this statement says to begin with the 13th character, which cannot be located;
-   the 13th character is beyond the 'end' of the string and greater than length which is 11.

14. **(a)** Award marks as indicated below; up to *[5 marks]* max.
COUNT column correct *[1 mark]*
TEMP column correct *[1 mark]*
TOTAL column correct *[1 mark]*
TEMP ≠ 0 column correct *[1 mark]*
AVERAGE column correct *[1 mark]*

Line	COUNT	TOTAL	TEMP	TEMP ≠ 0	AVERAGE
1	**0**	–	–		–
2		**0**			–
3			**15**		–
4				**true**	–
5		**15**			–
6	**1**				–
7			**7**		–
4				**true**	–
5		**22**			–
6	**2**				–
7			**23**		–
4				**true**	–
5		**45**			–
6	**3**				–
7			**9**		–
4				**true**	–
5		**54**			–
6	**4**				–
7			**0**		–
4				**false**	–
9					**13.5**

Question 14 continued

(b) Award *[1 mark]* for a suitable value and *[1 mark]* for the reason; up to *[2 marks]* max.
Example: – 500   (or suitability large negative value) <u>or</u>
                  400   (or suitability large positive value)
Explanation: because this could not be a possible reading and so would not cause problems caused by a premature ending of loop.

(c) Award *[1 mark]* for the error and *[2 marks]* for when it occurs (*[1 mark]* for recognising zero; *[1 mark]* for first value); up to *[3 marks]* max.
run time error (or division by 0);
If the first value entered was 0 (zero) / or the sentinel.