1 **(a)** Describe **one** difference between read only memory (ROM) and random access memory (RAM) in a computer. [2]

(b) **(i)** State **one** use of RAM in the memory of a computer, explaining why RAM is appropriate. [2]

(ii) State **one** use of ROM in the memory of a computer, explaining why ROM is appropriate. [2]

(c) A user needs to use a word processor and a spreadsheet package simultaneously. Each piece of software is larger than the size of the computer memory available.

Explain how paging and virtual memory can be used to allow the system to operate both pieces of software. [6]

2 **(a)** Describe the difference between an imperative language and a declarative language. [2]

(b) Explain what is meant by an object-oriented design. [3]

(c) The following algorithm is meant to output any number which has a square of 9 or more. The algorithm is designed to process 3 values and then stop.

```
COUNT=0
WHILE COUNT<=3 DO
        COUNT=COUNT+1
        INPUT NUMBER
        X=SQUARE(NUMBER)
        IF X>9 THEN OUTPUT X
        END IF
END WHILE
END
```

State **three** errors in the algorithm which will stop it working and, for each error, suggest a suitable correction to the code. [6]

(d) The algorithm represents a procedure.

(i) Explain what is meant by a procedure. [2]

(ii) SQUARE(NUMBER) is a call to a function SQUARE.
Explain why a function is different to a procedure. [1]

(iii) State the parameter which is being passed to the function SQUARE.
State how this parameter should be passed, justifying your answer. [3]

3 A national weather service uses a computer system to help in the production of a daily forecast for the television news.

(a) A number of automatic data collection centres exist around the country.

Explain how data logging is used in the capture of data and its communication to the national service centre. [4]

(b) **(i)** Describe how a computer which uses parallel processing differs from one which uses serial processing. [2]

(ii) Explain why the national weather service would decide to use parallel processing in its computer system. [2]

(c) Describe **three** different output formats that would be provided by the system for different uses. [6]

4 Computers are used extensively in shops.

(a) Explain how a "just-in-time" stock control system works in a supermarket. [5]

(b) Discuss the use of smart cards in supermarkets and how the management of the supermarket can use the information collected. [5]

5 **(a)** Explain **two** differences between using a compiler and an interpreter to translate a program written in high level language. [4]

(b) A programmer is producing a new computer game.

(i) State when the programmer will use an interpreter, giving a reason why it is appropriate. [2]

(ii) State when the programmer will use a compiler, giving a reason why it is appropriate. [2]

(c) During compilation, any algebraic expressions which are in infix form are changed to reverse Polish notation.

Change the following infix expressions to their reverse Polish form.

(i) A=B+C [1]

(ii) A=2B [1]

(iii) A=2(B+C)-3D [2]

6 **(a)** When a new piece of software is produced, it will normally be accompanied by a technical guide and a user guide.

(i) State **two** items, other than program code, which would be found in a technical guide. For each item, give a reason why it is necessary. [4]

(ii) One item, found in many user guides, is a set of instructions for producing a backup file. Describe what is meant by a backup file and suggest a typical procedure for producing one. [4]

(b) The final stage of the systems life cycle is the maintenance stage.
State **two** types of maintenance in a system and say why they are necessary. [4]

7 The manager of a company decides to computerise the systems in the office.

(a) Explain why the workers in the office may be worried about the changes that will happen when the new system is introduced. [4]

(b) The office workers will need to be trained in the use of the new system.
Explain why the management decide to use computerised training packages to train the office workers rather than running training courses for them. [5]

8 A decorator needs to give estimates for the price of decorating rooms in people's houses.
When calculating an estimate, the decorator uses the following rules for each room.

- The length of the room and the breadth of the room are added together and the answer is multiplied by 4. (Note: length and breadth are measured in metres.)
- The number of doors and windows in the room is subtracted from the answer.
- The final result is then multiplied by the cost of the material to be used. (Emulsion paint costs 2 dollars per square metre, Gloss paint costs 3 dollars per square metre and Wallpaper costs 5 dollars per square metre.)

(a) In order to receive an estimate for the cost of decorating one room, it is necessary to input four pieces of data

- the length of the room
- the breadth of the room
- a single total of the number of doors and windows in the room
- the finish required (G for gloss paint, E for emulsion, W for wallpaper).

Write an algorithm in pseudocode which will accept the four inputs and output the COST for a single room. [6]

(b) One other input is required: the number of rooms to be decorated.
When all the rooms have been calculated, a discount of 10% is given on the full price if more than 3 rooms are to be decorated.

Write an algorithm in pseudocode which will accept the number of rooms as an input and output the total price for decorating.
(Note: It is not necessary to reproduce the pseudocode from part (a), simply refer to the function ROOM when necessary). [8]