QUESTION 1.

4 Four statement types and four examples are shown below.

Draw a line to connect each statement type to the correct example.

Statement type	Example
Assignment	`FOR X ← 1 TO 10`
Iteration	`READ X`
Input	`PRINT X`
Output	`X ← Y + Z`

[3]

5 A programmer writes a program to store a patient's temperature every hour for a day.

State the data structure that would be most suitable to use and give the reason for your choice.

Data structure .....

Reason.....

.....[2]

6 Identify **two** different selection statements that you can use when writing pseudocode.

1 .....

.....

2 .....

.....[2]

Question 7 begins on page 10.

QUESTION 2.

5 **(a)** Describe the purpose of each statement in this algorithm.

```
FOR I ← 1 TO 300
  INPUT Name[I]
NEXT I
```

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.....[2]

(b) Identify, using pseudocode, another loop structure that the algorithm in **part (a)** could have used.

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.....[1]

(c) Write an algorithm, using pseudocode, to input a number between 0 and 100 inclusive. The algorithm should prompt for the input and output an error message if the number is outside this range.

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.....[3]

QUESTION 3.

4 The pseudocode algorithm shown should allow numbers to be entered a... 50 numbers to be stored in an array.

```
Count ← 0
REPEAT
  INPUT Values[Count]
  Count ← Count + 1
UNTIL Count = 0
```

(a) Explain why the algorithm will never end.

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..... [2]

(b) Re-write the original pseudocode so that it terminates correctly **and** also prevents numbers below 100 from being stored in the array `Values[ ]`

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..... [4]

(c) Describe how you could change your pseudocode in **part (b)** so that it prevents numbers below 100 and above 200 from being stored in the array `Values[ ]`

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..... [2]

QUESTION 4.

3 **(a)** An algorithm has been written in pseudocode to input the names and mark
The algorithm stores the names and marks in two arrays `Name[]` and `Mark[]`
mark awarded is found and the number of students with that mark is counted. Bo
values are output.

```
01  HighestMark ← 100
02  HighestMarkStudents ← 0
03  FOR Count ← 1 TO 35
04      OUTPUT "Please enter student name"
05      INPUT Name[Count]
06      OUTPUT "Please enter student mark"
07      INPUT Mark[Counter]
08      IF Mark[Count] = HighestMark
09        THEN
10          HighestMarkStudents ← HighestMarkStudents - 1
11      ENDIF
12      IF Mark[Count] > HighestMark
13        THEN
14          Mark[Count] ← HighestMark
15          HighestMarkStudents ← 1
16      ENDIF
17  NEXT Count
18  OUTPUT "There are ", HighestMarkStudents," with the highest mark of ",
      HighestMark
```

Give line numbers where the **four** errors are to be found in the pseudocode. Suggest a correction for each error.

Error 1 line number .....

Correction .....

.....

Error 2 line number .....

Correction .....

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Error 3 line number .....

Correction .....

.....

Error 4 line number .....

Correction .....

.....

[4]

(b) Explain how you could extend the algorithm to also find the lowest mark aw
number of students with that mark, and output both these values.

[6]

QUESTION 5.

4 A code must take the form LL9 9LL where L is a letter and 9 is a digit.

(a) A presence check has already been used to ensure data has been entered. Name two types of validation check that can be used to test the code is valid.

Check 1 .....

Check 2 .....

[2]

(b) Give **one** example of invalid test data for each of the validation checks you have named in **part (a)** and in each case, give a reason why it fails the check. Each example of test data must be different.

Check 1 Invalid Test Data .....

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Reason .....

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Check 2 Invalid Test Data .....

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Reason .....

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.....

.....

[4]

QUESTION 6.

5 `REPEAT ... UNTIL` and `WHILE ... DO ... ENDWHILE` are t
structures you can use when writing pseudocode.

Explain, using examples, why you would choose to use each type of loop.

Example 1 .....

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Reason for choice .....

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Example 2 .....

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Reason for choice .....

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.....[6]

QUESTION 7.

4 `IF ... THEN ... ELSE ... ENDIF` and `CASE ... OF ... OTHERWISE` are two different conditional statements that you can use when writing pseudocode.

Explain, using examples, why you would choose to use each conditional statement.

Example 1 .....

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Reason for choice .....

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Example 2 .....

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Reason for choice .....

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..... [6]

Question 5 begins on page 10.

QUESTION 8.

3 **(a)** Explain the difference between a validation check and a verification check.

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.....[2]

(b) Describe, using an example, how data could be verified on data entry.

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.....[2]

(c) Explain what is meant by the term library routine.

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.....[2]

4 **(a)** **Four** pseudocode descriptions and **five** pseudocode statements are shown. Draw one line to link each pseudocode description to the correct pseudocode statement. Not all pseudocode statements will be used.

Pseudocode description	Pseudocode statement
A loop that will iterate at least once.	FOR...TO...NEXT
A conditional statement to deal with many possible outcomes.	IF...THEN...ELSE...ENDIF
A loop that will iterate a set number of times.	WHILE...DO...ENDWHILE
A conditional statement with different outcomes for true and false.	CASE...OF...OTHERWISE...ENDCASE
	REPEAT...UNTIL

[4]

(b) Write an algorithm in pseudocode, using a single loop, to print 50 names stored in an array.

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.....[3]

QUESTION 9.

3 The following diagram shows **four** data structures and **four** descriptions.

Draw a line to connect each data structure to the correct description.

Data structure	Description
Constant	A collection of related data
Array	A value that can change whilst a program is running
Table	A value that never changes whilst a program is running
Variable	A series of elements of the same data type

[3]

4 `IF … THEN … ELSE … ENDIF` is one type of conditional statement used when writing pseudocode.

Identify and describe **another** type of conditional statement that you could use when writing pseudocode. Give a reason why you would use this type of conditional statement.

Conditional statement .....

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Description .....

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Reason .....

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[4]

Section B

2 For each of the **four** descriptions in the table, place a tick in the correct column to show describes a **Structure diagram**, a **Flowchart** or **Library routines**.

Description	Structure diagram	Flowchart	Library routines
A modelling tool used to show the hierarchy of a system.			
A collection of standard programs available for immediate use.			
A graphical representation used to represent an algorithm.			
A graphical representation to show how a system is broken into sub-systems.			

[4]

3 Examine the following pseudocode:

```
INPUT A
INPUT B
INPUT C
INPUT D
INPUT E
INPUT F
INPUT G
INPUT H
INPUT I
INPUT J
INPUT K
INPUT L
T ← A + B + C + D + E + F + G + H + I + J + K + L
OUTPUT "The average equals ", T/12
```

(a) Describe what happens in this pseudocode.

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.....[3]

(b) Describe how this pseudocode could be altered to allow any number of valu

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(c) Re-write the given pseudocode to allow any number of values to be input.

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.....[5]

4 **Four** validation checks and **four** descriptions are shown.

Draw a line to connect each validation check to the correct description.

Validation Check	Description
Range check	Checks that some data is entered.
Presence check	Checks for a maximum number of characters in the data entered.
Length check	Checks that the characters entered are all numbers.
Type check	Checks that the value entered is between an upper value and a lower value.

[3]

5 A programmer writes a program to weigh baskets of fruit in grams, keeping a total of the weight and counting the number of baskets. The total weight is stored in a variable `Total` and the number of baskets is stored in a variable `BasketCount`.

Explain, including examples of programming statements, how totalling and counting could be used in this program.

Totalling .....

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Counting .....

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[4]

4 The following pseudocode algorithm uses nested IF statements.

```
IF Response = 1
  THEN
    X ← X + Y
  ELSE
    IF Response = 2
      THEN
        X ← X - Y
      ELSE
        IF Response = 3
          THEN
            X ← X * Y
          ELSE
            IF Response = 4
              THEN
                X ← X / Y
              ELSE
                OUTPUT "No response"
            ENDIF
        ENDIF
    ENDIF
ENDIF
```

(a) Name the type of statement demonstrated by the use of `IF … THEN … ELSE … ENDIF`

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..... [1]

(b) Re-write the pseudocode algorithm using a `CASE` statement.

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..... [4]