Practice Worksheet Chapter 11

Q.1

(a) A program stores data about hospital patients.

Give a suitable **identifier name** for each of the data items.

Description of data item	Suitable identifier name
The temperature of the patient	
The temperature of the room	
The patient identification number	
The name of the nurse taking the measurement	

[4]

(ii) Programming languages support different data types.

Give an appropriate data type for each of these variables from **part (b)(i)**.

Variable	Data type
MyGreeting	
MyInitial	
AgeInYears	
Weight	
Married	

[5]

Q.2

2   The following is a function design in pseudocode.

Line numbers are given for reference only.

```
01   FUNCTION StringClean(InString : STRING) RETURNS STRING
02
03      DECLARE NextChar : CHAR
04      DECLARE OutString : STRING
05      DECLARE Counter : INTEGER
06      DECLARE MyString : STRING
07
08      OutString ← ""
09
10      FOR Counter ← 1 TO LENGTH(InString)
11
12          NextChar ← MID(InString,Counter,1)
13          NextChar ← LCASE(NextChar)
14
15          IF (NextChar >= 'a') AND (NextChar <= 'z')
16
17              THEN
18
19                  OutString ← OutString & NextChar
20
21          ENDIF
22
23      ENDFOR
24
25      RETURN OutString
26
27   ENDFUNCTION
```

(a) (i)   This pseudocode includes features that make it easier to read and understand.

State **four** such features.

Feature 1 ....

Feature 2 ....

Feature 3 ....

Feature 4 ....
                                                                                                    [4]

(ii)   State **one** feature that could be added to make the pseudocode easier to understand.

....[1]

(b) Study the function `StringClean()`. Identify the features of the function in the following table.

Feature	Answer
A line number containing an example of an assignment statement	
A line number containing the start of a repetition block	
A line number containing the end of a repetition block	
A line number containing the start of a selection statement	
The number of parameters of the MID function	
The Boolean operator used	
The number of local variables	
The number of function calls from within `StringClean()` resulting from the call: `NewString ← StringClean("Me")`	
The number of a line containing an unnecessary statement	

[9]

Q.3 Part of the processing of the data is to calculate the amount of tax which needs to be paid.

• The person's total income for the year is input to the system
• The first $500 is not taxed
• The remainder is taxed at 10%
• Either the tax to be paid is output from the system OR a message is output to say there is no tax to pay

(a) Using I to stand for the total income and T to stand for the tax to be paid, produce an algorithm which will take I as its input and then calculate the tax.

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(b) Explain why I and T are unsuitable as variable names and say how they can be improved.

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(c) Describe how the algorithm can be used to calculate the tax for each person in the city without it having to be rerun.

_____

_____

_____

Q.4

(a) Simple algorithms usually consist of three different stages.

Complete the following table.
Add a description of the stage and an example pseudocode statement.

The first stage has been given.

Stage	Description and example
Input	Description: .... Pseudocode example: ....
....	Description: .... Pseudocode example: ....
....	Description: .... Pseudocode example: ....

[7]

(b) (i) AND and OR are two operators that may be used when implementing an algorithm.
An example of their use is given in the following pseudocode statement:

```
MyFlag ← VarA OR VarB
```

State the data type of variable MyFlag.

....[1]

(ii) State the name given to the type of operators to which `AND` and `OR` belong.

....[1]

(iii) Evaluate the expressions given in the following table when the variable values are as follows:

```
FlagA ← TRUE
FlagB ← FALSE
FlagC ← TRUE
```

Expression	Evaluates to
FlagA AND (FlagB OR FlagC)	
FlagA AND (FlagB AND FlagC)	
(NOT FlagA) OR (NOT FlagC)	

[3]

(c) A common construct found in many algorithms is a loop.

Using **pseudocode**, write a pre-condition loop to output all of the even numbers between 99 and 201.

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....[4]