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(a) In one coding system, the character digits 0 to 9 are assigned the decimal number codes 48 to 57 and the letters A to Z the decimal number codes 65 to 90. Which keys produce the following codes?

(i) 0100 0001_____

(1)

(ii) 0011 1001_____

(1)

b) A number is entered at the keyboard as a sequence of character digits. This sequence is processed to convert the code representation into its decimal integer value using the following algorithm:

```

Number ← 0
While more character digits Do
  get next character digit
  and store its ASCII code in the variable Code
  Number ← Number * 10 + Code - 48
EndWhile

```

Complete the trace table for the sequence 7321.

Code	Number
-	0
55	7

(6)**(Total 9 marks)****6**

The contents of the arrays `Items` and `NewItems` are shown in **Figure 1**.

A pseudo-code representation of an algorithm is given in **Figure 2**.

Figure 1

Items			
[0]	[1]	[2]	[3]
12	25	12	53

NewItems			
[0]	[1]	[2]	[3]
0	0	0	0

Figure 2

```

ItemsCount ← 4
NewItems[0] ← Items[0]
NewItemsCount ← 1
FOR LoopA ← 1 TO ItemsCount - 1
    Done ← False
    For LoopB ← 0 TO NewItemsCount - 1
        IF Items[LoopA] = NewItems[LoopB] THEN
            Done ← True
        ENDIF
    ENDFOR
    IF Done = False THEN
        NewItems[NewItemsCount] ← Items[LoopA]
        NewItemsCount ← NewItemsCount + 1
    ENDIF
ENDFOR

```

- (a) Dry run the algorithm in **Figure 2** by completing the table. The first row has been completed for you. You may not need to use all of the rows provided in the table.

ItemsCount	NewItemsCount	LoopA	Done	LoopB	NewItems			
					[0]	[1]	[2]	[3]
4	1				12	0	0	0

(5)

- (b) Explain the purpose of the algorithm in **Figure 2**.

(1)

(Total 6 marks)