MAXIMUM MARK: 50
Section A

1. (a) (i) Many correct answers, they must be meaningful. This is an example only.
   StudentNames[1:30]

   (ii) Many correct answers, they must be meaningful. This is an example only.
   StudentMarksTest1[1:30]
   StudentMarksTest2[1:30]
   StudentMarksTest3[1:30] (1 mark)
   StudentTotalScore[1:30] (1 mark)

(b) (i) – outside loop zeroing total for loop (sum in example below)
– loop for all students
– input name and all test scores
– in loop adding a student’s total
– storing the total
– inside loop printing student’s name and total
– outside loop calculating class average
– printing class average

   sample algorithm:

   Sum ← 0
   FOR Count ← 1 TO 30
      INPUT Name
      StudentName[Count] ← Name
      INPUT Mark1, Mark2, Mark3
      StudentMarksTest1[Count] ← Mark1
      StudentMarksTest2[Count] ← Mark2
      StudentMarksTest3[Count] ← Mark3
      Total ← Mark1 + Mark2 + Mark3
      StudentTotalScore[Count] ← Total
      Sum ← Sum + Total
      PRINT StudentName[Count], StudentTotalScore[Count]
   NEXT Count
   ClassAverage = Sum/30
   PRINT ClassAverage

   (ii) any relevant comment with regards to efficient code (e.g. single loop)

(c) Many correct answers, these are examples only.
   1 mark per data set and reason

   Set 1: 20, 25, 30, 35
   Reason: valid data to check that data on the upper bound of each range check is accepted

   Set 2: 21, 26, 31, 36
   Reason: invalid data to check that data above the upper bound of each range check is rejected
(d) (i) Maximum 5 marks in total for question part
Maximum 3 marks for algorithm

Description (max 3)
– set variable called HighestScore to zero and variable called BestName to dummy value
– loop 30 times to check each student’s total score in turn
– check student’s score against HighestScore
– if student’s score > HighestScore then
– ... replace value in HighestScore by student’s score and store student’s name in BestName
– output BestName and HighestScore outside the loop

Sample algorithm (max 3):

HighestScore ← 0
BestName ← “xxxx”
FOR Count ← 1 TO 30
    IF StudentTotalScore[Count] > HighestScore
    THEN
        HighestScore ← StudentTotalScore[Count]
        BestName ← StudentName[Count]
    ENDIF
NEXT Count
PRINT BestName, HighestScore

If algorithm or program code only, then maximum 3 marks

(ii) comment on which student(s)’ name will be output
e.g. The first student with the highest score will be output
Section B

2 (a) 1 mark for value of c and message

51020: value of c: 5
message: PIN OK (1 mark)

5120: value of c: 4
message: error in PIN entered (1 mark) [2]

(b) length check [1]

3

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<th>OUTPUT</th>
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</table>

(1 mark) (1 mark) (1 mark) (1 mark) (1 mark) [6]

4 1 mark for each error identified + suggested correction

line 5: this should read \textbf{IF} x > h \textbf{THEN} h = x

line 7: \textit{PRINT} h should come \textit{after} the \textit{end} of \textit{the} \textit{repeat} \textit{loop}

line 8: this should read \textbf{UNTIL} c = 20 or \textbf{UNTIL} c >= 20 or \textbf{UNTIL} c > 19 [3]
5  
PENDOWN
LEFT 90
REPEAT 3  
FORWARD 30
RIGHT 90  
ENDREPEAT
FORWARD 10
LEFT 90  OR  PENUP
PENDOWN  
PENUP  OR  LEFT 90
FORWARD 10
PENDOWN
REPEAT 2  OR  REPEAT 3  
FORWARD 20
RIGHT 90
ENDREPEAT
FORWARD 20  OR  (LEFT/RIGHT 180)
(LEFT 90)

Alternative answer for last 2 marks:

FORWARD 20
RIGHT 90  
FORWARD 20
RIGHT 90
FORWARD 20

Give a mark for each correct group of statements [5]
6 (a) marking points:
the way to find and print the largest value a 1 mark
the way to find and print the largest value b 1 mark
the way to find and print the largest value c 1 mark

sample algorithm:
INPUT a, b, c
  IF a > b AND a > c THEN PRINT a (1 mark)
  ELSE IF b > c THEN PRINT b (1 mark)
  ELSE PRINT c (1 mark) [3]

(b) marking points:
loop construct 1 mark
check if number is an integer 1 mark
counting the number of integers input 1 mark
output count value (outside the loop) 1 mark

sample algorithm:
FOR x ← 1 TO 1000 (1 mark)
  INPUT Number
  Difference ← INT(number) – Number (1 mark)
  IF Difference = 0 THEN Total ← Total + 1 (1 mark)
NEXT x
PRINT total (1 mark)
(NOTE: alternative to lines 3 and 4:
IF INT(Number) = Number THEN Total ← Total + 1 (2 marks) ) [4]

(c) Description of any two sets of test data. Many correct answers, these are examples only.
1000 whole numbers to ensure that loop works properly
900 whole numbers and 100 numbers with decimal places to ensure that the routine distinguishes correctly [2]

7 (a) 7 [1]

(b) Hg, Cs [2]

(c) Element symbol [1]