

- 5 The program, as shown in Fig.2 below, is written in assembly code using the Little Man Computer instruction set. It is *supposed* to take in two numbers and output the higher.

```

      INP
      STA  NUMA
      INP
      STA  NUMB
      SUB  NUMA
      BRP  NOTA
      LDA  NUMB
      BRA  QUIT
NOTA  LDA  NUMA
QUIT  OUT
      HLT

NUMA  DAT
NUMB  DAT

```

Fig.2

- (a) State what type of translator program would be needed to convert the code above into machine code.

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[1]

- (b) The program does not work correctly. Describe what the program actually does, using the numbers 4 and 9 being entered as an example.

.....

[2]

- (c) Explain how you would correct the program so it outputs the higher of the two numbers entered.

.....

[2]

- (d) Programs can also be written in high level languages. In a high level language of your choice write a program that takes in two numbers and outputs the higher of them.

Chosen Language:

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[4]

- (e) Give **two** reasons why it would be preferable to write a program in a high level language rather than assembly code.

1.....

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2.....

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[2]

A processor executes this program following the Fetch-Decode-Execute cycle. To do this it needs to make use of registers.

One of the registers used is the Program Counter (PC). Ordinarily it would be incremented by one each cycle.

- (f) (i) Identify an instruction in the Little Man Computer program shown in Fig.2 that would cause the PC to change in a different way.

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[1]

- (ii) State which register the contents of the PC would be copied to in order for the processor to access the next instruction.

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[1]