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MARKSCHEME

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COMPUTER SCIENCE

Standard Level

Paper 1

12 pages

SECTION A

1.   187 *[1 mark]*

2.   *[1 mark]* for a suitable suggestion and *[1 mark]* for a reason.
      Anything on the following lines for suggestion
      • entering exam marks
      • multiple choice exam
      • selection from menu
      • questionnaire with multiple choice responses

      For example
      • fast data entry for large input
      • avoids transcription errors

3.   *[1 mark]* for any of the following. *[max 2 marks]*
      • server stores commonly used databases *etc.* that can be accessed from all machines
      • may hold software to be downloaded
      • holds usernames and passwords for logon
      • has permission rights for user.

      [1 mark] for any of the following. *[max 2 marks]*
      • client is a workstation that can access the server
      • user has to be verified by server when logging on at any client
      • temporary work stored on client whilst in use
      • some software installed on client to speed up processing

4.   *[1 mark]* for any of the following. *[max 2 marks]*
      • carries data, instructions and addresses
      • between CU, ALU and main memory
      • to fetch and execute instructions

      [1 mark] for any of the following. *[max 2 marks]* Overall *[max 3 marks]*
      • max processing speed needed
      • parallel carries all bits at the same time
      • serial would mean one bit at a time so too slow
      • immediate access needed

5.   *[max 2 marks]* for advantage and *[2 marks]* for disadvantage *[1 mark]* for valid point and *[1 mark]* for description or justification.

Advantages
- no need to go to the doctor for trivial illnesses which saves time and money
- can be quickly reassured that illness not important
- doctor does not waste time with trivial complaints
- early warning of symptoms that could lead to serious illness
- some people feel too shy to explain their symptoms to a person and feel more secure with a computer.

Disadvantages
- medical expertise not easily transferred to program
- patients may not realise all the symptoms
- many illnesses need personal reassurance
- not a good way to find out that you may have a serious illness
- mistakes in input could have serious consequences in either direction

6.   **Circular**
[1 mark] for any of the following. [max 2 marks]
- confines the list to a predefined area in store
- problems if queue becomes greater than given space
- only two pointers needed but each time item is added have to ensure front and end do not coincide
- and check for wrap around each time an item added or taken
- in the case of wrap around calculation of pointer takes time
- items do not have to be moved

Linear
[1 mark] for any of the following. [max 2 marks]
- if not moved up each time an item taken a lot of storage space is wasted
- very quick to add items as pointers quickly adjusted
- if list moved up when item taken then both pointers have to be adjusted and moving every item in a long list takes time

7.   Either verification or validation *[1 mark]*

verification *[1 mark] for each valid point up to [max 2 marks]*
- data entered twice
- by same or different person
- first copy checked against second
- any differences corrected

validation *[1 mark] for each valid point up to [max 2 marks]*
- each value entered checked against reasonable value
- by software
- unreasonable values rejected and retyped

8. (a) *[max 2 marks]* with *[1 mark]* *for each of the following points.*
- MHz Hz refers to frequency *[1 mark]*
- of fetch execute cycles *[1 mark]* per second
- in this case 750 mega *[1 mark]* or binary million *[1 mark]* cycles per second

(b) personal computer or workstation or portable *[1 mark]*

9. *[1 mark]* *for each valid point up to* *[max 2 marks]*
- development of
    1. modern operating system *[1 mark]*
    2. application software
    3. graphics interfaces
- need to hold a lot in RAM *[1 mark]*
- otherwise processing too slow *[1 mark]*

10. *[1 mark]* *for each valid point up to* *[max 2 marks]*
- system needs change over time *[1 mark]*
- some parts of the design will need updating *[1 mark]*
- or expanding *[1 mark]*
- hardware may no longer be capable of coping *[1 mark]*
- update system in light of how it has performed

[1 mark] *for each valid point up to* *[max 2 marks]*
- new sections of code may have to be written *[1 mark]*
- some may need amending in the light of changing circumstances *[1 mark]*
- for example new fields in records
- space for more records in a file

SECTION B

11.   (a)   3,5,4 *[1 mark] if two are correct, [2 marks] for all three [total 2 marks]*.

(b)   *Award [1 mark] for each of the following points [total 4 marks]:*
introduce a Boolean variable *e.g.* FOUND
set to false before starting
set to true when item found
loop until LEFT>RIGHT **or** FOUND=**false**

(c)   *Award [1 mark] for each correct line:*

LEFT	RIGHT	POS	**output**
1	6	3	
4	6	5	
4	5	4	
4	3	3	

[total 4 marks]

12. (a)   Optical Character Recognition. *[1 mark]*

(b)   *Award [1 mark] for each of the following. [max 3 marks]*
- optical reader senses amount of light in each of the 35 squares
- if shaded in square then 1 allocated to the memory map
- otherwise 0
- each letter has pattern of 1 and 0 in memory
- software compares the read pattern with those for each letter in alphabet
- until exact or near match found
- ASCII code for that letter stored

(c)   *[1 mark] for each of the following points. [max 2 marks]*
- different fonts would cover different squares
- for the same letter
- difficult to compare against the same standard

(d)   *[2 marks] for a valid difference or similarity [max 4 marks]*
- OCR uses light to distinguish the shape of the letter
- MICR uses magnetic attraction to do the same
- once the pattern is picked up by the input device the conversion is the same

13.   (a)   *[1 mark]* description of HTML and *[1 mark]* for use of editor
- HTML is (hyper text mark up language) is universally recognised code for screen display and insertion of images from text
- HTML editor allows the user to change the code and hence the visual display

(b)   Digital camera: *[1 mark]* *for advantage and* *[1 mark]* *for reason* *[max 4 marks]*
better quality:
- image better for screen display
- since already digitised
- whereas scanner has to digitise image from photograph

easier to use:
- simpler to insert diskette with JPEG file
- rather than spend time with scanner getting the balance correct
- and saving in appropriate format

(c)   *[2 marks]* *for description of web browser and* *[2 marks]* *for use of search engine.*

web browser:
- interprets the HTML code
- converts to screen image
- inserting objects as directed in code
- different browsers give separate defaults for unknown elements

search engine:
- takes key words entered by user *e.g.* holiday Spain
- searches for pages/sites that have these words as keywords or in title
- returns a list of sites found with addreses for viewing

14. (a)   There are many possible solutions. *Accept any reasonable.* *[1 mark]* for suitable method *[1 mark]* for way in which device read and *[1 mark]* for validating and opening barrier:
- bar code/magnetic strip on badge fitted to windscreen
- read by bar code scanner/ magnetic reader as car passes
- barrier opened if valid

(b)   *[1 mark]* for method of counting those with device *[1 mark]* for counting those who pay or *[2 marks]* for counting both in the same way.
- cars fitted with device simply have a count incremented each time a car passes
- for those who stop either the person who takes the money presses a button for each vehicule that passes
- or calculation made from money at end of day

alternatively
- sensor fitted at strategic part of road
- triggered when car passes
- converted to digital incrementation

(c)   *[1 mark]* *for correct understanding of integrity and* *[1 mark]* *for identifying a problem.*
- loss of data integrity would mean wrong values sent across WAN
- wrong figures could mean no reaction to critical situation
- or over reaction and cost when not required.

(d)   *[1 mark]* *for a suitable method* *[2 marks]* *for description*
- check sum digit incorporated into transmission
- after a set number of bits/bytes send the sum of preceding transmission
- check that sum of digits sent is the same as the sent sum

- odd or even parity check
- use one digit in transmission to maintain parity
- in case of even parity set to one or zero to ensure that an even number of bits for each byte is sent. In the case of odd the reverse