

**MARK SCHEME for the May 2009 question paper**  
**for the guidance of teachers**

**CAMBRIDGE INTERNATIONAL DIPLOMA IN COMPUTING**  
**5216      Computer Systems, Communications and Software,**  
**maximum mark 90**

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- 1 (a) (i) To allow the user to give the computer data/change data into computer understandable form
- (ii) To allow the computer to give information/communicate with the computer/to change information from computer into human understandable form
- (iii) To keep data while the computer is not using it  
(1 per dotty) [3]

- (b) -Black and white laser  
 -e.g. Use in office to produce letters  
 -Produces high quality/speedy so does not develop large queue on a LAN
- Colour laser  
 -e.g. To produce reports for a meeting  
 -High quality outputs/can produce large quantity quickly
- Dot Matrix  
 - e.g. Print receipts at checkout/tickets on railway  
 -Produces more than one copy at a time, one for customer + one for shop
- Inkjet  
 -e.g. Doing homework at home  
 -Relatively cheap and slowness does not matter
- Plotter  
 -e.g. Produce architect's plans  
 -Precision drawing tool
- Braille printer  
 -Producing documents/books for blind people  
 -Outputs physical/3D form of data  
 (3 per type, max 3 types, max 9) [9]

- 2 (a) (i) Name: Text/String/alpha/alphanumeric  
 Description: Text/String/alpha/alphanumeric  
 Cost: Currency/integer/real/float  
 Whether: Boolean  
 Number: Integer  
 (1 for first three, 1 for last 2) [2]

(ii) Field Sizes:

	10	–	50
	50	–	250
	4	–	8
	1		
	<u>1</u>	–	<u>4</u>
Total	66	–	313 bytes (1)

- (1) for showing that the field sizes should be added up  
 Multiply Total by 1000 (1) = 66000 to 313000 bytes  
 Add extra (10%) for overheads (1) = 72600 to 344300 bytes  
 Convert to sensible unit ( $\div 1024$ ) (1) = 70.9Kb to 344.3Kb.  
 (5 possible mark points, max 4) [4]

- (b) Advantage:**  
 -Processed/Searched more easily/quickly/Estimate of file size is easier  
 -e.g. When a customer wants to know the availability of an item the record can be found quickly/makes selection of storage easier  
**Disadvantage:**  
 -The size of fields must be determined before use so space is often wasted/not sufficient  
 -e.g. The "description" field may not be large enough for a particular item.  
 (1 per -, max 4) [4]

- 3** -Working from home  
 -Fewer journeys/more free time/less supervision...  
 -Different types of jobs/jobs lost/job opportunities arising  
 -Production line/manual jobs being lost/replaced by more technical jobs  
 -Work done can be more visible to managers  
 -All work/times working can be seen/leading to rewards where appropriate/sanctions when poor effort  
 -Safety of workers is improved  
 -Computers/robots do dangerous tasks/can be used to accurately monitor dangerous processes  
 -Work time can be less rigid  
 -Work can be fitted in round other commitments/leads to simpler ways of job sharing  
 -The 24 hour job/office/commitment/world workforce  
 -Workers may always be contactable/throughout the world/communications.  
 (Up to 2 per group, max 3 groups, max 6) [6]

**4 (a)**

Line	X	A	OUTPUT	CONDITION
1	1			
3	1	1		
4	1	1	1,1	
5	2	1		
6	2	1		TRUE
3	2	4		
4	2	4	2,4	
5	3	4		
6	3	4		FALSE
7	3	4		

(1 for values of X and matching line numbers; 1 for values of A corresponding to values of X; 1 for giving correct outputs; 1 for giving 2 conditions) [4]

- (b) (i)** Change X = 3 to X = 11 [1]
- (ii)** -A first line to allow user to input value (N)  
 -UNTIL X = (N + 1) [2]

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(c) e.g.

```
X = 5
REPEAT
  A = X * X
  OUTPUT X, A
  X = X + 5
UNTIL X = 25
END
```

Mark points:

- Begins with 5 (as first output)
- Loop with working condition
- Counter correctly incremented

[3]

5 (a) (i) -Options appear on screen from which to select

-Selection may lead to submenus

-Menus arranged in a tree structure (from single root to many branches)

Use: In a passive information system e.g. Tourist guide at a train station.

(1 for use, + 2 other -, max 3)

[3]

(ii) -Follows a spoken language allowing user to input queries in normal vocabulary/syntax

-Computer understands keywords/positions in sentence to get idea of syntax

-Will then search database for keyword to provide output or responses.

Use: e.g. On an expert system or search engine.

(1 for use, + 2 other -, max 3)

[3]

(b) -Provides utility programs to allow user to carry out maintenance tasks (any 3)

-Provides security measures like passwords and identifications.

-Controls the hardware and the operations they allow.

-Provides translators to convert software into a form useable by the computer.

-Manages interrupts.

-To provide a platform for the execution of software

(1 per -, max 3)

[3]

6 (a) (i) Data is transmitted along a single wire/one bit at a time.

[1]

(ii) Data is transmitted along a number of wires/one byte (or more) at a time.

[1]

(iii) Data can only be transmitted in a single direction.

[1]

(iv) Data can be transmitted in both directions but only one at a time.

[1]

(b) (i) -Each byte contains an even number of 1's

-A special bit is set to 0 or 1 to ensure that total is even.

-Byte is checked for even number of 1's after transmission.

(1 per -, max 2)

[2]

(ii) -When two bits are in error the errors cancel each other out/10101001.

[1]

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- 7** -Data collected on site/by drilling /observation/explosions  
 -Data collected remotely/by satellite/by electronic means  
 -Collected data input to system via HCI/automatically  
 -Data input is compared to library of data to find matches...  
 -by inference engine...  
 -Using rules found in rule base  
 -Decisions made about geologic structure reported through HCI.  
 (1 per -, max 4) [4]
- 8 (a)** -Site map  
 -a diagram showing the way the different screens fit together  
 -shows the links between screens,  
 -Gantt chart/progress chart  
 -shows the different parts that need to be developed  
 -shows which parts of the development are independent and which are reliant on each other.  
 -Spider diagram  
 -to show interaction between the different elements of the solution  
 -and those parts which are independent of each other.  
 -Flow diagram  
 -to show the order of producing the parts of the solution  
 -or to show the flow through the proposed site.  
 (Up to 2 groups, up to 2 per group, max 4) [4]
- (b)** -Documentation for owner of site  
 -will be paper based  
 -will contain instructions for changing/maintaining site  
 -Documentation for viewer/visitor to site  
 -will be on-screen  
 -giving detailed help on searches/use of facilities/communication with site owner... [4]
- 9** -Sound  
 -Music to accompany the pictures/speech to explain the pictures....  
 -Video/animation  
 -Moving pictures to better describe the object on the site  
 -Automatic hard copy/saving  
 -Automatic downloading of data to printer/hard drive for future reference.  
 -Hyperlinks  
 -Allowing access to different sites/parts of site  
 (Up to 2 groups, up to 2 per group, max 4) [4]
- 10** Colour:  
 -Contrast  
 -Corporate schemes  
 -Aggressive/passive/soothing colour schemes  
 -Consistency over site to make site look cohesive  
 -Use colour to provide emphasis  
 -Accessibility issues e.g. colour blindness

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Layout:

- Consistent layout so user gets used to 'what is where'.
- Important things to top and left
- Data spread out across whole screen
- Tab order
- Group similar data together

Content:

- Limit to amount of content on a page
- Content on a page is cohesive
- Content matches the published intentions of the site
- Content is of sensible type and reading age for audience.

(1 per -, max 2 per group, max 6)

[6]

**11** -The bit rate is a measure of the rate that data can be sent across the communication medium

- Different communication media have different bit rates
- For simple text/still pictures...a low bit rate connection is adequate
- because volume of data per page is low and fixed
- For (live) video/sound...bit rate needs to be high
- because large volume of data which must be downloaded in real time because...
- information is time sensitive.

(1 per -, max 4)

[4]

**12 (a) (i)** -Custom written software is especially written/according to the requirements of the customer

- Off the shelf is readily available/needs tailoring to the needs of the customer

[2]

**(ii)** -no delay as it is ready immediately

- No shortage of experienced users/ready trained/No learning curve
- Software should be error free
- Help available through Internet/colleagues/courses
- Compatible with other users/software

(1 per -, max 2)

[2]

**(b) (i)** -Check data input to ensure it matches source data

- Typed in twice...
- by different people/at different times
- inputs checked against each other for errors
- manual check by comparing...
- screen output of input with original document.

(1 for first -, + any 2 other -, max 3)

[3]

**(ii)** -Check data input is sensible/follows set rules/are reasonable

- Data type/should be numeric
- Data format/should be in currency form/xxx.xx
- Length check/input should be < x characters
- Presence check/something has been input.
- Range check/value between 0 and some upper limit

(1 for first -, + any 2 other -, max 3)

[3]