CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2014 series

9691 COMPUTING

9691/13 Paper 1 (Written Paper), maximum raw mark 75

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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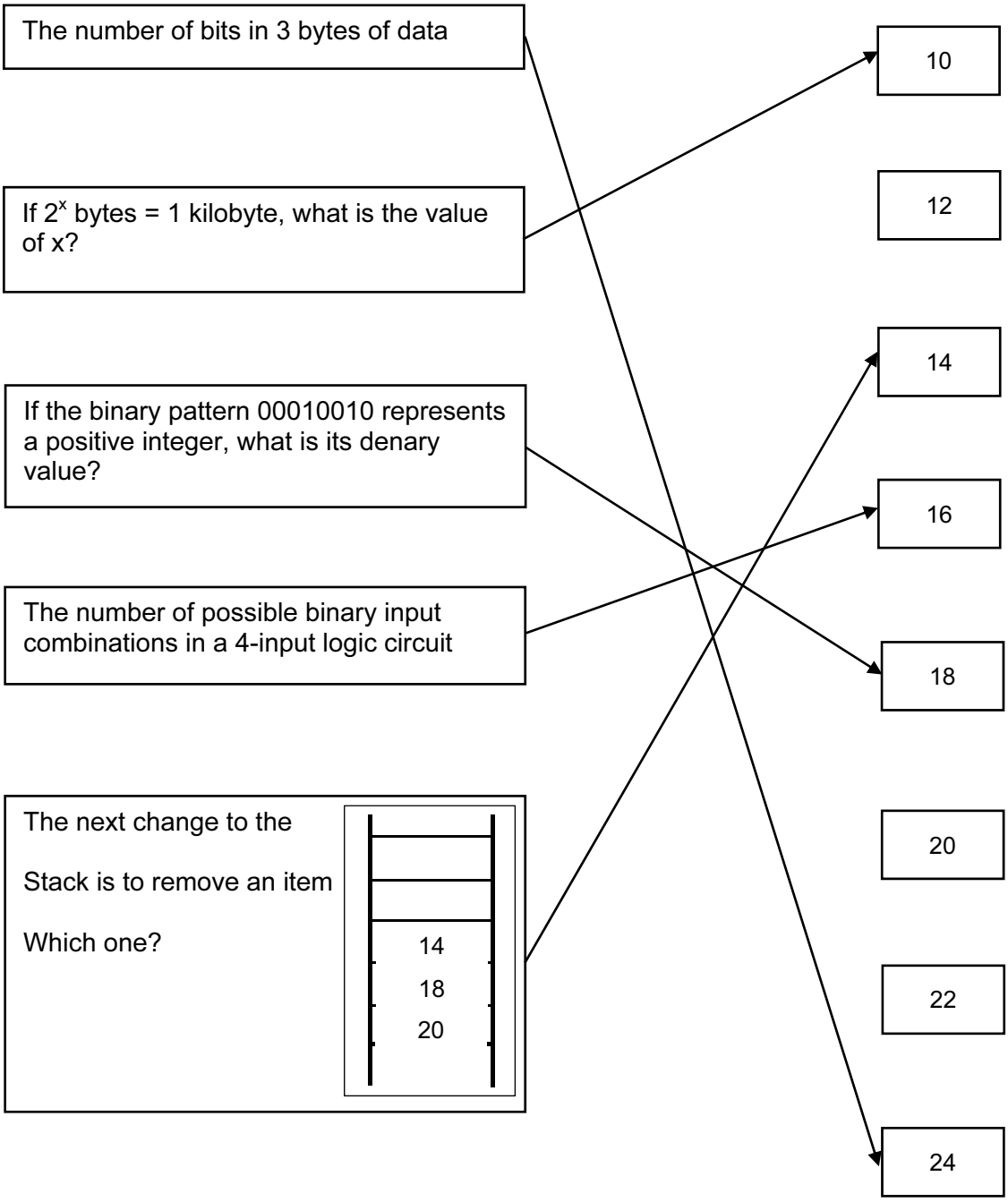


[5]

2 (a) Any **four** points from:

- ***buffer*** is an area of fast access storage
- ***buffers*** are temporary storage areas
- a ***buffer*** can be filled by the processor and then emptied at a much slower speed by the printer
- allowing the processor to do other tasks while printing is done
- data is first sent to the ***buffer***
- once it is full, the printer starts to empty the ***buffer*** of its contents
- when ***buffer*** is empty …
- the printer tells the processor it needs more data
- this is done by sending a message to the processor called an ***interrupt***
- the processor halts its present tasks and fills the ***buffer*** with more data
- this continues until no more data remains to be printed
- interrupt priority [4]

(b) Any **two** points from:

serial

- bits of each character/byte are sent one after the other …
- along a single communication path/wire
- works well over long distances

parallel

- each bit in a character/byte is transmitted along individual channels/wires
- works well over a short distance … but over longer distances the bits can get skewed (bits arrive out of order) [2]

3 (a) 1 mark for name + corresponding description

questionnaires – hand out questionnaires to company employees to find out problems with current system; no need for analyst to be present when questionnaires being filled out

interviews – one to one or group interviews of company staff or management to find out problems with current system; time consuming method; but can alter questions being asked based on earlier responses

observation – watching the system being used; find out first hand where the problems are and also gather information about input/output requirements; time consuming process

examine paperwork – can see first hand what procedures are used; what are the safety rules and operational instructions [2]

(b) 1 mark for each point

data flow diagrams (DFD) (maximum of 3 marks)

- use symbols to represent input/output, processing and store
- shows path/flow of data through the system
- shows the input/output, processing and storage of data
- defines the boundaries of the system
- (accept a diagram to show an example of DFD)

system flowchart (maximum of 3 marks)

- these show decisions made in the process
- uses special symbols to show input/output, processing and storage – these symbols represent physical components in the system
- shows how systems major components fit together and interact
- used as a project planning and project management tool [4]

(c) Any **two** from:

- purpose of the system
- program listing/coding
- programming language used
- flowcharts/algorithms
- input formats
- hardware requirements
- software requirements or a single mark for system requirements
- minimum memory requirements
- known bugs in the system
- list of variables used and their meanings
- file structures
- sample runs (including test data and results)
- output formats
- validation rules
- meaning of error messages [2]

4 (a) 1 mark for each input device

Input device/reason

- barcode scanner/reader
- keyboard/keypad
- touch screen
- weighing device
- magnetic stripe reader/smart card reader [3]

(b) Any **four** points from:

- barcode scanned (at checkout)
- barcode number searched for in (product) database
- barcode number acts as primary (key) field
- search continues until a match is found
- error signal if barcode is damaged
- field showing item level is read
- value is changed following sale(s) of item(s)
- new value written back to file
- item level is then compared against re-order level value for that item
- if the item level <= reorder level, then order for more items is automatically generated
- a flag is set to indicate that an order has been placed
- when new items arrive, the item level is updated and the flag is re-set [4]

(c) (i) system where all the data is first gathered together and then processed all in one go (without any human interaction) [1]

(ii) Any **two** from:

- large volume of data
- data is all of a similar type
- not time sensitive (at end of month …)
- need to collect number of hours/overtime for each month <u>first before</u> the wages can be calculated [2]

5 (a) (i) Any **three** from:

- magnetic stripe is read
- number on the magnetic stripe is checked against pre-stored number on computer
- check image of face scanned with database of workers faces
- the camera takes a photo of workers face and converts it to a bit map
- key parts of both images are compared …
- to check if photo on card matches photo originally taken of worker
- system also cross checks 10 digit code with (bit map) image of worker stored on file [3]

(ii) Any **two** from:

- length check (must be 10 digits only)
- character check (must be digits only)

(NOT range check or presence check) [2]

(b) Any **two** from:

- hologram on photograph containing security image
- use of password as well as 10 digit code
- use of other biometric data (e.g. fingerprints) [2]

6 (a) 1 mark per point

CLI

- user types in instructions to open/launch an application
- usually a number of instructions need to be typed in
- user is in direct communication with the computer system
- user has to type in the commands each time they want to open/launch the application

GUI

- user interacts with the system by using icons
- user doesn't need to know where application resides in the computer
- the application is opened/launched by clicking on an icon using a mouse (e.g.)
- windows is an example of GUI interface [2]

(b) CLI

- programmer/technician } need to access system and communicate
- systems engineer } at system level

GUI

- end user } does not need computer knowledge
  } just click on the icon to launch the application [2]

(c) Any **four** from (no marks for naming disability but interface mods must link to disability must state a disability):

(NOTE: do not allow duplication if more than one disability mentioned)

<u>blind/partially sighted people</u>

- use of microphone (instead of keyboard)
- use of voice recognition software
- use of loud speakers and voice output
- use of braille printers
- use of larger screen icons/text/font
- care with colour schemes for partially sighted people

<u>little/no use of hands/arms</u>

- use of microphone (instead of keyboard)
- use of voice recognition software
- head wands to select keys from a keyboard
- touch screens and head wands to select icons
- trackerball (rather than mouse) and other more useable pointing devices [4]

7 **(a)** Data transmitted in both directions BUT only 1 direction at a time [1]

(b) **(i)** **1** 1 0 1 0 0 0 1 [1]

(ii) Any **two** points from:

- computer "B" counts number of 1-bits
- if number of 1-bits is even then byte has been transmitted correctly
- if number of 1-bits is odd then byte has been corrupted during transmission [2]

(c) 1 0 1 1 0 1 1 1

0 1 1 1 1 0 0 0

⟶ 0 0 0 1 **1** 0 1 0

0 1 1 1 0 0 0 1
- - - - - - - - - - -
1 0 1 0 1 1 0 0
- - - - - - - - - - -

(i) (see diagram above). 1 mark for identifying third byte and 1 mark for identifying 5th bit as an error [2]

(ii) corrected byte

0	**0**	**0**	**1**	**0**	**0**	**1**	**0**

[1]

(iii) Any **two** from:

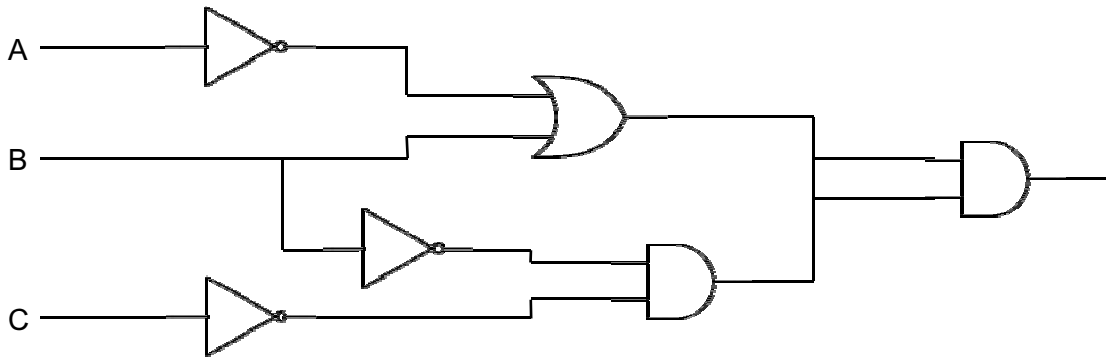
- for example, a check sum
- brief description of check sum
- description of alternative checking method
- ask for data to be re-sent [2]

8 (a)

A	B	C	X	
0	0	0	**1**	1 mark
0	0	1	**1**	
0	1	0	**0**	1 mark
0	1	1	**0**	
1	0	0	**0**	1 mark
1	0	1	**1**	
1	1	0	**0**	1 mark
1	1	1	**0**	

[4]

(b) 1 mark per correct logic gate in correct position



[6]

9 (a) lift number: 14

floor number: 45

up or down: down [3]

(b)

1	**0**	**0**	**0**	**1**	

0	**1**	**1**	**0**	**0**	**1**

1

[3]

(c) (i)
- checks which lift is nearest to floor 11
- checks which lifts are below floor 11
- checks direction of travel of lift [2]

(ii) 1 mark for correct choice and 1 mark for correct reason

- choice: “C” if wrong or NO "C" then rest is invalid.
- A, C and D are all below 11
- A is nearest
- but only lift C is going in the correct direction [2]

(d) Any **two** from:

- computer software sorts out destination floors in ascending order produces a sorted list
- each time someone gets in lift and selects new floor, the sorted list is recalculated
- as each floor in the order sequence is reached, it is removed from sorted list
- if state lift is going down floors are sorted in reverse order [2]