

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the May/June 2015 series

9691 COMPUTING

9691/13

Paper 1 (Written Paper), maximum raw mark 75

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1 (a) 1 mark for each example + 1 mark for description of technology

magnetic

- hard disk (drive) / floppy disk / magnetic tape
- make use of the magnetic properties of materials such as iron
- magnetic areas/flux represent 1s and 0s
- magnetic field is either clockwise or anticlockwise to represent 0 and 1
- concentric tracks and sectors

[2]

optical

- DVD (R/RW/ROM/RAM) / CD (R/RW/ROM) / Blu-ray discs
- these use “pit” and “lands” to represent 1s and 0s on a light sensitive layer
- use red or blue lasers to read the data on the light sensitive layer

[2]

solid state

- pen drive/flash drive / SD/XD cards/memory/compact flash cards / solid state drives
- uses EEPROM technology
- use of NOR/NAND transistors/cells
- use of semi-conductor chips
- by applying precise voltages to transistors, a unique pattern of 0s and 1s is stored (NOT faster access speeds)
- less likely to be erased by magnetic fields

[2]

(b) Any **two** from:

- more robust / no moving parts if dropped less likely to be damaged
- lightweight // physically small
- don't have to wait to reach “running speed”// latency
- low energy consumption
- low heat generation
- faster access time
- More read / write cycles // longer longevity
- less likely to be affected by magnetic fields

[2]

2

The following binary pattern
1010011000111101 is stored in X
bytes.
What is the value of X?


A stack contains the
values shown on the right.
X ← POP
What is the value of X?

6
8
10

Odd parity is used as an error check
when sending data. If X represents
the parity bit, what is the value of X in
the byte below?
...X 1 1 0 0 0 1 0

What denary value, X, is represented
by the binary number below?
0 0 0 0 1 1 0 0

What is the value of X in the following
logic gate?



An array, Number, contains:
4 8 2 6
4 6 4 8
X ← Number [2, 4]
What is X?

If $2^x = 1024$, what is the value of x?

0

1

2

4

6

8

10

12

[7]

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3 1 mark for each feature (max of 2) + 1 mark for naming I/O device + 1 mark justification of chosen I/O device

(a) CAD

(i) features

- 2D/3D modelling
- use of wire frames
- library of parts
- auto-calculation of final cost of part
- auto-calculation of weight of final part
- zoom, rotate, colour, (utilities)
- kinematics
- link into CAM
- virtual / simulated testing

[2]

(ii) I/O devices + justification

- light pen – move/draw/select objects on a **CRT screen**
- trackerball – move/draw/select objects from any type of screen
- spacemouse/ball – allows users to manipulate 3D objects on screen
- **large** monitor – large screen allows intricate details (e.g. circuits) to be seen
- plotter – print out of large, accurate drawings/blueprints
- 3D printer – print out a working prototype (at much less cost)
- graphics tablet and stylus – allows the operator to draw naturally

Accept any reference to computer-controlled lathes etc.

[2]

(b) Spreadsheet

(i) features

- carry out calculations on data in cells
- automatically produce graphs/charts from data
- make use of formulas
- use of built-in functions (such as replicate, MAX, COINTIF,)
- macros to do auto-calculations (etc.)
- "what if" predictions

[2]

(ii)

- printer – printout report to produce hard copy

[2]

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(c) Presentation

(i) features

- slide transitions
- integrate multimedia (sound/movies/animation) into presentation
- embed links to websites into presentations
- introduce attractive colours/fonts/etc. to make it interesting/clear

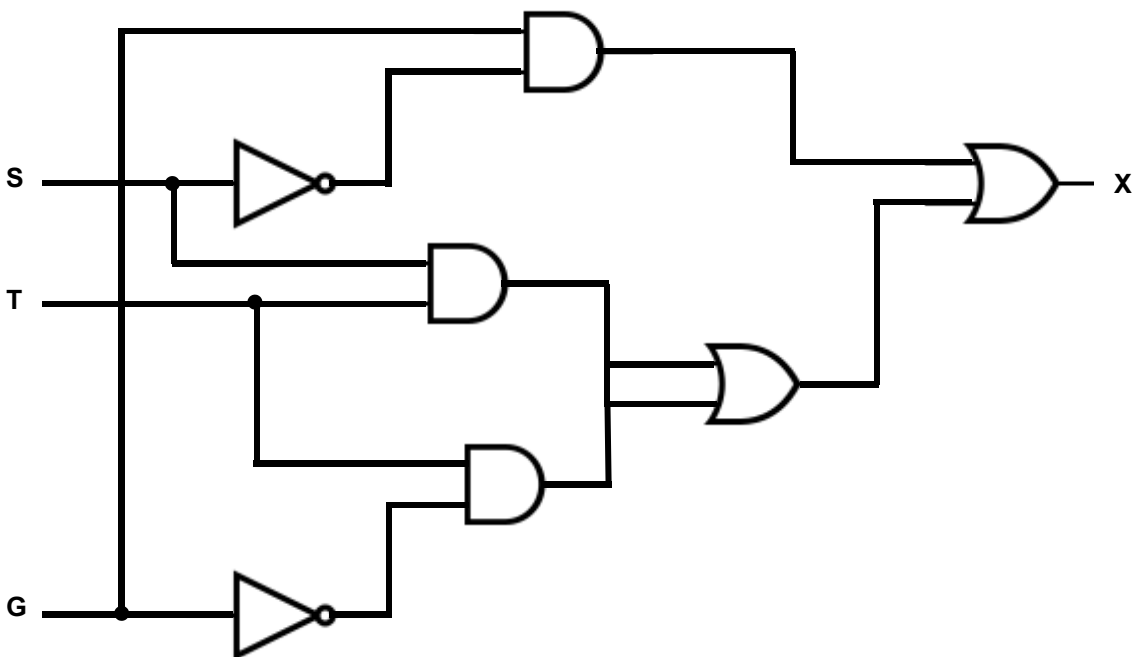
[2]

(ii) I/O devices + justification

- pointing device – to select items in the presentation
- microphone – to do “voice-overs”
- multimedia projector – allow presentation to be projected onto large screen
- speakers – to hear “voice-overs”/music/videos
- large screen – so audience can easily see the presentation
- printer – to produce notes to accompany slide show/presentation

[2]

4 (a) 1 mark for each correct gate (look out for alternative answers that work)



Allow a single triple input OR gate at the right hand side

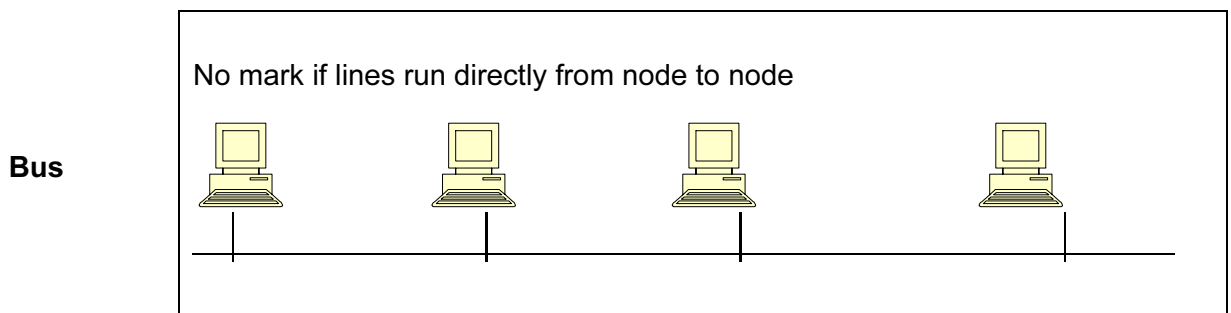
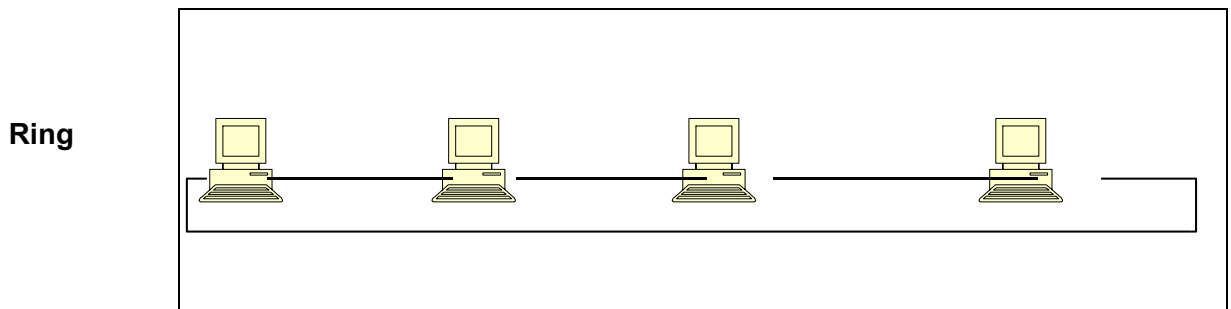
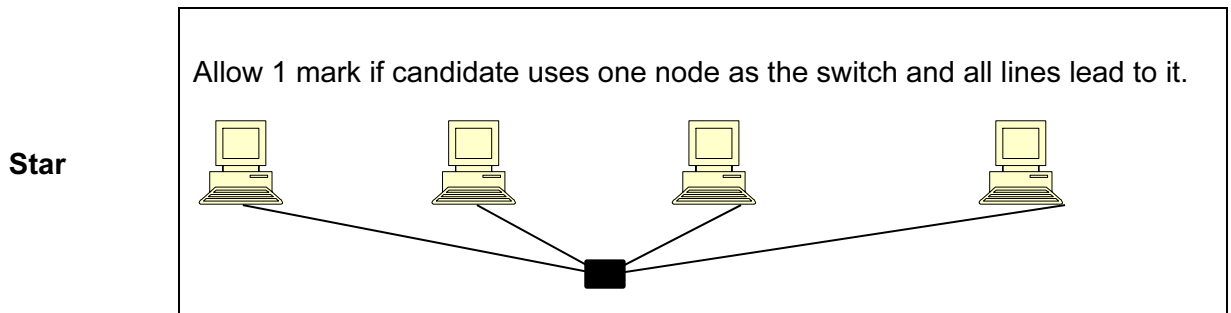
[7]

(b) 1 mark for each pair of outputs – shown highlighted in table

Inputs			Workspace	Output
S	T	G		X
0	0	0		0
0	0	1		1
0	1	0		1
0	1	1		1
1	0	0		0
1	0	1		0
1	1	0		1
1	1	1		1

[4]

5 (a) 1 mark for each correct wiring of network topology. 1 mark for switch in star



[4]

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(b) 1 mark for each benefit, max 2 per topology

Star

- failure of a node or node cable doesn't affect other nodes
- easier to troubleshoot since only one node is affected if a cable break occurs
- it is simpler to add extra nodes/expand network since extra nodes don't affect overall performance of network
- each node can use a different type of data cable / different transmission speeds
- it is a more secure type of network

[2]

Ring

- works well under heavy load
- it is possible to form very large networks
- it is relatively inexpensive and simple type of network to install
- uses a token so only 1 device can transmit at a time so no clash and no need for re-transmission
- does not rely on a server for control

[2]

Bus

- it is the least expensive network to set up
- it is very flexible since nodes can be added or removed without affecting the rest of the network
- failure of one node doesn't affect the rest of the bus network (unless there is a main cable failure!)

[2]

6 (a)

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

[1]

(b) channel 75

[1]

(c) error message would occur
channel 84 is not available // nothing would happen

[1]

(d) 1

[1]

(e) bits sent one at a time along a single channel

transmission is in one direction only

[2]

7 (a) Any **four** from:

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- obsolescence of existing equipment / hardware out of date
- inability to repair existing equipment/obtain spare parts
- existing hardware can't utilise new software
- better hardware / software NOT newer hardware/software
- company that produced original software/hardware is no longer in business
- no longer possible to get technical support for existing hardware/software
- changes in technology over the years
- changes of health and safety regulations
- expansion of the power station
- need to improve the overall reliability
- changes to rules/legislation
- changes in company policies
- greater automation required // reduce staff costs

[4]

(b) Direct / big bang

Pilot





Parallel

Phased

[4]

- 8 (i) data read at a POS terminal needs to be real time and not batch [1]
- (ii) entering data twice into a computer is an example of verification (not validation)
examples of validation would be length check or type/character check [1]
- (iii) a queue is an example of a FIFO structure
stacks use LIFO and not queues [1]
- (iv) ROM memories are non-volatile, permanent memories
the properties described (volatile and temporary) refer to RAM [1]
- (v) data that can only be transmitted in one direction is called simplex transmission
Full duplex refers to data transmission in both directions at the same time. [1]

- 9 (a) 1 mark for 4 correct identifiers, 1 mark for 4 correct stages added.

A	 A0046/			
B			 B1504/3  B1600/3	
C				
D				 D0088/4
	1	2	3	4

[2]

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- (b) – the additional information is available on demand
- when mouse/finger hovers over graphic/right-click mouse, (on the icon)
 - hotspot/rollover displays other data items
 - pop up / drop down box appears with extra details

[2]

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

For example:

- sensor detects the presence of a bicycle ...
- .. at specific points of the conveyor belt
- sensor sends signal to computer system ...
- including the bicycle code
- computer maps the sensor number to the current stage
- suitable sensors: RFID, barcode reader
- software responds to sensor to move bicycle to the next stage
- process control software

[4]