

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

## **MARK SCHEME for the October/November 2015 series**

### **9691 COMPUTING**

**9691/13**

Paper 1 (Written Paper), maximum raw mark 75

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1 (a) 1 mark for device + correct reason.

**Input devices**

- |                               |   |
|-------------------------------|---|
| barcode reader/scanner        | – to read the barcode <u>on the product</u>     |
| keyboard / keypad             | – to key in barcode if scanner fails            |
|                               | – key in PIN from customer credit card          |
|                               | – key in number of items                        |
| touchscreen                   | – select items of fresh fruit, etc.             |
| weighing device               | – to weigh loose items                          |
| magnetic stripe / chip reader | – to read magnetic stripe / chip on credit card |

**Output devices**

- |                      |   |     |
|----------------------|---|-----|
| screen / monitor     | – to show item description / price/total bill |     |
| printer              | – to produce itemised bill/coupons            |     |
| beeper / loudspeaker | – to indicate barcode read OK                 |     |
|                      | – to indicate barcode failed to read OK       | [4] |

(b) Four from:

- data is sent to the printer buffer
  - once buffer is full, printer empties the buffer ...
  - ... meanwhile processor gets on with other jobs
  - when (printer) buffer is empty ...
  - ... printer sends interrupt to processor
  - requesting more data
  - interrupt processed according to its priority
- [4]

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2 (i) **Three** from:

- software which erases contents of whole disk
- to setup / configure the disk for first use
- tracks and sectors checked to ensure correct format/identifies bad sectors
- identifies FAT (file allocation table) / NTFS (new technology file system)
- used to prepare a new disk for use
- disk surface divided into tracks and sectors (both) [3]

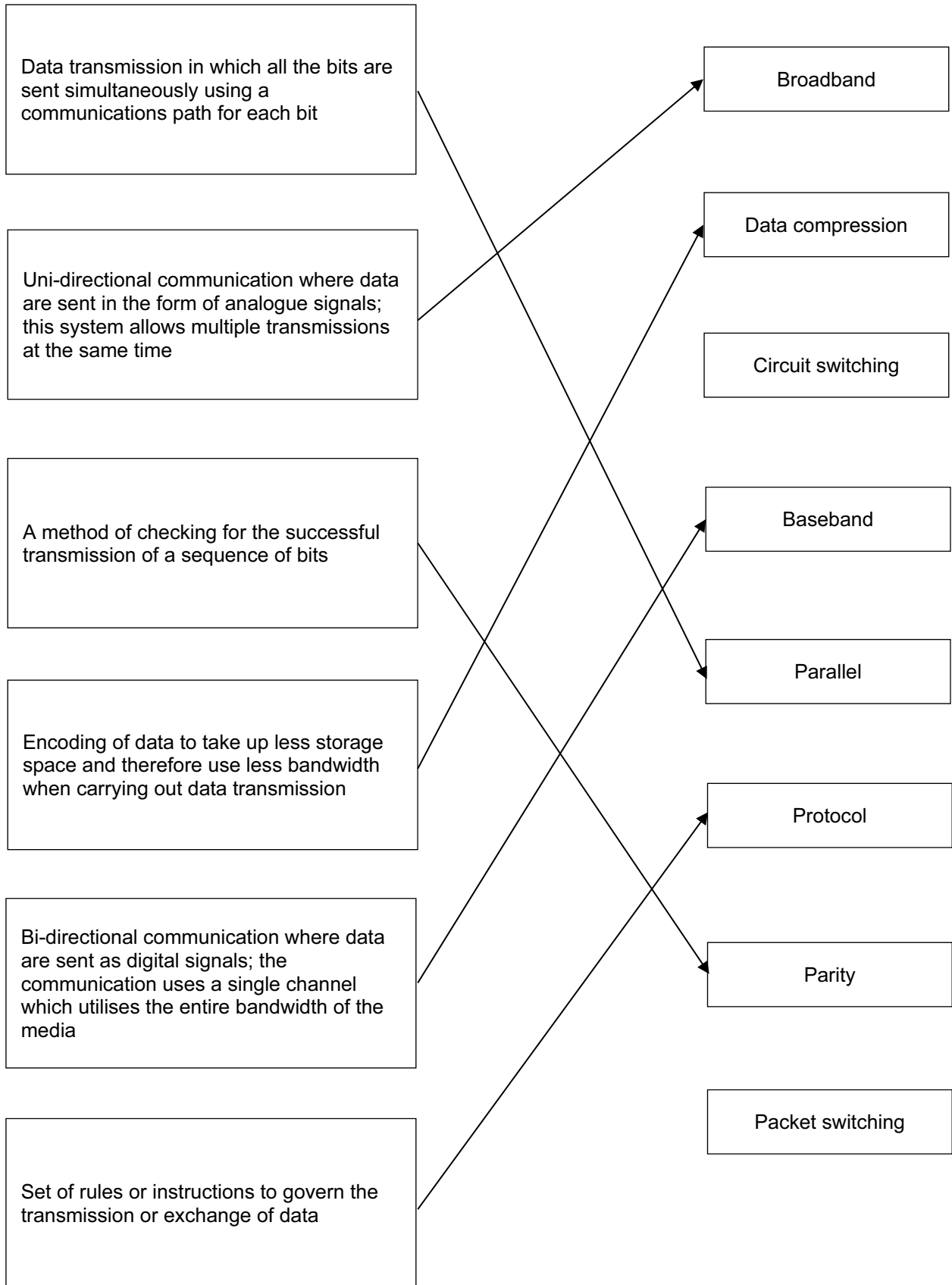
(ii) **Three** from:

- to allow the printer to communicate with the computer
- software supplied with printer hardware
- many often recognised by operating system automatically
- allows communication between hardware and operating system
- converts commands into instructions that can be carried out [3]

(iii) **Three** from:

- software that continuously checks for viruses ...
- ... and is running in the background
- indicates when / if a virus is found
- can remove / quarantine the virus
- checks disks and downloads for viruses automatically / asks user if they want virus scan
- to protect the computer from viruses / to detect viruses [3]

3 1 mark for each correct line entered



[6]

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4 (a) 1 mark for each correct tick (✓).

If more than two ticks then take away 1 mark for each incorrect tick.

Sensor	Suitable (✓)
motion	
oxygen	✓
acidity (pH)	✓
pressure	
humidity	

[2]

(b) (i) Two from:

- greater security than “public” line / less likely to be “tapped into” / hacked than a public line
- faster data transmission
- doesn’t share data with other users
- lower level of latency (less time between initiating a request and receiving an answer)
- always available
- no rental costs from public companies

[2]

(ii) Serial

- data sent one bit at a time
- down a single channel / line (NOT cable)

**Full-duplex**

- data sent in both directions
- at the same time / simultaneously

[4]

(iii) Four from:

- data from sensors sent to processor
- ADC reference if it is clear sensor is analogue
- data stored on computer / in a database / in a spreadsheet
- data are compared against predefined acceptable values
- if values are not within the limits a warning is generated
- visually on monitor / audio signals
- graphs can be automatically produced from sensor data

[4]

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## 5 (a) Bus

### Benefits

- requires less cabling (than other two)
- cheapest (of the three) to set up
- easier to expand the network
- one node fails the rest still operate

### Drawbacks

- if there is a fault in central cable, whole network goes down
- number of nodes/stations is limited
- doesn't work well under heavy load
- less secure (than others)
- difficult to isolate a fault / troubleshoot

## Star

### Benefits

- each node/station has its own cable
- failure on one connection doesn't affect others
- different communication methods possible for different branches
- easier to identify faults / troubleshoot
- easier to expand the network
- network is more secure

### Drawbacks

- if the central hub fails, whole network goes down
- more expensive (than others) to set up
- number of nodes/stations that can be added depends on capacity of hub

## Ring

### Benefits

- traffic is uni-directional so has fast data transmission
- works better than bus under heavy loading
- possible to form very large networks
- no need for a central server
- less costly to set up than a star network

### Drawbacks

- faulty connection / failed node can shut down whole network
- more difficult to expand the network
- less secure (than star)
- difficult to find faults/troubleshoot

[6]

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(b) Four from (need some correct description as well as just hardware name)

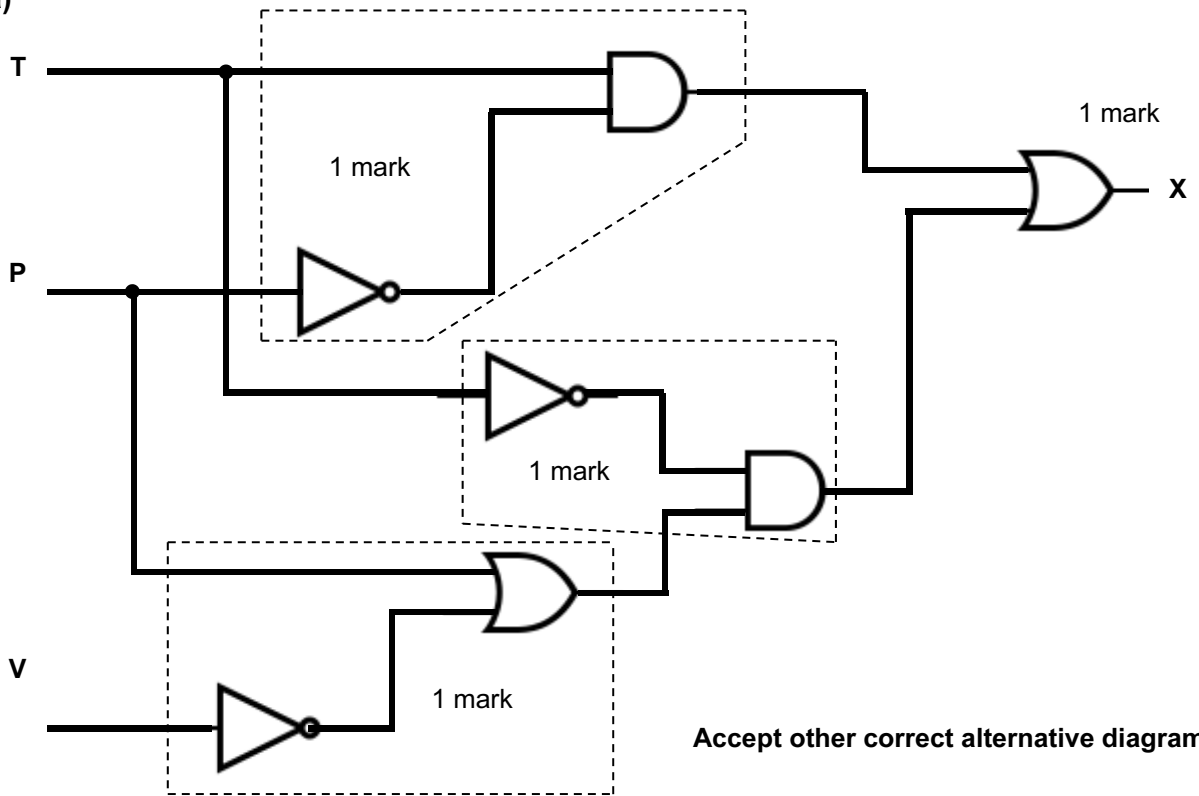
If name only given, then a maximum of two marks.

- hub
  - forwards data/packets to all the devices connected to it
- bridge
  - device/software used to connect two or more segments so they can communicate
- switch
  - reads the IP/MAC address of all the devices connected to it; the switch reads the destination address of the data/packet and sends the data to the destination device only
- network (cat 5) cabling // cable terminators
  - high quality cabling is essential for high speed data transfer // bus network requires two cable terminators
- network interface card (NIC)
  - a circuit board inserted into each node (PC/workstation or server) to allow communication with other nodes
- gateway
  - a network point that acts as an entrance to another network (using a different protocol)
- router
  - operates at the network layer (layer 3) // routing data between nodes // if the router receives a packet which doesn't have a known destination address, it forwards the packet to the default gateway
- server
  - there are many dedicated servers, such as a file server, which have different tasks within the network environment

Accept other sensible hardware items

[4]

6 (a)



[4]

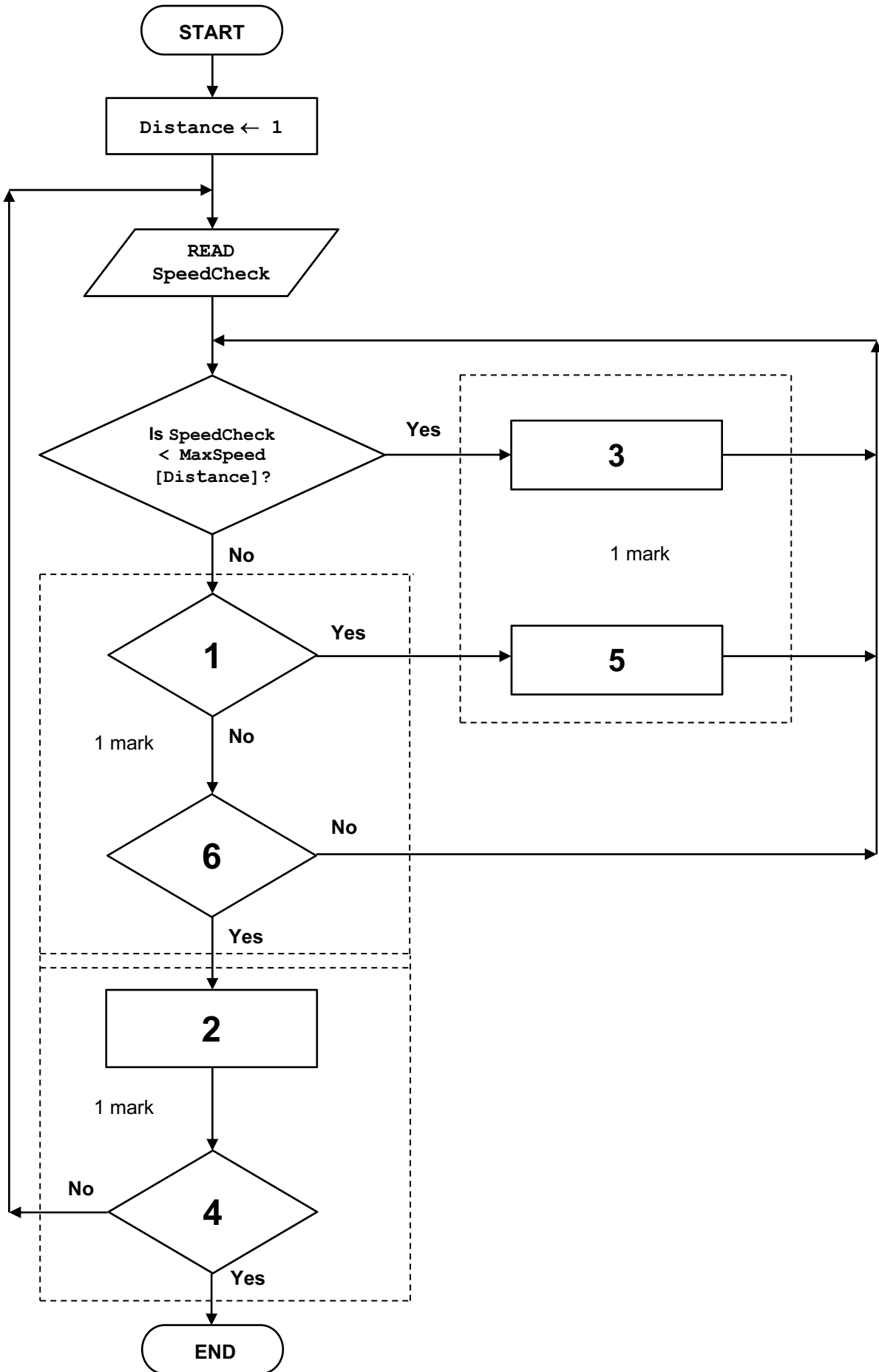
(b)

Input			Working space	Output
T	P	V		X
0	0	0		1
0	0	1		0
0	1	0		1
0	1	1		1
1	0	0		1
1	0	1		1
1	1	0		0
1	1	1		0

[4]



7 (a)



[3]

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**(b) Three** from (need name + description which fits scenario) for 1 mark

- writing the program code
  - implement the flowchart design as a working program
- testing
  - check to make sure the program works correctly / ensure there are no errors
- documentation
  - creating a user manual for the control room staff / technical documentation for the programmers/operations staff
- implementation / installation
  - installing the new software in the train system
- evaluation
  - checking the new software system meets all of the requirements [3]

**(c) 1 mark** for type + **1 mark** for situation

- corrective
  - errors have been found in the software which need to be corrected / not found during testing
- perfective
  - the overall performance of the system needs to be improved [4]

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(d) (i) A: 158

B: 85

[2]

(ii)

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

[1]

8 (a) (i) Navigation buttons // move to a different screen // move backwards and forwards

[1]

(ii) One from:

- use of colour green/red to show valve is open/closed
- show this visually at position 6 in diagram

Accept sensible alternatives

[2]

(iii) Slider, which is labelled 0 and 20, arrow pointer indicates current value

Accept sensible alternatives

[2]

(b) Two from:

- usually have limited desk space in a control room
- need for a mouse pad to ensure its correct operation
- known health risks from long term use of a mouse
- mouse tends to pick up dirt/dust/chemicals which hinders its operation
- difficult to operate if wearing protective gloves/clothing

[2]

(c) Two from:

- computers respond faster than humans to a dangerous situation
- computers can monitor many plant parameters at the same time
- computers don't lose concentration / get tired / operate 24–7
- reduce human error factor
- it is easier for a human to “miss something”
- idea of keeping humans away from dangerous situations

[2]