Name: _____

IAL IT Topic 1 Mark Scheme

Date:

Time:

Total marks available:

Total marks achieved: _____

Mark Scheme

Q1.

Question number	Answer	Additional Guidance	Mark
i	C		1
ii	A		1

Q2.

Question number	Answer	Additional Guidance	Mark
	Award **one** mark per point to a maximum of **two** marks. • attribution / acknowledgement (1) • non-commercial / no selling (1) • no derivatives / no changing (1) • public domain / all rights released (1)	Accept other wording that has the same meaning.	2

Q3.

Question number	Answer	Additional guidance	Mark
i	The only correct answer is B, because USB C has a bandwidth of up to 20Gbps A is not correct because Bluetooth has a bandwidth of around 1Mbps C is not correct because Ethernet has a bandwidth of up to 10Gbps D is not correct because Micro USB has a bandwidth of up to 5Gbps		1
ii	Award up to two marks for a linked explanation such as: • The tablet has GPS (enabled) (1) so it can match its location to the known location of the premises (1) • The tablet has Wi-Fi (enabled) (1) so when it sees the company's Wi-Fi signal/SSID it 'knows' where it is (1)		2

Q4.

Question number	Answer	Additional Guidance	Mark

	Award **one** mark for each point up to a maximum of **two** marks for a linked description of Patch and Upgrade.
	
	Patch
	• minor improvement
	• addresses a security issue/a comparability issue/a
	    bug/other stated minor improvement
	
	Upgrade
	• major improvement / new version
	• includes significant alterations/important
	    changes/stated major improvement
	
	Examples:
	• A patch is a minor improvement (1) while an upgrade
	    is a new version (1)
	• A patch might fix a small code error (1) an upgrade will
	    combine lots of fixes (into a new
	    version) (1)
		Accept examples for the improvement etc.	2

Q5.

Question number	Answer	Additional Guidance	Mark
	Describe how passive RFID works Award **one** mark for each point up to a maximum of **three** marks for a linked description. • tag reader sends a radio pulse/signal when (the radar indicates) **a vehicle is present** (1) • the radio pulse/signal powers the RFID chip/tag (1) • the chip/tag returns a (radio) signal with the tag ID (1) • the chip/tag contains an antenna (1) • the chip stores the tagID/data (1)		3

Q6.

Question number	Answer	Additional guidance	Mark
	Award up to two marks for : • Video files larger than audio (1) • Ethernet more bandwidth than Bluetooth (1) eg. • Bluetooth has enough bandwidth for the audio but not the video (1) whereas Ethernet has enough bandwidth for both (1) • The video file contains both the audio and video data (1) so needs the greater bandwidth available using Ethernet (1)	Allow other indications of bandwidth. e.g. more bps, higher capacity	2

Q7.

Question number	Answer	Additional Guidance	Mark
i	Award **one** mark for each of: • Bytes to bits by using x 8 in the numerator • Gibibits to bytes by using 1024 x 1024 x 1024 in the numerator (2^10) • Bits to seconds by using 10 x 1000 x 1000 x 1000 in the denominator $$\frac{20 \times 8 \times 1024 \times 1024 \times 1024}{10 \times 1000 \times 1000 \times 1000}$$ Time is 17.18 sec to 2 dec places, 17 sec to nearest whole second.	Accept any variation that works. Allow **one** mark for an answer of 17.2 or 17 with no expression.	3
ii	Award **one** mark for each point up to a maximum of **two** marks for any of: • switch not operating at 10Gbps/fast enough (1) • NIC/network card/other specified component not operating at 10Gbps/fast enough (1) • multiple file transfers at the same time will take up bandwidth/slow transfers down/take longer (1) • normal OS traffic will use some bandwidth (1) • collisions/packet loss require data to be sent more than once (1)		2

Q8.

Question number	Indicative content

	Digital devices:
	• own devices
	    • harder to support, IT technicians are unlikely to be familiar with all possible devices
	    • some devices
	        ▪ will be in warranty and would need manufacturer/dealer support
	        ▪ may be unrepairable/have unusual OSs/unusual configurations
	        ▪ may be unable to run required software
	        ▪ may not have needed connectivity e.g. WiFi/Ethernet may be absent
	    • may bring in malware, hacking tools, forbidden/unlicensed/inappropriate material/software
	    • concerns about privacy and ownership of device contents/ non college related/personal material on the device
	    • concerns about software licenses when college software put on private devices, could get round this with open source.
	• College devices
	    • high initial cost of outlay
	    • ongoing maintenance costs probably less than for own devices
	    • IT technicians will be familiar with the devices/can be trained to maintain devices
	    • disc images can be used to load/reset devices
	    • devices will have be selected to have the required connectivity and be capable of running the required software
	    • better control over licensing of software
	    • easier to apply patches/upgrades
	    • simpler to apply standard security settings/prevent malware/misuse/inappropriate material

Question number	Indicative content

	Recommendation.
	No correct answer but it should be supported by arguments about the devices.
	Realistically, the college should probably supply devices as allowing own devices for college work could result in damaging legal exposure. Piracy/licensing/in loco parentis/devices being damaged by technicians.
	
	Software:
	• web based:
	    • less technical support needed as online supplier/vendor will upgrade/patch
	    • no software installation needed, but may need an app/link configuring
	    • needs internet connection in order to use the software
	    • college does not own the software, vendor may change licensing terms or other aspects unilaterally. College would have to agree or stop using the software.
	    • privacy/security concerns of work being done/data being processed or stored online
	    • limited choice of educational software in some areas of the curriculum

- locally installed:
  - more technical support needed as IT technicians will have to handle patches/upgrades
  - software will need installing on each device. Difficult if using student's own devices, part of a disc image if college supplies devices
  - no internet needed
  - college may buy, rent, or use open source. More choices available
  - greater range of software available
  - all work/data kept inside the LAN so easier for security/privacy control

Recommendation.

No correct answer, but it should be supported by arguments about the two choices.

The recommendation is likely to be influenced by how a candidate has used/experienced software in their own establishment, e.g. cost of internet, stability of connection, quality of tech support may be the deciding factor.

Level	Mark		Descriptor
	0		No rewardable material.
Level 1	1–4		• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a response that lacks development. • Demonstrates limited awareness of competing arguments. Conclusion, if present, is generic or unsupported.
Level 2	5–8		• Demonstrates knowledge and understanding, which is mostly relevant and may include some inaccuracies. • Applies understanding to make some coherent connections and a partially developed response. • Demonstrates some awareness of competing arguments, but this may be unbalanced, and partially supports conclusion with evidence.
Level 3	9–12		• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a fully developed response. • Demonstrates an awareness of competing arguments and supports conclusion with evidence.

Q9.

Question number	Answer	Additional Guidance	Mark
i	Award **one** mark for any of: • ROM (1) • Read Only Memory (1) • EPROM (1) • EEPROM (1) • flash memory (1) • Non-volatile memory (1) • Solid state (1)	Ignore any spelling errors With multiple answers mark the first one Do not allow RAM	1
ii	Award **one** mark for each function up to a maximum of **two** marks: • Controls how the device / TV behaves/functions on start-up (1) • Controls how the device / TV behaves/functions during user interaction (e.g. onscreen menus) (1) • Allows software to interact with the TV's hardware (1) • Allows the TV to be modified (at a later date) to remove bugs / add features / change functions (1) • Stores date / time / region information (1) • Stores updates to the software (1) • Stores TV's apps (1) • Stores the BIOS (1)		2

Q10.

Question number	Answer	Additional guidance	Mark
i	The only correct answer is C A is not correct because video drivers are software, loaded after startup B is not correct because the operating system is called by the bootloader and may be held on a drive D is not correct because the processor is hardware		1

ii	Award one mark for any of • flash memory (1) • flash ROM (1) • EEPROM (1) • EPROM (1) • ROM (1) • non-volatile memory (1)			1

Q11.

Question number	Answer	Additional Guidance	Mark
i	Award up to **two** marks for each of **two** descriptions such as: • voice guide / on-screen reader (1) which will read on-screen text / give information about current channel / programme (1) • audio description (1) which provides a description of the scene/setting (1) • high contrast (1) which applies high contrast to all menus, control panels, etc. (1) • change brightness / screen temperature (1) to allow more comfortable viewing / relieve eye strain (1) • colour blindness mode / ability to change colours (1) to allow colour blind people to see what is on the TV (menus, etc.) (1) • screen zoom/enlarge (1) allowing people to zoom in to important parts of the screen / enlarge menus, etc. (1) • guide dots / markings on the (remote) controls (1) to enable people to operate it without seeing the buttons (1) • voice activated TV controls (1) to enable people to operate the TV without seeing the controls. (1)	Do not accept helping visual impairment as an extension	4

Question number	Answer	Additional Guidance	Mark
ii	Award up to **three** marks for a linked explanation such as: Want to create an inclusive/non-discriminating society where anybody can access the digital devices (1) there are official standards/guidelines that manufacturers must follow (1) which have legal/reputation penalties if not followed (1) OR Making devices easier to use for people with disabilities will increase the size of the market (1) OR Customer pressure to include people with disabilities (1) company responds to keep customers satisfied (1)	Do not allow making more profit arguments	3

Q12.

Question number	Answer	Additional Guidance	Mark
i	Award up to **two** marks for each of **two** descriptions such as: • eavesdropping/listening in to (NFC transmission) (1) allows access to private/personal/financial data while card is making the connection to the reader (1) • data corruption/manipulation (1) where the connecting signal is jammed/interfered with affecting/altering/preventing the transaction (1) • man in the middle/signal interception (1) where an attacker intercepts the signal and alters it before sending it on (1)		4
ii	Award **one** mark for each point up to a maximum of two marks for: • (vendor/garden can) set up **secure channels** (this ensures communications are encrypted) (1) which prevents eavesdropping/data corruption/data theft (1)	Do not accept passive measures such as card shields Allow encryption for 1 mark	2

Q13.

Question number	Answer	Additional Guidance	Mark
i	Award **one** mark for each point up to a maximum of **four** marks for a linked description. • RIFD tag contains (digitally) stored information (1) • RIFD tag has an antenna (1) • RIFD reader sends (interrogation) signal (1) • any tag within range responds to the signal (1) • RIFD tag responds to signal by returning stored information (1) • RIFD tag gets power from broadcast radio waves (1) • RFID detector performs action as a result of exchange (1) Example • RIFD tags hold identification information (1) which is sent in response (1) to a reader sending a signal (1) the tag is powered by the reader's signal (1) • passive tags are powered by radio waves (1) which are sent by the RIFD reader (1) the tag sends identifying information (1) in response to signals from the reader • the tag works with a reader. The reader broadcasts a radio signal (1) and any tag within range responds (1) sending the code that is stored in the tag (1) the tag does not have a battery and gets its power from the radio signal (1).		4

ii	Award **one** mark for any of: • selling a plant / checkout free payment • stocktaking / stock checking / stock control / inventory control / order picking • logging plant care e.g. watering schedule	Do not allow theft related answers as this was given in the question	1

Q14.

Question number	Answer	Additional Guidance	Mark
	Award **one** mark for each point up to a maximum of **three** marks. • position information (1) • alignment markings (1) • error correction information (1) • timing information (1) • QR code version (1) • QR code format (1)	Although this is not what the question asked, allow 1 mark for 'contains a URL/link to web page'	3

Q15.

Question number	Indicative content.	Additional Guidance	Mark
	Answers should be in the context of the suitability of the license types for school use Multiple user • Requires a license for each user. • Could be per named user, per concurrent user (per seat). • Usage depends on the EULA. • Concurrent use version could be suitable in the context. • Per named user could be expensive (possibly all students would need a licence). • Per named user could be difficult/time consuming to administer. Institutional • Also known as a site licence. • Usually charged on a scale based on the number of people in the institution, in this case probably the number of students. • Could be based on students plus staff. • May be discounted for educational establishments. • Could be appropriate if all/most students will use the art package.		6

Network

- A variety of multiple user licence.
- Licenses concurrent users (per seat).
- Number of users is controlled by a licensing application.
- When the maximum number of allowed users are running the software concurrently, no further instances of the software will be allowed to start.
- Could be appropriate as the maximum class size/ number of PCs available is usually known in advance.

Conclusion
- A separate conclusion is useful but not required. The information may be in the discussion of licence types.
- There is no 'correct' answer. Network licenses are common in schools but candidates may be using other types.
- Recommendations/conclusions should be supported by the arguments made about each licence type.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a superficial and unbalanced discussion.
Level 2	3–4	• Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies. • Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.
Level 3	5–6	• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a balanced and fully developed discussion.

Q16.

Question number	Answer	Mark
(i)	C	1

Question number	Answer	Mark
(ii)	A	1

Q17.
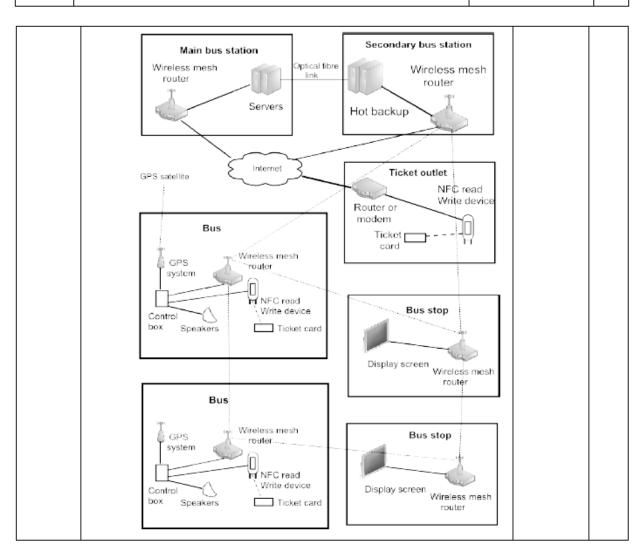
Question number	Answer	Additional Guidance	Mark
	The diagram shows the functionality – the location of particular devices may vary. Allow radio signals for connecting devices as long as a receiver is included. Award **one** mark for each item to a maximum of **ten** marks: a) microprocessor / processor / embedded computer in control box / server / computer b) modem / router in control box / attached or wired to the box c) timer / clock in box or from internet d) microprocessor (or device credited in (a)) connects to Internet via router/modem e) red light / traffic camera on main/side road f) red light sensor identified, motion (radar, camera) g) speed sensor on main/side road (radar, camera) (must be at entrance to the village) h) appropriate vehicle sensor on **side road**, proximity (pressure, radar, induction loop, camera) i) radio receiver j) wireless signal to radio receiver (vehicle is not needed for the mark) k) all sensors, lights, cameras and radio receiver connect to switch 	Allow software based clock / timer for (c)	10

Note:
Where sensors are not labelled the mark can be awarded if:
- a sensor is placed near the traffic lights (f)
- one or more sensors are placed at the entrance to the village (g).
(h) can only be awarded if it is clearly positioned on a side road

Q18.

Question number	Answer	Additional guidance	Mark
(a)	Award one mark for each up to a maximum of 10 marks: 1. Internet connection (1) 2. Router on internet connection (1) 3. Cable to rest of house (1) 4. NAS and PC in office with cable (1) 5. Laptop with wireless connection to any part of the network (1) 6. Switch with at least three connected items (1) 7. Switch/switches used correctly (1) 8. WAP with cable or is part of router or switch (1) 9. Media server, projector, TV, in entertainment room with cable (1) 10. Mobile device or laptop wireless link to TV (1) 11. Projector wireless link to sound system (1)	Mark labels only. Accept any symbol. Devices may be placed anywhere within their correct rooms.	

| | | | 10 |

Question number	Answer	Additional guidance	Mark
(b) i	Award one mark for an X between the internet and the first network component on the network diagram	Accept a label or other obvious indication of the firewall	1
(b) ii	Award up to two marks for a linked explanation such as: • hardware firewalls have single point of administration (1) whereas software firewalls must be installed/maintained on each device that needs protection (1) • hardware firewalls protect the whole network/devices that cannot run their own firewall (1) whereas software firewalls only protect the device that they are running on (1)		2

Q19.

Question number	Answer	Additional Guidance	Mark
	Award **one** mark for each item to a maximum of **twelve** marks: (a) servers in main bus station (b) hot backup server in secondary bus station (c) fibre connection between server and backup (d) router with WiFi (may be separate) in at least one bus station (e) cable connection from at least one server to router to internet (f) ticket outlet(s) has NFC device and router/modem with internet connection (g) ticket card indicated at ticket outlet(s) and/or bus(es), connecting to NFC device (h) bus stop(s) and bus(es) have WiFi connection (via router) (i) bus stop(s) have display screen(s) connected to router/network (j) bus(es) have NFC card reading device (k) bus(es) have a control box/processor (l) bus(es) have speakers connected to the control box (m) diagram shows a wireless mesh network (n) diagram shows GPS source connected to bus(es) (o) diagram shows GPS receiver/system in bus(es)	Single line = cable double = fibre dotted = wireless Where specific symbols are used for a device that occurs more than once, only one copy need be labelled. Where multiple buses and/or bus stops are shown the components only need to be shown once. Devices should be marked from their labels.	12

Q20.

Question number	Answer	Additional Guidance	Mark
	Explain one way in which an operating system could manage security in the school's network. Award one mark for each point to a maximum of **two** marks for a linked explanation such as: • OS runs/uses/has anti-malware (1) which prevents students loading malware/virus (onto a PC) (1) • OS controls logins/user accounts (1) only allowing students to use their own account (1) • OS controls file access (1) only allowing students to access approved files (1) • OS controls file access (1) allows different rights to students and teachers (1) • OS has built in firewall (1) preventing unauthorised access from outside the network/from the internet (1)	Allow other sensible security methods that could apply to a school network.	2

Q21.

Question number	Answer	Additional Guidance	Mark
i	State the purpose of system software. Allows applications/other software/users to interact with/control the hardware/computer (1)		1

Question number	Answer	Additional Guidance	Mark
ii	State the purpose of applications software. Award **one** mark for any one of: Allows users to perform (a range/variety of) tasks (1) To provide services to users (1)		1

Q22.

Question number	Answer	Mark
i	**The only correct answer is A** **B** is not correct because TVs are often not patched/updated after they are sold **C** is not correct because the TV's code is usually written specifically for that device **D** is not correct because not all TVs have email apps or suitable storage	1
ii	**The only correct answer is C** **A** is not correct because an embedded system may use a range of different memory types **B** is not correct because an embedded system may be autonomous **D** is not correct because some embedded systems can be turned off and on	1

Q23.

Question number	Answer	Additional guidance	Mark
	Award one mark each to a maximum of 2 marks for: • Specified online task e.g. browsing the internet, shopping, banking (1) • Reading e-books (1) • Playing games (1) • Playing music (1) • Running a desktop application e.g. word processor, pdf viewer, spreadsheet, language translation, email (1) • Route planning (1) • Image manipulation (1) • Printing (1)	Accept any reasonable smartphone task that is not about making phone calls or texting Allow an MP to be used twice Ignore networking or videocalls, they were available pre smartphone	2

Q24.

Question number	Answer	Additional guidance	Mark
(i)	Award **one** mark for each descriptive point, up to a maximum of **two** marks for **each** linked description. • Anika could use online applications (1) to allow her to work collaboratively (1). • Anika could use syncing software (1) to keep documents on the server at the education centre synchronised/up to date (1). • Anika could use a mobile phone (1), which could act as a hotspot to access the internet/documents from another device (1). • Anika could use VoIP (1) to speak to/video conference with her colleagues and supervisor (1). • Anika could use publically available Wi-Fi to access the internet (1) to exchange emails (1) with her colleagues. • Anika could use her mobile phone (1) to take messages from colleagues (1) when she is teaching • Anika could use cloud-based solutions (1) for all her resources that she could access from both locations (1), either the schools or centre.	Any appropriate digital device will suffice. Accept any other appropriate response.	4

Question number	Answer	Mark
(ii)	Award **one** mark for an identified benefit and **one** mark for justification/expansion up to a maximum of **two** marks. • Reduction of overheads (1) because the regional educational centre can reduce the amount of floor space/staff facilities/parking (1) • Expand/can employ more teachers/cover a wider region/ (1) because they are not restrained by physical space/location (1) • Increase in productivity (1) because teachers can work more effectively/share information/support each other when not in the same place/data is in sync (1)	2

Q25.

Question number	Answer	Additional Guidance	Mark

	Answers must be in the context of compatibility problems. Award **one** mark for each point up to a maximum of **two** marks for each of **two** linked explanations.
	
	• file types
	  ◦ old software/new software may have proprietary file type(s) (1)
	  ◦ that is not supported by/cannot be read by/ cannot be written to by the other software (1)
	  ◦ a third party file conversion may be needed (1)
	
	• features
	  ◦ old software may include features that the new software does not have/cannot replicate (1)
	  ◦ the user may need more than one piece of software to replicate the original (1)
	  ◦ these may have their own issues with working together (1)
	
	• included content
	  ◦ old software may include content such as fonts/images that are copyrighted (1)
	  ◦ licensing may prevent them being used in other products (1)
	  ◦ it may be difficult/impossible to find/contact the software writer/copyright holder (1)
	  ◦ alternatives may have to be found (1)
	• OS patch/upgrade
	  ◦ changes to the operating system (1)
	  ◦ may change/remove files/resources that the software needs (1)
	  ◦ the software will be unable to work/run until a further patch/workaround is issued (1)
	  ◦ the patch/upgrade may need to be reversed (1)
	
	• Wrong OS version
	  ◦ patch/upgrade may be for new/different OS version (1)
	  ◦ installed OS may not support the patch/upgrade (1)
	  ◦ may be problems with e.g. drivers/dlls/registry values/file locations/permissions (1)
		For each explanation, look for two second level bullet points from any top level bullet point	4

Q26.

Question number	Answer	Mark
	Award **one** mark for each descriptive point up to a maximum of **two** marks for a linked description. • An organisation negotiates a price for the software and a number of seats/unique keys (1). An activation server is visited during the installation process, to assign a seat/unique key to this installation (1). • The number of seats/unique keys for the organisation is fixed (1). Once the fixed number of seats/unique keys is used, no more activations can take place (1). • The number of seats/unique keys for the organisation is fixed (1), but more users are allowed as long as the total number active at one time does not exceed number of seats (1).	2