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Mark Scheme (Results)
October 2021

Pearson Edexcel International Advanced Subsidiary
In Information Technology (WIT11/01)
Unit 1

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Additional Guidance	Mark
1 (a)i	Award **one** mark for any of: • faster/higher transmission rate (1) • greater bandwidth (1) • more secure (1) • more reliable/stable (1)		**1**
1 (a)ii	Award **one** mark for any of: • users can move around (with devices) (1) • simpler infrastructure (1) • easier to install (1) • easier to add mobile devices (1)		**1**

Question number	Answer	Additional Guidance	Mark
1 (b) i	**The only correct answer is C** *A is not correct because an internet service provider only provides internet access, not network services* *B is not correct because this is possible with peer-to-peer* *D is not correct because the LAN isn't running over the internet*		**1**
1 (b) ii	**The only correct answer is C** *A is not correct because it could describe a hub* *B is not correct because it could describe a hub* *D is not correct because it describes a router*		**1**

Question number	Answer	Additional Guidance	Mark
1 (c)i	Award **one** mark for any of: • network interface controller (1) • NIC (1) • network card (1) • network adaptor (1)		**1**
1 (c)ii	Award **one** mark for each point up to a maximum of **two** marks for a description containing: • MAC addresses are unique (1) • The router/LAN/WAP holds a list (1) • The router/WAP will check the MAC address against the list (1) • Only addresses on the list can connect (1) Examples: • Laptop MAC address held in a (white/allow) list in WAP/LAN/router (1) no other (MAC) addresses will be allowed to connect (1) • MAC addresses are unique (1) WAP/LAN/router holds a list of addresses that are allowed to connect (1) • The router checks the MAC address (1) against its list (1)		**2**

Question number	Answer	Additional Guidance	Mark
1 (d)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**
1(d)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**

Question number	Answer	Additional Guidance	Mark
1(e)i	Hardware firewall. Award **one** mark for any one of: • on the router (1) • on a separate/dedicated device (1) • on the LAN gateway (1)		**1**
1(e)ii	Software firewall. Award **one** mark for any one of: • on each/all/any computer/PC (1) • on the server (1)		**1**
		Total for Question 1	**14**

Question number	Answer	Additional Guidance	Mark
2(a)i	Describe what is meant by an online community. Award one mark for each point to a maximum of **two** marks for a linked description such as: • a group (of individuals/businesses) with a shared/common topic/area/interest (1) that (mainly) interact via the internet (1) • an online group such as a forum (1) where members discuss (shared/common) topic/area/interest (1) • an internet group such as a chat room (1) dedicated to a (shared/common) topic/area/interest (1)	Do **not** accept a type of community without further information. i.e. forum/chat room by itself is not worthy of credit.	**2**

Question number	Answer	Additional Guidance	Mark
2(a)ii	Explain one way that membership of the online community could benefit Alex. Award one mark for each point to a maximum of **two** marks for a linked explanation such as: • he can meet/interact with people/students with similar interests (1) building relationships/networking to expand his social life/structure (1) • he can get (expert) advice on Biology/subject matters (1) from community members with more knowledge (1) • he can improve his self-image/sense of worth (1) by helping others in the community (1) • he can improve his (Biological) knowledge (1) by reading posts/interacting with other members (1)		**2**

Question number	Answer	Additional Guidance	Mark
2(b)	Give two ways by which an online community could be monetised. Award **one** mark for each way to a maximum of **two** marks: • use of customer data with targeted advertising (1) • (pay-per-click) advertising (1) • selling of customer data (1) • paid subscriptions/paywalls (1) • sponsored content (1) • ask for/accept donations (1) • sell (related) merchandise (1) Examples: • charge an access/membership fee (1) • have advertising on the online interface/website (1) • license content such as (Biological) images/blog posts (1)		**2**

Question number	Answer	Additional Guidance	Mark
2(c)i	Describe what is meant by personal data. Award one mark for each point to a maximum of **two** marks for a linked description: • information/data that relates to an individual/person (1) • unique to person/would allow them to be identified (1) • by several separate items of information being combined (1)	Allow examples for MP1	**2**

Question number	Answer	Additional Guidance	Mark
2(c)ii	Give **one** way in which a member could protect their account from unauthorised access. Award **one** mark for any password related measure such as: • use a (strong) password (1) • use a password manager (1) • keep their password securely/secret (1) • use two-factor authentication (1) • log off after visiting (when using public computer) (1)	Allow any sensible, password related measure.	**1**
2(c)iii	Explain **one** way that the people who run the online community could protect members' data from unauthorised access. Award one mark for each point to a maximum of **two** marks for a linked explanation such as: • encrypt the data/files (1) and use secure sockets layer (SSL) /encrypt the link to the (users) browser / so that hackers can't decode the data (1) • install/use a (web application) firewall (1) to protect the data/files/application server / prevent external/internet attacks (1) • use a Turing test/method of detecting bots (1) to recognise/reject non-human/automated input (1) • two-factor authentication/biometrics could be used (1) to ensure that only authorised users can access the data/files (1) • prevent SQL injection (1) by formatting/checking input fields / checking for unexpected/malicious input (1)		**2**

Question number	Indicative content.	Additional Guidance	Mark
2(d)	Answers should be in the context of Alex using an online environment when working remotely. • improved flexibility ◦ can work wherever there is internet access ◦ can work across time zones/differences ◦ can work to own schedule – field work during the day and catch up on studies in the evening or when not in the field ◦ may need to be at the location for some time for observation of plant growth • improved support ◦ able to stay in touch with tutors/students who are not at the field work location ◦ supervision of studies ◦ queries about the field work or other tasks ◦ submit drafts ◦ maintenance of links will help mental wellbeing and motivation • able to access (university) resources such as the library, online publications, image banks and through that to guided links to other publications ◦ access to recorded lectures ◦ access to live or recorded seminars and tutorials • able to submit work for review/grading without postage/return to university		**6**

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.	
		Total for Question 2	**17**

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

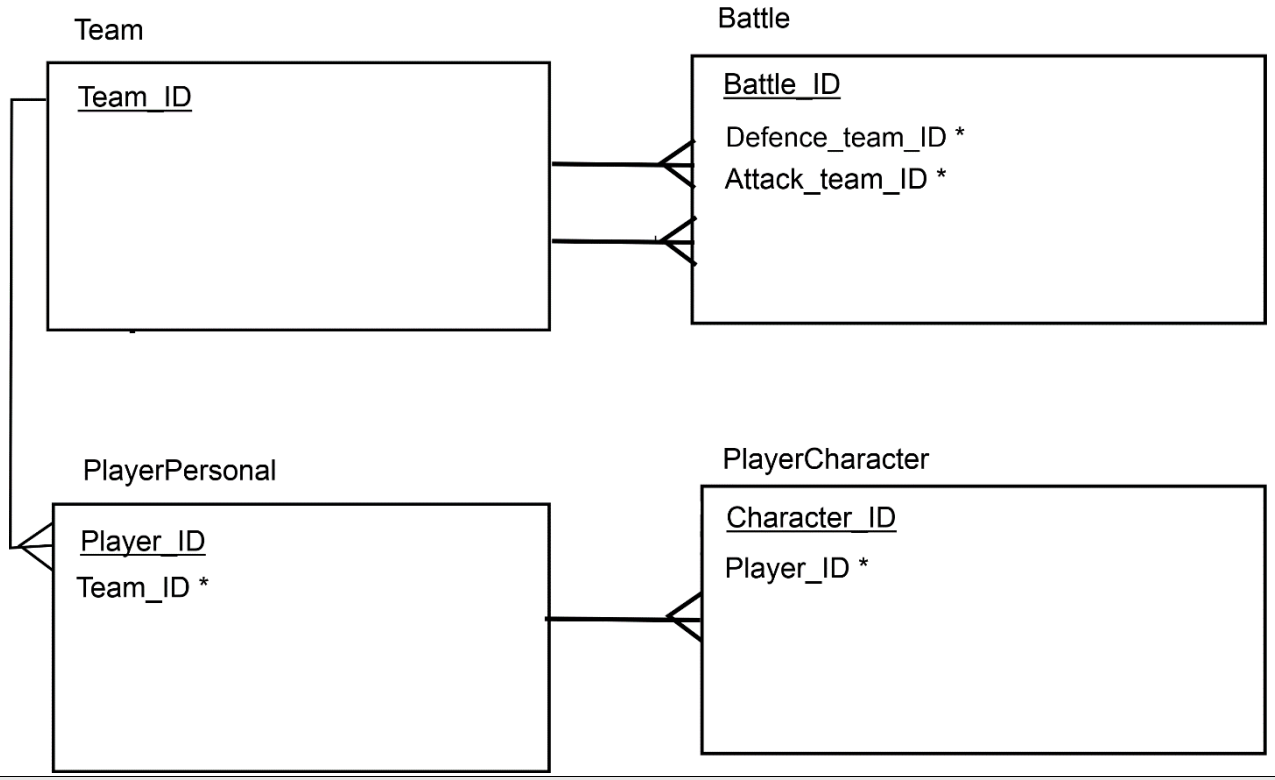
Question number	Answer	Additional Guidance	Mark
3 (a) ii	State the purpose of applications software. Award **one** mark for any one of: Allows users to perform (a range/variety of) tasks (1) To provide services to users (1)		**1**

Question number	Answer	Additional Guidance	Mark
3 (b)	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**

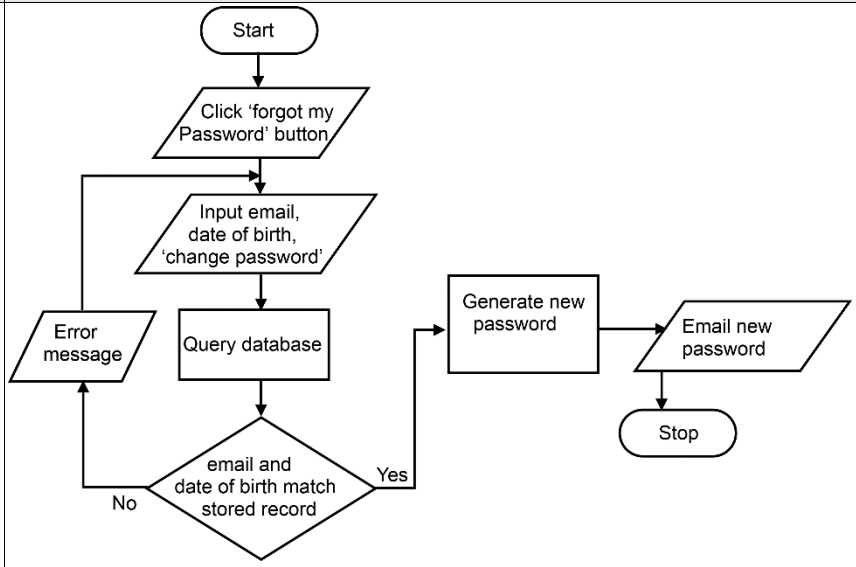
Question number	Indicative content.	Additional Guidance	Mark
3(c)	Answers should be in the context of the suitability of the license types for school use Multiple user • Requires a license for each user. • Could be per named user, per concurrent user (per seat). • Usage depends on the EULA. • Concurrent 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. 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.		**6**

	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.
		Total for Question 3 **10**

Question number	Answer	Additional Guidance	Mark
4(a)	Award **one** mark for each of: • one correct relationship • one correct relationship type • three correct primary keys • correctly identified foreign keys in PlayerPersonal and PlayerCharacter • Attack_team_ID in Battle • a complete diagram with no extra attributes or relationships or incorrect keys  		6

Question	Answer	Additional	Mark

number		Guidance	
4(b)	 **Note:** The flowchart is drawn to illustrate all the marking points. It is not the only answer. Award **one** mark for each of: • input email **and** date of birth • click 'change password' button • check email **and** date of birth against stored record (database query) • decision based on email **and** date of birth • error message in the correct place • generate a password in the correct place • output/email new password • correct loop. To a maximum of **six** marks		**6**
		Total for Question 4	**12**

Question	Indicative content	Mark

number		
5	Responses should be in relationship to the context, use of location awareness on a smartphone. **Technologies** • GPS • cell tower triangulation • Wifi access point triangulation • offline methods such as digital maps with user selection of location. **Advantages to the user of allowing location awareness in the app.** • app can tell user where they are • suggestions may include places that are not immediately visible/obvious to a tourist • app may suggest 'similar places' when a location is visited • app may include useful contact details, opening times, etc. • app may include booking/reservations/discount codes feature **Privacy problems due to the technology** • app sends the location to a central/company server • location can be tied to smartphone ID/international mobile subscriber identity (IMSI) • location logs could be used to track a smartphone and, by implication, its owner • information could be sold to advertisers/third parties • information could be stolen/hacked by third parties • information could be taken/subpoenaed by government. **Ethical and moral implications. May be given in terms of data protection laws.** • privacy, ethical issue of tracking people without their consent/knowledge or any legal obligations/redress • data harvesting, ethical issue of mass collection of data, even if anonymised, for e.g. advertising • using location to make judgements about the user, moral issue. e.g. determining that a user is near a bar or adult entertainment venue could result in a decision to serve adult themed adverts • ethical and/or moral issues about how much users are told about privacy implications and what	**12**

	settings/options the app may have to give users control • Legal issue, not asked for but may be mentioned. App user may be a minor and unable to give legal consent to data collection/tracking. **Conclusion** Might include: • an assessment of which method ◦ is least intrusive ◦ produces/stores least data about the user • suggestions for improving privacy/user control of the app • ideas about striking a balance between usability and privacy/data protection • ideas about whether the pressure group has a valid point	

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.
		Total for Question 6 **12**

Question number	Answer	Additional Guidance	Mark
6 (a)	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**

Question number	Answer	Additional Guidance	Mark
6 (b)	Award **one** mark for each item to a maximum of **twelve** marks: (a) Radar entity (b) Tag/vehicle entity (c) Barrier entity (d) Driver entity (e) Find tag ID process (f) Control barrier process (g) Generate/process toll charge/driver's account process (h) Payment process (i) Toll account store/file (j) All data flows have arrows showing correct direction of flow (k) Find tag ID process has links getting data from radar and tag/vehicle (l) Control barrier process has direct/indirect data link to control open **and** close (m) Payment process has a return of confirmation / new balance amount	The names given for data sources, store and movement may vary. Allow any reasonable alternatives as long as they're used consistently.	**12**
		Total for Question 6	**15**

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