



# Mark Scheme (Results) October 2021

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

Question number	Answer	Additional Guidance	Mark
1 (a)i	Award <b>one</b> mark for any of: <ul style="list-style-type: none"> <li>• faster/higher transmission rate (1)</li> <li>• greater bandwidth (1)</li> <li>• more secure (1)</li> <li>• more reliable/stable (1)</li> </ul>		<b>1</b>
1 (a)ii	Award <b>one</b> mark for any of: <ul style="list-style-type: none"> <li>• users can move around (with devices) (1)</li> <li>• simpler infrastructure (1)</li> <li>• easier to install (1)</li> <li>• easier to add mobile devices (1)</li> </ul>		<b>1</b>

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

Question number	Answer	Additional Guidance	Mark
1 (c)i	Award <b>one</b> mark for any of: <ul style="list-style-type: none"> <li>• network interface controller (1)</li> <li>• NIC (1)</li> <li>• network card (1)</li> <li>• network adaptor (1)</li> </ul>		<b>1</b>
1 (c)ii	Award <b>one</b> mark for each point up to a maximum of <b>two</b> marks for a description containing: <ul style="list-style-type: none"> <li>• MAC addresses are unique (1)</li> <li>• The router/LAN/WAP holds a list (1)</li> <li>• The router/WAP will check the MAC address against the list (1)</li> <li>• Only addresses on the list can connect (1)</li> </ul> Examples: <ul style="list-style-type: none"> <li>• Laptop MAC address held in a (white/allow) list in WAP/LAN/router (1) no other (MAC) addresses will be allowed to connect (1)</li> <li>• MAC addresses are unique (1) WAP/LAN/router holds a list of addresses that are allowed to connect (1)</li> <li>• The router checks the MAC address (1) against its list (1)</li> </ul>		<b>2</b>

Question number	Answer	Additional Guidance	Mark
1 (d)i	<p>Award <b>one</b> mark for each of:</p> <ul style="list-style-type: none"> <li>• Bytes to bits by using x 8 in the numerator</li> <li>• Gibibits to bytes by using 1024 x 1024 x 1024 in the numerator (2<sup>10</sup>)</li> <li>• Bits to seconds by using 10 x 1000 x 1000 x 1000 in the denominator</li> </ul> $\frac{20 \times 8 \times 1024 \times 1024 \times 1024}{10 \times 1000 \times 1000 \times 1000}$ <p>Time is 17.18 sec to 2 dec places, 17 sec to nearest whole second.</p>	<p>Accept any variation that works.</p> <p>Allow <b>one</b> mark for an answer of 17.2 or 17 with no expression.</p>	<b>3</b>
1(d)ii	<p>Award <b>one</b> mark for each point up to a maximum of <b>two</b> marks for any of:</p> <ul style="list-style-type: none"> <li>• switch not operating at 10Gbps/fast enough (1)</li> <li>• NIC/network card/other specified component not operating at 10Gbps/fast enough (1)</li> <li>• multiple file transfers at the same time will take up bandwidth/slow transfers down/take longer (1)</li> <li>• normal OS traffic will use some bandwidth (1)</li> <li>• collisions/packet loss require data to be sent more than once (1)</li> </ul>		<b>2</b>

Question number	Answer	Additional Guidance	Mark
1(e)i	Hardware firewall. Award <b>one</b> mark for any one of: <ul style="list-style-type: none"> <li>• on the router (1)</li> <li>• on a separate/dedicated device (1)</li> <li>• on the LAN gateway (1)</li> </ul>		1
1(e)ii	Software firewall. Award <b>one</b> mark for any one of: <ul style="list-style-type: none"> <li>• on each/all/any computer/PC (1)</li> <li>• on the server (1)</li> </ul>		1
<b>Total for Question 1</b>			<b>14</b>

Question number	Answer	Additional Guidance	Mark
2(a)i	<p>Describe what is meant by an online community.</p> <p>Award one mark for each point to a maximum of <b>two</b> marks for a linked description such as:</p> <ul style="list-style-type: none"> <li>• a group (of individuals/businesses) with a shared/common topic/area/interest (1) that (mainly) interact via the internet (1)</li> <li>• an online group such as a forum (1) where members discuss (shared/common) topic/area/interest (1)</li> <li>• an internet group such as a chat room (1) dedicated to a (shared/common) topic/area/interest (1)</li> </ul>	<p>Do <b>not</b> accept a type of community without further information. i.e. forum/chat room by itself is not worthy of credit.</p>	<b>2</b>

Question number	Answer	Additional Guidance	Mark
2(a)ii	<p>Explain one way that membership of the online community could benefit Alex.</p> <p>Award one mark for each point to a maximum of <b>two</b> marks for a linked explanation such as:</p> <ul style="list-style-type: none"> <li>• he can meet/interact with people/students with similar interests (1) building relationships/networking to expand his social life/structure (1)</li> <li>• he can get (expert) advice on Biology/subject matters (1) from community members with more knowledge (1)</li> <li>• he can improve his self-image/sense of worth (1) by helping others in the community (1)</li> <li>• he can improve his (Biological) knowledge (1) by reading posts/interacting with other members (1)</li> </ul>		<b>2</b>

Question number	Answer	Additional Guidance	Mark
2(b)	<p>Give two ways by which an online community could be monetised.</p> <p>Award <b>one</b> mark for each way to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• use of customer data with targeted advertising (1)</li> <li>• (pay-per-click) advertising (1)</li> <li>• selling of customer data (1)</li> <li>• paid subscriptions/paywalls (1)</li> <li>• sponsored content (1)</li> <li>• ask for/accept donations (1)</li> <li>• sell (related) merchandise (1)</li> </ul> <p>Examples:</p> <ul style="list-style-type: none"> <li>• charge an access/membership fee (1)</li> <li>• have advertising on the online interface/website (1)</li> <li>• license content such as (Biological) images/blog posts (1)</li> </ul>		2

Question number	Answer	Additional Guidance	Mark
2(c)i	<p>Describe what is meant by personal data.</p> <p>Award one mark for each point to a maximum of <b>two</b> marks for a linked description:</p> <ul style="list-style-type: none"> <li>• information/data that relates to an individual/person (1)</li> <li>• unique to person/would allow them to be identified (1)</li> <li>• by several separate items of information being combined (1)</li> </ul>	Allow examples for MP1	2

Question number	Answer	Additional Guidance	Mark
2(c)ii	<p>Give <b>one</b> way in which a member could protect their account from unauthorised access.</p> <p>Award <b>one</b> mark for any password related measure such as:</p> <ul style="list-style-type: none"> <li>• use a (strong) password (1)</li> <li>• use a password manager (1)</li> <li>• keep their password securely/secret (1)</li> <li>• use two-factor authentication (1)</li> <li>• log off after visiting (when using public computer) (1)</li> </ul>	Allow any sensible, password related measure.	<b>1</b>
2(c)iii	<p>Explain <b>one</b> way that the people who run the online community could protect members' data from unauthorised access.</p> <p>Award one mark for each point to a maximum of <b>two</b> marks for a linked explanation such as:</p> <ul style="list-style-type: none"> <li>• 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)</li> <li>• install/use a (web application) firewall (1) to protect the data/files/application server / prevent external/internet attacks (1)</li> <li>• use a Turing test/method of detecting bots (1) to recognise/reject non-human/automated input (1)</li> <li>• two-factor authentication/biometrics could be used (1) to ensure that only authorised users can access the data/files (1)</li> <li>• prevent SQL injection (1) by formatting/checking input fields / checking for unexpected/malicious input (1)</li> </ul>		<b>2</b>

Question number	Indicative content.	Additional Guidance	Mark
2(d)	<p>Answers should be in the context of Alex using an online environment when working remotely.</p> <ul style="list-style-type: none"> <li>• improved flexibility <ul style="list-style-type: none"> <li>◦ can work wherever there is internet access</li> <li>◦ can work across time zones/differences</li> <li>◦ can work to own schedule – field work during the day and catch up on studies in the evening or when not in the field</li> <li>◦ may need to be at the location for some time for observation of plant growth</li> </ul> </li> <li>• improved support <ul style="list-style-type: none"> <li>◦ able to stay in touch with tutors/students who are not at the field work location</li> <li>◦ supervision of studies</li> <li>◦ queries about the field work or other tasks</li> <li>◦ submit drafts</li> <li>◦ maintenance of links will help mental wellbeing and motivation</li> </ul> </li> <li>• able to access (university) resources such as the library, online publications, image banks and through that to guided links to other publications <ul style="list-style-type: none"> <li>◦ access to recorded lectures</li> <li>◦ access to live or recorded seminars and tutorials</li> </ul> </li> <li>• able to submit work for review/grading without postage/return to university</li> </ul>		6

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	<ul style="list-style-type: none"> <li>• Demonstrates limited knowledge and understanding, some of which may be inaccurate.</li> <li>• Applies understanding with limited coherence to produce a superficial and unbalanced discussion.</li> </ul>
Level 2	3-4	<ul style="list-style-type: none"> <li>• Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies.</li> <li>• Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.</li> </ul>
Level 3	5-6	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant knowledge and understanding throughout.</li> <li>• Applies understanding coherently to produce a balanced and fully developed discussion.</li> </ul>
		<b>Total for Question 2</b>
		<b>17</b>

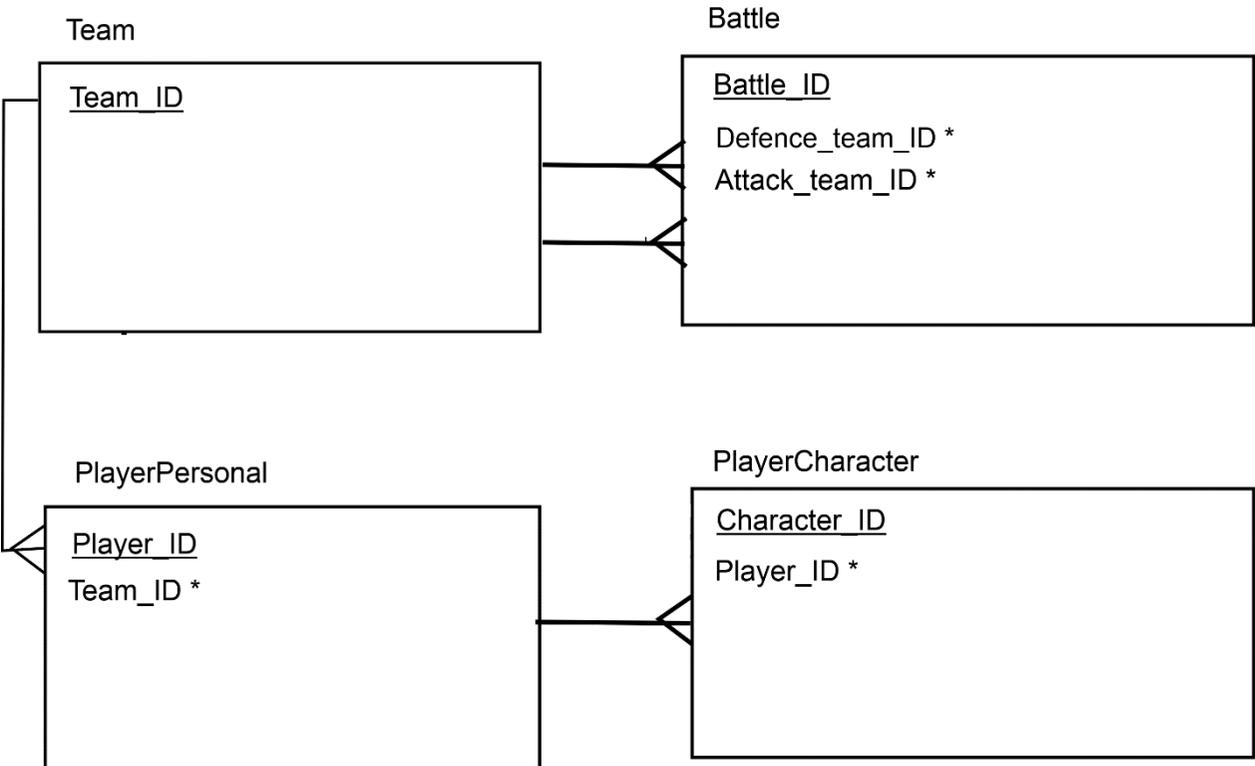
Question number	Answer	Additional Guidance	Mark
3 (a) i	State the purpose of system software.  Allows applications/other software/users to interact with/control the hardware/computer (1)		1

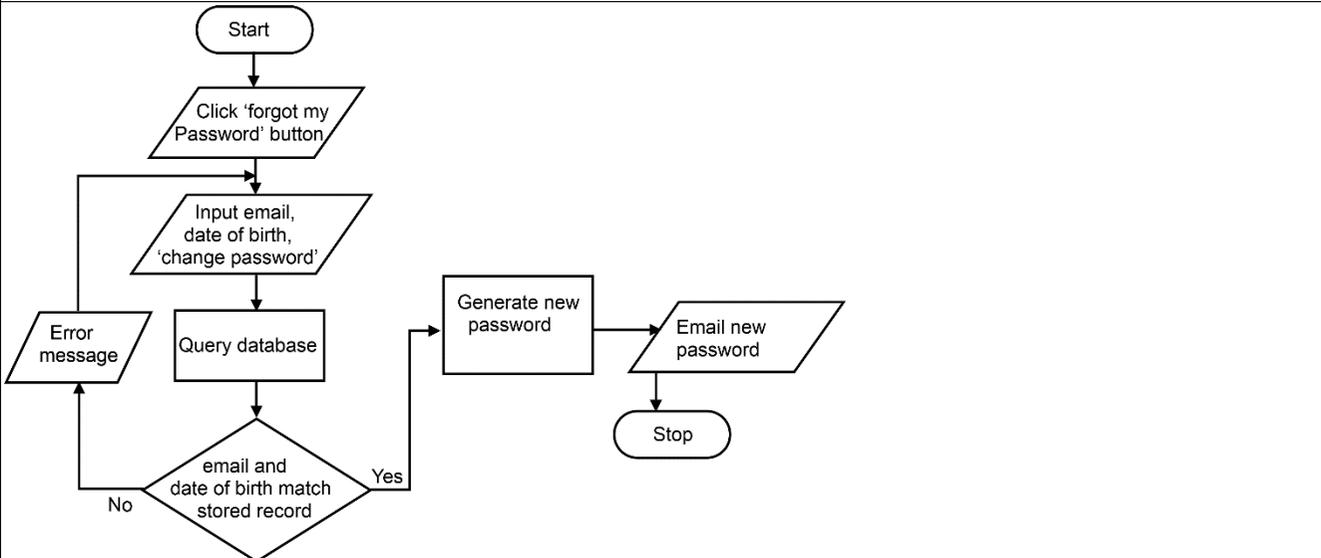
Question number	Answer	Additional Guidance	Mark
3 (a) ii	State the purpose of applications software. Award <b>one</b> mark for any one of:  Allows users to perform (a range/variety of) tasks (1) To provide services to users (1)		1

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 <b>two</b> marks for a linked explanation such as: <ul style="list-style-type: none"> <li>OS runs/uses/has anti-malware (1) which prevents students loading malware/virus (onto a PC) (1)</li> <li>OS controls logins/user accounts (1) only allowing students to use their own account (1)</li> <li>OS controls file access (1) only allowing students to access approved files (1)</li> <li>OS controls file access (1) allows different rights to students and teachers (1)</li> <li>OS has built in firewall (1) preventing unauthorised access from outside the network/from the internet (1)</li> </ul>	Allow other sensible security methods that could apply to a school network.	2

Question number	Indicative content.	Additional Guidance	Mark
3(c)	<p>Answers should be in the context of the suitability of the license types for school use</p> <p>Multiple user</p> <ul style="list-style-type: none"> <li>• Requires a license for each user.</li> <li>• Could be per named user, per concurrent user (per seat).</li> <li>• Usage depends on the EULA.</li> <li>• Concurrent use version could be suitable in the context.</li> <li>• Per named user could be expensive (possibly all students would need a licence).</li> <li>• Per named user could be difficult/time consuming to administer.</li> </ul> <p>Institutional</p> <ul style="list-style-type: none"> <li>• Also known as a site licence.</li> <li>• Usually charged on a scale based on the number of people in the institution, in this case probably the number of students.</li> <li>• Could be based on students plus staff.</li> <li>• May be discounted for educational establishments.</li> <li>• Could be appropriate if all/most students will use the art package.</li> </ul> <p>Network</p> <ul style="list-style-type: none"> <li>• A variety of multiple user licence.</li> <li>• Licenses concurrent users (per seat).</li> <li>• Number of users is controlled by a licensing application.</li> <li>• When the maximum number of allowed users are running the software concurrently, no further instances of the software will be allowed to start.</li> <li>• Could be appropriate as the maximum class size/ number of PCs available is usually known in advance.</li> </ul>		6

	<p>Conclusion</p> <ul style="list-style-type: none"> <li>• A separate conclusion is useful but not required. The information may be in the discussion of licence types.</li> <li>• There is no 'correct' answer. Network licenses are common in schools but candidates may be using other types.</li> <li>• Recommendations/conclusions should be supported by the arguments made about each licence type.</li> </ul>		
Level	Mark	Descriptor	
	0	No rewardable material.	
Level 1	1-2	<ul style="list-style-type: none"> <li>• Demonstrates limited knowledge and understanding, some of which may be inaccurate.</li> <li>• Applies understanding with limited coherence to produce a superficial and unbalanced discussion.</li> </ul>	
Level 2	3-4	<ul style="list-style-type: none"> <li>• Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies.</li> <li>• Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.</li> </ul>	
Level 3	5-6	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant knowledge and understanding throughout.</li> <li>• Applies understanding coherently to produce a balanced and fully developed discussion.</li> </ul>	
<b>Total for Question 3</b>			<b>10</b>

Question number	Answer	Additional Guidance	Mark
4(a)	<p>Award <b>one</b> mark for each of:</p> <ul style="list-style-type: none"> <li>• one correct relationship</li> <li>• one correct relationship type</li> <li>• three correct primary keys</li> <li>• correctly identified foreign keys in PlayerPersonal and PlayerCharacter</li> <li>• Attack_team_ID in Battle</li> <li>• a complete diagram with no extra attributes or relationships or incorrect keys</li> </ul>  <pre> erDiagram     Team   --o{ Battle : "Defence_team_ID"     Team   --o{ Battle : "Attack_team_ID"     PlayerPersonal   --o{ PlayerCharacter : "Player_ID"     </pre> <p>The diagram shows four entities: Team, Battle, PlayerPersonal, and PlayerCharacter. Team has a primary key Team_ID. Battle has a primary key Battle_ID and two foreign keys: Defence_team_ID and Attack_team_ID, both with a '*' indicating a many-to-one relationship with Team. PlayerPersonal has a primary key Player_ID and a foreign key Team_ID with a '*' indicating a many-to-one relationship with Team. PlayerCharacter has a primary key Character_ID and a foreign key Player_ID with a '*' indicating a many-to-one relationship with PlayerPersonal.</p>		6
Question	Answer	Additional	Mark

number		Guidance	
4(b)	 <pre> graph TD     Start([Start]) --&gt; Click[Click 'forgot my Password' button]     Click --&gt; Input[/Input email, date of birth, 'change password'/]     Input --&gt; Query[Query database]     Query --&gt; Decision{email and date of birth match stored record}     Decision -- No --&gt; Error[/Error message/]     Error --&gt; Input     Decision -- Yes --&gt; Generate[Generate new password]     Generate --&gt; Email[/Email new password/]     Email --&gt; Stop([Stop]) </pre> <p><b>Note:</b> The flowchart is drawn to illustrate all the marking points. It is not the only answer.</p> <p>Award <b>one</b> mark for each of:</p> <ul style="list-style-type: none"> <li>• input email <b>and</b> date of birth</li> <li>• click 'change password' button</li> <li>• check email <b>and</b> date of birth against stored record (database query)</li> <li>• decision based on email <b>and</b> date of birth</li> <li>• error message in the correct place</li> <li>• generate a password in the correct place</li> <li>• output/email new password</li> <li>• correct loop.</li> </ul> <p>To a maximum of <b>six</b> marks</p>		6
<b>Total for Question 4 12</b>			
<b>Question</b>	<b>Indicative content</b>		<b>Mark</b>

number		
5	<p>Responses should be in relationship to the context, use of location awareness on a smartphone.</p> <p><b>Technologies</b></p> <ul style="list-style-type: none"> <li>• GPS</li> <li>• cell tower triangulation</li> <li>• Wifi access point triangulation</li> <li>• offline methods such as digital maps with user selection of location.</li> </ul> <p><b>Advantages to the user of allowing location awareness in the app.</b></p> <ul style="list-style-type: none"> <li>• app can tell user where they are</li> <li>• suggestions may include places that are not immediately visible/obvious to a tourist</li> <li>• app may suggest 'similar places' when a location is visited</li> <li>• app may include useful contact details, opening times, etc.</li> <li>• app may include booking/reservations/discount codes feature</li> </ul> <p><b>Privacy problems due to the technology</b></p> <ul style="list-style-type: none"> <li>• app sends the location to a central/company server</li> <li>• location can be tied to smartphone ID/international mobile subscriber identity (IMSI)</li> <li>• location logs could be used to track a smartphone and, by implication, its owner</li> <li>• information could be sold to advertisers/third parties</li> <li>• information could be stolen/hacked by third parties</li> <li>• information could be taken/subpoenaed by government.</li> </ul> <p><b>Ethical and moral implications. May be given in terms of data protection laws.</b></p> <ul style="list-style-type: none"> <li>• privacy, ethical issue of tracking people without their consent/knowledge or any legal obligations/redress</li> <li>• data harvesting, ethical issue of mass collection of data, even if anonymised, for e.g. advertising</li> <li>• 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</li> <li>• ethical and/or moral issues about how much users are told about privacy implications and what</li> </ul>	12

		<p>settings/options the app may have to give users control</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul> <p><b>Conclusion</b> Might include:</p> <ul style="list-style-type: none"> <li>• an assessment of which method <ul style="list-style-type: none"> <li>◦ is least intrusive</li> <li>◦ produces/stores least data about the user</li> </ul> </li> <li>• suggestions for improving privacy/user control of the app</li> <li>• ideas about striking a balance between usability and privacy/data protection</li> <li>• ideas about whether the pressure group has a valid point</li> </ul>	
Level	Mark	Descriptor	
	0	No rewardable material.	
Level 1	1–4	<ul style="list-style-type: none"> <li>• Demonstrates limited knowledge and understanding, some of which may be inaccurate.</li> <li>• Applies understanding with limited coherence to produce a response that lacks development.</li> <li>• Demonstrates limited awareness of competing arguments.</li> <li>• Conclusion, if present, is generic or unsupported.</li> </ul>	
Level 2	5–8	<ul style="list-style-type: none"> <li>• Demonstrates knowledge and understanding, which is mostly relevant and may include some inaccuracies.</li> <li>• Applies understanding to make some coherent connections and a partially developed response.</li> <li>• Demonstrates some awareness of competing arguments, but this may be unbalanced, and partially supports conclusion with evidence.</li> </ul>	
Level 3	9–12	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant knowledge and understanding throughout.</li> <li>• Applies understanding coherently to produce a fully developed response.</li> <li>• Demonstrates an awareness of competing arguments and supports conclusion with evidence.</li> </ul>	
			<b>Total for Question 6</b> 12

Question number	Answer	Additional Guidance	Mark
6 (a)	<p>Describe how passive RFID works</p> <p>Award <b>one</b> mark for each point up to a maximum of <b>three</b> marks for a linked description.</p> <ul style="list-style-type: none"> <li>• tag reader sends a radio pulse/signal when (the radar indicates) <b>a vehicle is present</b> (1)</li> <li>• the radio pulse/signal powers the RFID chip/tag (1)</li> <li>• the chip/tag returns a (radio) signal with the tag ID (1)</li> <li>• the chip/tag contains an antenna (1)</li> <li>• the chip stores the tagID/data (1)</li> </ul>		<b>3</b>

Question number	Answer	Additional Guidance	Mark
6 (b)	<p>Award <b>one</b> mark for each item to a maximum of <b>twelve</b> marks:</p> <ul style="list-style-type: none"> <li>(a) Radar entity</li> <li>(b) Tag/vehicle entity</li> <li>(c) Barrier entity</li> <li>(d) Driver entity</li> <li>(e) Find tag ID process</li> <li>(f) Control barrier process</li> <li>(g) Generate/process toll charge/driver's account process</li> <li>(h) Payment process</li> <li>(i) Toll account store/file</li> <li>(j) All data flows have arrows showing correct direction of flow</li> <li>(k) Find tag ID process has links getting data from radar and tag/vehicle</li> <li>(l) Control barrier process has direct/indirect data link to control open <b>and</b> close</li> <li>(m) Payment process has a return of confirmation / new balance amount</li> </ul>	The names given for data sources, store and movement may vary. Allow any reasonable alternatives as long as they're used consistently.	<b>12</b>
<b>Total for Question 6</b>			<b>15</b>