5220-30-030/530 Level 3 Advanced Technical Certificate in Digital Technologies / Level 3 Advanced Technical Extended Diploma in Digital Technologies (720) – Theory Exam

Exam date: March 2019

Q1	State **two** specialist roles within a project team.			
Q1	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q1	**1 mark each for any of the following, to a maximum of 2 marks:** • financial staff (1) • resource manager (1) • estimators (1) • design staff (1) • team manager (leader) (1) • project support office (1)	The list contains specialist roles within a project team. The candidate may give specific examples of roles that are not included in the unit, such as: • Administrator • Human Resources / personnel • IT consultant • Security consultant Where an item is duplicated within the answers given, either by name or meaning, the duplicated item will not be awarded a mark. Marks are capped to a maximum of 1 mark for each valid item stated.	**2**	**5220-030 301.1.2** **AO1**
LO	301.1 Apply the principles of project management			

Q2	Explain the process of the following **two** stages of viability and financial considerations in Project Management. • Estimating. • Cost control.			
Q2	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q2	**2 marks each for any of the following, to a maximum of 4 marks:** • The <u>estimating stage</u> is used to create projections of likely costs that will be incurred (1) so that the overall project budget can be calculated and controlled (1). • <u>Cost control stage</u> is used to monitor the costs being incurred during all stages of the project (1) to avoid overspend/underspend on available budgets (1).	Candidates may give very different explanations from those in the model answers that are not included in the unit. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	**4**	**5220-030 301.1.1** **AO2**
LO	301.1 Apply the principles of project management			

Q3	Explain **each** of the following.				
	• Mandatory Access Control (MAC).				
	• Discretionary Access Control (DAC).				

Q3	Acceptable answer(s)	Guidance	Max mks	Ref
Q3	**2 marks each for any of the following, to a maximum of 4 marks:** • <u>Mandatory Access Control (MAC):</u> is a centralised system of securing access to resources (1) which does not permit the resource owner to grant or deny access (1). • <u>Discretionary Access Control (DAC):</u> allows individual resource owners to determine the security of the resource (1) and to control access to users and groups as they may decide (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	4	5220-030 302.1.1 AO2
LO	302.1 Apply Security concepts				

Q4	Explain one security risk associated with **each** of the following storage media types.				
	• Removable.				
	• Cloud.				
	• Local hard disk.				

Q4	Acceptable answer(s)	Guidance	Max mks	Ref
Q4	**2 marks each for any of the following, to a maximum of 6 marks:** • <u>Removable:</u> may be easily lost or stolen (1) thereby allowing unauthorised access to any unencrypted data (1) stored on the media. • <u>Cloud:</u> when using third party servers, data is located outside the organisation (1) you rely on the security provision put in place by the Cloud provider (1). • <u>Local hard disk:</u> data stored can be at risk from unauthorised access (1) if the local machine has weak or no access security (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	6	5220-030 302.2.2 AO2
LO	302.2 Determine infrastructure security				

Q5	State **four** threats to an IT system.			
Q5	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**

Q5	**1 mark each for any of the following, to a maximum of 4 marks:**
	
	• DOS - Denial of Service (1)
	• DDOS - Distributed Denial of Service (1)
	• back door (1)
	• spoofing (1)
	• man in the middle (1)
	• replay (1)
	• TCP/IP Hijacking (1)
	• weak keys (1)
	• mathematical (1)
	• social engineering (1)
	• birthday (1)
	• compromise password
	   o guessing (1)
	   o brute force (1)
	   o dictionary (1)
	   o software exploitation (1)
	• malware (1)
		The list contains threats to an IT system. The candidate may give specific examples of threats that are not included in the unit, such as:
		• Keylogger
		• Browser hijacking
		• SQL injection
		• Spear phishing
		• DNS hijacking/spoofing
		• Ransomware
		• Malicious attackers
		• User error/user inexperience
		• Power failures
		• Zero day attacks
		• Environmental hazards (eg fire or flooding that may affect IT infrastructure)
		
		Where an item is duplicated within the answers given, either by name or meaning, the duplicated item will not be awarded a mark.
		
		Marks are capped to a maximum of 1 mark for each valid item stated.
			4	5220-030 302.1.2
				
				AO1

LO	302.1 Apply security concepts			

Q6	Explain the use of **each** of the following cryptographic algorithms. • Hashing. • Symmetric.			
Q6	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q6	**2 marks each for any of the following, to a maximum of 4 marks:** • Hashing: uses an algorithm to generate a unique mathematical value (1) which is used to identify if changes have been made to the text (1). • Symmetric: uses a shared key (1) to encrypt and decrypt data (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	4	5220-030 302.3.1 AO2
LO	302.1 Identify types of cryptography			

Q7	State **four** types of network hardware.			
Q7	Acceptable answer(s)	Guidance	Max mks	Ref
Q7	**1 mark each for any of the following, to a maximum of 4 marks:** • workstation (1) • server (1) • Network Interface Card (NIC) (1) • repeater (1) • hub (1) • bridge (1) • Layer 2 switch (1) • Layer 3 switch (1) • router (1) • gateway (1)	The list contains types of network hardware. The candidate may give specific examples of network hardware types that are not included in the unit, such as: • IPS • IDS • Modem • Wireless access point • Wireless router • Firewall Marks must not be awarded for the use of brand names to represent applications. For example, Cisco is not acceptable to represent the devices they manufacture. Where an item is duplicated within the answers given, either by name or meaning, the duplicated item will not be awarded a mark. Marks are capped to a maximum of 1 mark for each valid item stated.	4	5220-030 303.1.2 AO1
LO	303.1 Determine physical and logical network topologies and components			

Q8	Explain one purpose of **each** of the following network software applications.			
	• Proxy server.			
	• Firewall.			

Q8	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q8	**2 marks each for any of the following, to a maximum of 4 marks:** • <u>Proxy Server:</u> intercepts requests from an application (eg Web Browser) to a real server to see if it can fulfil the request itself (1): if it can't it forwards the request to the real server (1). • <u>Firewall:</u> intercepts all messages passing in and out of a network (1) examining each message and denying those that fail to meet specified security rules (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	4	5220-030 303.1.2 AO2
LO	303.1 Determine physical and logical network topologies and components			

Q9	Explain the role of the following layers of the TCP/IP model.			
	• Transport.			
	• Internet.			
	• Network Access.			

Q9	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q9	**2 marks each for any of the following, to a maximum of 6 marks:** • The role of the <u>Transport layer</u> is to ensure end to end connectivity over a network (1) and the delivery of data to the intended destination (1). • The role of the <u>Internet layer</u> is to allow the routing of data between networks (1) using logical addressing schemes (1). • The role of the <u>Network Access layer</u> is to encapsulate data into frames (1) and to convert frames into a signal that can be transmitted on the physical media (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	6	5220-030 303.3.1 AO2
LO	303.3 Recognise the Transmission Control Protocol/Internet Protocol (TCP/IP) model of networking			

Q10	Explain **each** of the following logical data transmission methodologies. - Broadcast. - Token passing.			
Q10	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q10	**2 marks each for any of the following, to a maximum of 4 marks:** • <u>Broadcast</u> is where all data is transmitted to all devices on the network (1) and each device will only process the data directly addressed to it (1). • <u>Token Passing</u> requires a 'token' to be passed in a predetermined manner around the network (1) with only the device holding the token allowed to transmit (1) thus preventing collisions.	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	**4**	**5220-030 303.1.1** **AO2**
LO	303.1 Determine physical and logical network topologies and components			

Q11	Explain **each** of the following software development lifecycle models. • Waterfall. • Prototyping. • Spiral.			

Q11	Acceptable answer(s)	Guidance	Max mks	Ref
Q11	**2 marks each for any of the following, to a maximum of 6 marks:** • Waterfall: is a sequential development model where each phase is completed before the start of the next phase (1) and is best used for small projects easily defined in advance (1). • Prototyping: is where clear requirements are defined and a prototype is built (1) which is then repeatedly improved until a final model meeting all the requirements is produced (1). • Spiral: works by repeatedly iterating the same set of developmental processes (1) using risk based analysis to eliminate risk after each iteration (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	6	5220-030 305.1.2 AO2
LO	305.1 Determine the design of programming languages			

Q12	Explain the following fundamental principles of Object Oriented Programming. • Classes. • Encapsulation.			
Q12	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q12	**2 marks each for any of the following, to a maximum of 4 marks:** • <u>Classes</u>: a blueprint or set of instructions for creating a specific type of object (1) to represent a single entity (1). • <u>Encapsulation</u>: the process of hiding class members (1) to restrict access to them (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	**4**	5220-030 305.2.3 AO2
LO	305.2 Recognise common programming language data structures			

Q13	State **four** software technologies used in website construction.			
Q13	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**

Q13	**1 mark each for any of the following, to a maximum of 4 marks:**
	 • Html tags/elements (1)
	 • State v stateless (1)
	 • HTML5 (hypertext mark-up language) includes:
	  ○ CSS (how the elements will look) cascaded style sheets
	  ○ Scripting languages
	 • Interpretation by web browsers
	  ○ Status in session
	 • Style sheets
		The list contains software technologies in website construction. The candidate may give specific examples of software technologies that are not included in the unit, such as:
		  • SSL/TSL
		  • PHP
		  • SQL
		  • Server side scripting
		  • Client side scripting
		  • Frameworks
		
		 Where an item is duplicated within the answers given, either by name or meaning, the duplicated item will not be awarded a mark.
		
		 Marks are capped to a maximum of 1 mark for each valid item stated.
			4	5220-030 305.3.2
				
				 AO1

LO	305.3 Determine application software for business purposes			

Q14	State **two** elements that can be part of the requirements documentation in software development.			
Q14	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q14	**1 mark each for any of the following, to a maximum of 2 marks:** • Project aims (1) • Project management (1)	The list contains elements part of the requirements documentation in software development. The candidate may give specific examples of elements that are not included in the unit, such as: • SDLC • Application purpose • Application features • Input / Output requirements • Data requirements • Hardware constraints Where an item is duplicated within the answers given, either by name or meaning, the duplicated item will not be awarded a mark. Marks are capped to a maximum of 1 mark for each valid item stated.	**2**	**5220-030 305.4.1 -4.2** **AO1**
LO	305.4 Create documented code			

Q15	Explain the format of the following **two** numbering systems. • Binary. • Hexadecimal.			
Q15	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q15	**1 mark each for any of the following, to a maximum of 4 marks:** • <u>Binary</u> is expressed in the Base 2 numeral system (1) where there are only two states – "on" or "off" represented by the two symbols – 1 and 0 (1). • <u>Hexadecimal</u> is expressed in the Base 16 numeral system (1) using the ten symbols 0 – 9 then the six letters A, B, C, D, E, F to represent the sixteen digits (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. Marks awarded are capped for each separate explanation at a total of 2 marks. Candidates should be allowed to give any valid explanation and marks should be awarded for each distinct element in the explanation. Where a point is duplicated within each explanation, by meaning, the duplicated item will not be awarded a mark.	**4**	**5220-030 305.1.4** **AO2**
LO	305.1 Determine the design of programming languages			

Q16	You have been asked to produce a report for the Board of Trustees of a local charity regarding the development of an intranet website containing details of their volunteers and all the tasks needing allocation. Discuss what would be included in your report.			
Q16	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**

Q16	**Indicative content:**
	A candidate's discussion may include consideration of:
	• Life cycle models
	• Planning
	  o Sourcing
	    ▪ Budget
	  o Hardware
	    ▪ System requirements
	    ▪ Data storage strategies
	  o Software
	    ▪ Operating System
	    ▪ Applications
	  o Networks
	    ▪ Wireless
	    ▪ Wired
	    ▪ Cloud services
	  o Legislation
	  o Regulations
	  o Compliance
	• Design
	  o Skill requirements
	  o Data requirements
	  o Data storage
	  o Security
	    ▪ Threats
	    ▪ Vulnerabilities
	    ▪ Risks
	    ▪ Data
	    ▪ Countermeasures
	  o Hardware
	  o Software
	• Implementation
	  o Device configuration
	• Testing
	  o Test plan
	• Maintenance
	  o Security
		0 marks – No awardable material
		
		Band 1:
		1– 3 marks
		The response demonstrates a limited understanding of the processes and technologies involved and is mostly a statement of facts which are not developed. The approach to the task is inconsistent. Statements may be occasionally incorrect, and the use of precise technical language is sparse.
		
		Band 2:
		4 – 6 marks
		The candidate has produced a discussion that expands on the factual knowledge but lacks detail in some areas. They show an adequate understanding of the processes and technologies involved including some reasons for their selection. They have provided some valid reasons for their choices. The response is structured and presented in a logical order.
		
		Band 3:
		7 – 9 marks
		The candidate has produced a thorough discussion in a logical and professional manner. They show a thorough understanding of the processes and technologies involved and have covered these in the correct logical order, including reasons behind the processes and technologies, the factors that need to be considered and the impact these factors may have on the implementation. They have clearly understood how all of the processes and technologies link to one another in terms of order and importance. They have provided valid reasons for their choices. The response is clear, coherent and all information has been presented in a logical order.
			9	5220-030 301: 1.2, 2.1,2.2 302: 1.1, 1.2, 1.3, 2.1, 2.3, 2.5, 3.2, 303: 1.1, 1.2, 3.2, 4.1, 4.2 305: 3.1
				
				AO4

	o User support o Accounts o Fault log o Data backup o Data restoration			

LO	301: 1. Apply the principles of project management
	    2. Apply the stages of project management life cycles
	302: 1. Apply security concepts
	    2. Determine infrastructure security
	    3. Identify types of cryptography
	303: 1. determine physical and logical network topologies and components
	    3. recognise the Transmission Control Protocol/Internet Protocol (TCP/IP) model of networking
	    4. configure networks
	305 3. determine application software for business purposes			

| Q17 | A group of animal rescue shelters have joined together to reduce their costs by purchasing their equipment, medical supplies and animal feed as a consortium.
 They need to create a shared pricing and ordering system, accessed over the internet by a PC located in each shelter.

 Discuss what the consortium would need to consider for their system and how they should implement it. | | | |

Q17	Acceptable answer(s)	Guidance	Max mks	Ref

Q17	**Indicative content:**
	 A candidate's discussion may include consideration of:
	 • Life cycle models
	 • Planning
	    o Sourcing
	       ▪ Budget
	    o Hardware
	       ▪ System requirements
	       ▪ Data storage strategies
	    o Software
	       ▪ Operating System
	       ▪ Applications
	    o Networks
	       ▪ Wireless
	       ▪ Wired
	       ▪ Cloud services
	    o Legislation
	    o Regulations
	    o Compliance
	 • Design
	    o Skill requirements
	    o Data requirements
	    o Data storage
	    o ISP
	    o Security
	       ▪ Threats
	       ▪ Vulnerabilities
	       ▪ Risks
	       ▪ Data
	       ▪ Countermeasures
	    o Hardware
	    o Software
	 • Implementation
	    o Device configuration
	 • Testing
	    o Test plan
	 • Maintenance
	    o Security
		0 marks – No awardable material
		
		 Band 1:
		 1– 3 marks
		 The response demonstrates a limited understanding of the processes and technologies involved and is mostly a statement of facts which are not developed. The approach to the task is inconsistent. Statements may be occasionally incorrect, and the use of precise technical language is sparse.
		
		 Band 2:
		 4 – 6 marks
		 The candidate has produced a discussion that expands on the factual knowledge but lacks detail in some areas. They show an adequate understanding of the processes and technologies involved including some reasons for their selection. They have provided some valid reasons for their choices. The response is structured and presented in a logical order.
		
		 Band 3:
		 7 – 9 marks
		 The candidate has produced a thorough discussion in a logical and professional manner. They show a thorough understanding of the processes and technologies involved and have covered these in the correct logical order, including reasons behind the processes and technologies, the factors that need to be considered and the impact these factors may have on the implementation. They have clearly understood how all of the processes and technologies link to one another in terms of order and importance. They have provided valid reasons for their choices. The response is clear, coherent and all information has been presented in a logical order.
			9	**5220-030 301:** 1.1, 1.2, 2.1, 2.2, 3.1 **302:** 1.1, 1.2, 1.3, 2.1, 2.3, 2.5, **303:** 1.1, 1.2, 4.2 **305:** 1.2, 1.3, 1.4, 3.1, 3.2, 4.1, 4.2
				
				 AO4

	o User support o Accounts o Fault log o Data backup o Data restoration		

LO	301: 1. Apply the principles of project management
	    2. Apply the stages of project management life cycles
	    3. present a project review
	302: 1. Apply security concepts
	    2. Determine infrastructure security
	303: 1. determine physical and logical network topologies and components
	    4. Configure networks
	305: 1. determine the design of programming languages
	    3. determine application software for business purposes
	    4 . create documented code.		