City & Guilds

A City & Guilds Group Business

5220-32-036/536 Level 3 Advanced Technical Extended Diploma in Digital Technologies (720) (System Infrastructure) – Theory Exam (2)

Exam date: March 2019

Q1	State **four** factors that can be taken into account when preparing the scope for the development of a system.			
Q1	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q1	**1 mark for each item, maximum of 4 marks:** • Business requirements (1) • The function(s) of the system (1) • User requirements (1) • Regulatory/compliance requirements (1) • Integration with existing systems (1) • The services to be provided by the system (1) • Time frames involved (1) • Team members (1) • Resource constraints (1) • Access to available resources (1)	The list contains factors. The candidate may give specific examples of factors that are not included in the unit, such as: • Objectives • Goals • Sub-phases • Tasks • Budget • Risks associated with the project 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**	**320: 2.1 / 2.2** **AO1**
LO	320.2 Use analysis to define the scope			

Q2	Explain the purpose of the following stages of a 'system life cycle' when replacing an existing system. • Feasibility. • Implementation.			
Q2	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q2	**2 marks for each explanation, maximum of 4 marks:** • The purpose of the feasibility stage, is to establish firstly whether there is a need for the new system (1) and if there is a need, can the cost of the system be justified against the benefits that it will bring (1). • The purpose of the Implementation stage is to the convert the system specifications into a reliable solution (1). So that users can begin to perform required business operations with the system (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, when explaining feasibility the candidate may make consideration of the requirements / needs that need to be met and the cost involved in the project. 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**	**320: 1.3** **AO2**
LO	320.1 Determine a methodology to use during system developments			

Q3	Describe how the following methodologies are implemented as part of the analysis and design of a system. • Spiral. • Rapid application development (RAD).			
Q3	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q3	**2 marks for each description, maximum of 4 marks:** • Spiral models are implemented with increased emphasis placed on risk analysis (1) and the software project repeatedly passes through the phases in iterations (1). • Rapid Application Development (or RAD) is implemented based on prototyping and is an iterative model with no (or little) specific planning (1). Meaning less emphasis is placed on planning tasks and more emphasis is placed on developing a prototype (1).	Candidates may give very different descriptions from those in the model answers, but the answers must be technically accurate. For example, the Spiral model combines the features of the prototyping model and the waterfall model. It is favoured for large, expensive and complicated projects. Whereas Rapid application development (RAD) is a suite of software development techniques used to expedite software application development. RAD uses predefined prototyping techniques and tools to produce software applications. Marks awarded are capped for each separate description at a total of 2 marks. Candidates should be allowed to give any valid description and marks should be awarded for each distinct element in the description. Where a point is duplicated within each description, by meaning, the duplicated item will not be awarded a mark.	**4**	**320: 1.1** **AO2**
LO	320.1 Determine a methodology to use during system developments			

Q4	State **two** metrics that can be used when establishing a baseline for Cloud services.			
Q4	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q4	**1 mark for each item, maximum of 2 marks:** • Predicted costs (1) • Improvements to productivity (1) • Upload/download speeds (1) • Decreased administration (1) • Improved allocation of resources across development/maintenance (1) • Reduced salary costs (1) • Security of data storage (1) • Client feedback (1) • User feedback (1)	The list contains metrics that can be used when establishing a baseline. The candidate may give specific examples of metrics that are not included in the unit, such as: • Compliance with Service Level Agreements (SLAs) • Delivery models used • System/service availability • Mean time between failure • Mean time to repair • Scalability 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**	**321: 3.2** **AO1**
LO	321.3 Justify the use of cloud technologies.			

Q5	Explain how the following Cloud services are delivered. • Software as a Service (SaaS). • Platform as a Service (PaaS). • Infrastructure as a Service (IaaS).			
Q5	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q5	**2 marks for each explanation, maximum of 6 marks.** • Software as a service (SaaS) is delivered using a distributed model in which third-party providers host applications (1) and makes them available to customers over the Internet (1). • Platform as a Service (PaaS) is delivered by providing a platform allowing customers to develop, and host applications (1) without the need to build an infrastructure (1). • Infrastructure as a service (IaaS) is delivered by providing an infrastructure on an outsourced basis (1) allowing customers to install their own operating systems and applications (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, when explaining SaaS, the candidate may look at the use of existing network infrastructure to access SaaS services and clients paying for or subscribing to SaaS services. 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**	**321: 2.1/2 .2** **AO2**
LO	321.2 Determine how cloud technologies may be used			

Q6	Explain **two** potential cost savings that can be offered to an organisation by introducing Cloud services.			
Q6	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q6	**2 marks for each explanation, maximum of 4 marks:** • There will be a reduced requirement for expensive equipment (1) such as servers as the hosting organisation will provide the infrastructure. This will reduce the capital outlay (1) on server and other hardware. • The provisioning of resources is scalable to meet demand (1) therefore organisations will only pay for the resources that they use (1). • There will be a reduction in the amount of power consumed (1) by the organisation as they will no longer need servers. This will result in reduced spending on utilities (1). • The organisation will no longer have to purchase the latest applications (1) as the service provider will be responsible for providing the latest version of the software (1) as part of the service agreement. • The organisation will no longer be required to physically update software (1) as the service provider is responsible for undertaking maintenance tasks (1) as part of the service agreement. • There will be a reduction in the licence fees being paid upfront (1) as this will be built into the service charges (1). • The staffing overheads will be reduced (1) as there is no need for the organisation to employ IT technicians to perform routine maintenance tasks (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, there will be a reduced requirement for security hardware and software if the local infrastructure is reduced. A pay on demand model could reduce the costs as the organisation will only pay for the services and storage that they are using. 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**	**321: 3.1** **AO2**
LO	321.3 Justify the use of cloud technologies			

Q7	State **two** types of interconnection devices that can be used when creating a network.			
Q7	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q7	**1 mark for each item, maximum of 2 marks:** • Routers (1) • Switches (1) • Hubs (1)	The list contains types of interconnection devices. The candidate may give specific examples of types of interconnection devices that are not included in the unit, such as: • Bridge (1) • Repeater (1) • Wireless access point (1) • Wireless router (1) 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**	**322: 1.1** **AO1**
LO	322.1 Connect network components			

Q8	Describe how the following technologies are used when securing a wireless network. • Security Set Identifier (SSID). • Wired Equivalent Privacy (WEP). • Wi-Fi Protected Access (WPA).			
Q8	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q8	**2 marks for each explanation, maximum of 6 marks:** • Security Set Identifier (SSID) is used to identify wireless networks (1). All devices must use the same SSID to allow them to communicate over the wireless network (1). • Wired Equivalent Privacy (WEP) is used to provide a wireless local area network (WLAN) with a level of security and privacy comparable to that of a wired LAN (1). However, it has a number of flaws that can be easily exploited, therefore must only be used with legacy devices (1). • Wi-Fi Protected Access (WPA) secures a wireless network by using a 128-bit "temporal key integrity protocol" (TKIP) (1) which dynamically produces a new key for each data packet (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, explain one of the most significant changes between WPA and WPA2 is the mandatory use of AES algorithms and the introduction of CCMP (Counter Cipher Mode with Block Chaining Message Authentication Code Protocol) as a replacement for TKIP. However, TKIP is still preserved in WPA2 as a fall-back system and for interoperability with WPA. Candidates can be awarded marks for either WPA or WPA2. 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**	**322: 1.3** **AO2**
LO	322.1 Connect network components			

Q9	State **two** design factors that can directly affect the process of network management.			
Q9	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q9	**1 mark for each factor, maximum of 2 marks:** • Scalability (1) • Traffic patterns (1) • Performance (1) • Data traffic (1) • Data formats (1) • Heisenberg uncertainty principle (1) • Standards compatibility (1) • Resilience (1) • Availability (1) • Security (1)	The list contains design factors. The candidate may give specific examples of design factors that are not included in the unit, such as: • Skills • Software • Remote access 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**	**323: 1.1** **AO1**
LO	323.1 Recognise network performance and management			

Q10	Describe **each** of the following threats that a network. • Worms. • DoS attack . • Zombie.			
Q10	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q10	**2 marks for each description, maximum of 6 marks:** • A Worm is a form of malware that self-replicates across local networks (1) and is commonly spread by end-users plugging in mobile storage devices (1). • During a DoS attack, a hacker attempts to overload or shut down a service so that legitimate users can no longer access it (1) by sending more traffic to a computer than it can handle (1). • A Zombie is an infected computer that is remotely controlled by a hacker (1) and is part of a large group of compromised computers (1) called a Botnet.	Candidates may give very different descriptions from those in the model answers, but the answers must be technically accurate. For example, Worms either exploit a vulnerability on the target system or use some kind of social engineering to trick users into executing them. A DoS attack, candidates may describe a distributed denial of service attack (DDoS) as this displays an understanding of the processes employed, marks should be awarded. A Zombie, candidates may refer to Botnet when describing a large group of computers and is acceptable for the term to be awarded a mark. Marks awarded are capped for each separate description at a total of 2 marks. Candidates should be allowed to give any valid description and marks should be awarded for each distinct element in the description. Where a point is duplicated within each description, by meaning, the duplicated item will not be awarded a mark.	**6**	**323: 2.2** **AO2**
LO	323.2 Determine network security threats			

Q11	State **two** tools that are commonly used in providing technical support in an organisation.			
Q11	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q11	**1 mark for each tool, maximum of 2 marks:** • Software diagnosis (1) • Monitoring tools (1) • Remote diagnostic (1) • VNC (1) • Control panel (1) • Network monitoring (1) • Cable testers (1) • Tone testers (1) • Multimeter (1) • Feedback (1)	The list contains tools. The candidate may give specific examples of tools that are not included in the unit, such as: • Cable certifier • Optical loss test set (OLTS) • Light source and power meter (LSPM) • Optical Time-Domain Reflectometer (OTDR) 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**	**324: 1.2** **AO1**
LO	324.1 Identify techniques for providing technical support			

Q12	Explain how the following methods are used to provide technical support within an organisation. • Vendor support. • In-house technician.			
Q12	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q12	**2 marks for each explanation, maximum of 4 marks:** • Vendor support is used to provide technical support for newly purchased equipment or software. This is provided by the manufacturer for a limited period of time under warranty (1). During which they will fix or replace any faulty item (1). • In-house technicians are directly employed by an organisation to provide technical support for end users (1) resolving technical issues using both remote and face to face approaches (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, vendor support is provided to resolve issues that occur once a product has been purchased in the case of software this may involve supplying updates and patches. 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**	**324: 1.1** **AO2**
LO	324.1 Identify techniques for providing technical support			

Q13	Explain how the following 'Command Line Interface (CLI)' utilities are used to troubleshoot network issues. • Ping. • Trace route (tracert).			
Q13	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q13	**2 marks for each explanation, maximum of 4 marks:** • Ping: is used to send an echo request to a specific node (1). The replies from this node are displayed and can be used to determine if the connection is functioning (1). • Trace route (tracert): is used to determine the path taken to reach a specific destination (1) across networks, identifying any bottle necks that are encountered (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, Ping candidates must indicate that Ping is a Command Line utility that sends a request for information (echo request) to another device. The recipient then replies indicating how many packets were received. 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**	**324: 2.2** **AO2**
LO	324.2 Perform technical diagnosis			

Q14	List **four** roles associated with infrastructure management within an organisation.			
Q14	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q14	**1 mark for each role, maximum of 4 marks:** • System architect (1) • Network manager (1) • Hardware engineers (1) • Cable engineers (1) • Database administrator (1) • Data analyst (1) • Website analyst (1) • Website developer (1)	The list contains roles. The candidate may give specific examples of roles that are not included in the unit, such as: • Network technician • Network engineer • Infrastructure technician • 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.	**4**	**325: 1.1** **AO1**
LO	325.1 Identify infrastructure management roles and benefits			

Q15	Explain the use of the following centralised computing facilities within a large organisation. • Mainframe computers. • Distributed systems.			
Q15	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q15	**2 marks for each explanation, maximum of 4 marks.** • Mainframe computers are used primarily by large organisations for bulk data processing (1) and provides more memory, storage space and processing power than a standard computer (1). • A distributed system is used to provide end-users with an integrated network (1) by enabling the combining of multiple physical resources to perform tasks (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, candidate's answer must identify that a Mainframe is a large system that has extremely high specifications that are used primarily by large organisations for critical applications; bulk data processing, such as census, industry and consumer statistics, enterprise resource planning; and transaction processing. 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**	**325 3.1** **AO2**
LO	325.3 Determine internal infrastructure			

Q16	Explain the role of the following employees within an organisation. • Database administrator. • Network manager.			
Q16	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q16	**2 marks for each explanation, maximum of 4 marks:** • The role of a database administrator is to ensure compliance with data legislation/regulations (1) by controlling access to the data via permissions (1). • The role of a network manager is to ensure the availability of the network (1) and to manage the network support team (1) to ensure the SLAs in place are met.	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**	**325: 1.1** **AO2**
LO	325.1 Identify infrastructure management roles and benefits			

Q17	A chain of book stores is looking to consolidate their stock ordering systems, on to a centralised Cloud based system. At present they do not have a centralised ordering system, currently each store prepares and submits their orders directly to the publishers. Discuss the available technologies and any considerations that must be taken into account when moving to the Cloud based system.			
Q17	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**

Q17	**Indicative content:**
	A candidate's discussion may include consideration of:
	• Planning
	  ○ Sourcing
	  ○ Budget
	  ○ Hardware
	  ○ Cloud technologies
	  ○ Network infrastructure
	  ○ User requirements
	  ○ Legislation
	  ○ Regulations
	  ○ Compliance
	• Design
	  ○ Skill requirements
	  ○ Development timescales
	  ○ Data requirements
	  ○ Data storage
	  ○ Security
	  ○ Threats
	  ○ Vulnerabilities
	  ○ Risks
	  ○ Data
	  ○ Countermeasures
	• Implementation
	  ○ Device configuration
	• Testing
	  ○ Test plan
	• Maintenance
	  ○ Security
	  ○ User support
	  ○ Accounts
	  ○ Fault log
	  ○ Backing up data
		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 representing the sequences of processes that would be carried out during development.
		
		Band 3:
		7 – 9 marks
		The candidate has shown a thorough understanding of the processes and technologies involved. They have covered these in a 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 logically presented.
			9	**320: 1.2, 1.3, 3.1, 3.2**
				321: 1.1, 1.2, 2.1, 2.2, 3.1
				323: 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.2
				324: 1.1
				325: 1.2, 1.3, 2.1, 3.1, 3.2
				AO4

LO	**320: 1.2, 1.3, 3.1, 3.2**			

	321: 1.1, 1.2, 2.1, 2.2, 3.1 **323: 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.2** **324: 1.1** **325: 1.2, 1.3, 2.1, 3.1, 3.2**

Q18	You are employed as an IT technician for a small accounting firm. Following a ransomware attack on your organisations network, the senior partner has asked you to prepare a report. The report must discuss common security threats and the measures that can be adopted to mitigate against them. Discuss the considerations that must be taken into account when mitigating against potential threats.			
Q18	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**

Q18	**Indicative content:**
	A candidate's discussion may include consideration of:
	• Sourcing
	  ○ Budget
	• Hardware
	• Cloud technologies
	• Network infrastructure
	• User requirements
	• Legislation
	• Regulations
	• Compliance
	• Skill requirements
	• Data requirements
	• Data backup
	• Restoration strategies
	• Security
	  ○ Threats
	  ○ Vulnerabilities
	  ○ Risks
	  ○ Data
	  ○ Countermeasures
	• Implementation
	  ○ Device configuration
	• Testing
	  ○ Test plan
	• Maintenance
	  ○ Security
	  ○ User support
	  ○ Accounts
	  ○ Security baseline
		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 representing the sequences of processes that would be carried out during development.
		
		Band 3:
		7 – 9 marks
		The candidate has shown a thorough understanding of the processes and technologies involved. They have covered these in a 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 logically presented.
			9	**320: 1.2, 1.3, 3.1, 3.2**
				321: 1.1, 1.2, 2.1, 2.2, 3.1
				323: 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.2
				324: 1.1
				325: 1.2, 1.3, 2.1, 3.1, 3.2
				
				AO4

LO	**320: 1.2, 1.3, 3.1, 3.2** **321: 1.1, 1.2, 2.1, 2.2, 3.1** **323: 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.2** **324: 1.1**			

	325: 1.2, 1.3, 2.1, 3.1, 3.2