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

Exam date: June 2019

Q1	State **four** stages of a 'system life cycle' used when implementing new systems.			
Q1	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q1	**1 mark for each item, maximum of 4 marks:** • feasibility (1) • analysis (1) • design (1) • prototyping (1) • testing (1) • implementation (1) • monitoring (1) • management • maintenance (1)	The list contains stages of a system life cycle. The candidate may give examples of stages that are not included in the unit. Candidates may use different terminology to represent each stage and marks should be awarded if these are equivalent. 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: 1.3** **AO1**
LO	320.1 Determine a methodology to use during system developments			

Q2	Explain why the following factors are taken into account when defining a project scope for the development of a system. • Business requirements. • User requirements.			
Q2	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q2	**2 marks for each explanation, maximum of 4 marks:** • business requirements are the critical activities of an enterprise (1) that must be performed to meet the organisational objective(s) (1) while remaining solution independent. • user requirements identify specifically what the user expects the software to be able to do (1) to enable them to perform their role (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, business requirements • are critical activities • must be performed to meet organisational needs. user requirements • software/systems meets user's requirements • enables them to perform their role. 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: 2.1** **AO2**
LO	320.2 Use analysis to define the scope			

Q3	Explain how the following design diagrams can be used when documenting a new system. • Entity relationship. • Data flow diagram.			
Q3	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q3	**2 marks for each explanation, maximum of 4 marks:** • An entity-relationship (ER) is typically used in computing in regard to the organisation of data within databases or information systems (1) and is a diagram representing objects and the links between them (1). • A data flow diagram (DFD) is typically used as a preliminary step to create an overview of the system without going into great detail (1) and is a graphical representation of the "flow" of data through a system (1) modelling its state.	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**	**320: 3.3** **AO2**
LO	320.3 Design Information Systems			

Q4	State **two** types of Cloud services that can be used to support business activities.			
Q4	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q4	**1 mark for each item, maximum of 2 marks:** • Software-as-a-Service (SaaS) (1) • Platform-as-a-Service (PaaS) (1) • Infrastructure-as-a-Service (IaaS) (1) • Solution-as-a-Service (So-aaS) (1)	The list contains types of Cloud services. The candidate may give examples of types that are not included in the unit, such as: • Storage as a service (STaaS) (1) • Security as a service (SECaaS) (1) • Data as a service (DaaS) (1) • Test environment as a service (TEaaS) (1) • API as a service (APIaaS) (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**	321: 2.1 **AO1**
LO	321.2 Determine how cloud technologies may be used			

Q5	Explain the following Cloud models that can be used by organisations. • Public. • Private. • Hybrid.			
Q5	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q5	**2 marks for each explanation, maximum of 6 marks:** • Public Cloud is a computing service model offered by a third-party provider over the public Internet (1), making them available to anyone authorised to access them (1). • Private Cloud is a computing service model where IT services are provided over private IT infrastructure (1) for the dedicated use of a single organisation (1). • Hybrid Cloud is a computing service model that uses a mix of private infrastructure (1) and third-party, public infrastructure (1) to deliver the service.	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**	**321: 1.1** **AO2**
LO	321.1 Recognise cloud technology concepts			

Q6	Explain the impact of the following potential risks that can be encountered when conducting business using Cloud services. • Loss or corruption of client data. • Theft of client data.			
Q6	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q6	**2 marks for each explanation, maximum of 4 marks:** • <u>loss or corruption of client data</u> – results in a business being unable to conduct its normal operations (1) due to the data being unavailable to required processes (1). • <u>Theft of client data</u> – can result in a third party gaining unauthorised access to sensitive data (1) which may lead to prosecution for failure to comply with data protection regulations or legislation (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**	**321: 3.1** **AO2**
LO	321.3 Justify the use of cloud technologies			

Q7	State **two** types of cables 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:** • Unshielded Twisted Pair (UTP) cables (1) • Shielded Twisted Pair (STP) cables (1) • Coaxial cables (1) • Fibre optic cables (1)	The list contains types of cables. The candidate may give examples of types of cables that are not included in the unit, such as: • PowerLine • Cat 5e • Cat 6 • Cat 7 • RG57 It is not acceptable for marks to be awarded for the types of connectors associated with the cables. Where an item is duplicated for example Cat 5e, Cat 6 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	Explain the use of the following technologies when implementing a network. • DNS. • DHCP. • IP v4.			
Q8	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q8	**2 marks for each explanation, maximum of 6 marks:** • DNS is a service that is used to resolve a URL (1) into an IP address (1) which can then be used to send data between networks. • DHCP is a protocol that is used to automatically lease (1) an IP address to a device when they join a network (1). • IP v4 is a protocol that is used to provide a unique numerical address (1) which allows data packets to be sent to a specific host on a network (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, when explaining DNS the candidate may refer to web addresses rather than URLs. When considering IP v4 a candidate may explain that an IP address can be subnetted to allow extra host addresses to be made available. 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** metrics that can be used when monitoring network performance.			
Q9	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q9	**1 mark for each item, maximum of 2 marks:** • Reliability (1) • Availability (1) • Latency (1) • Throughput (1)	The list contains types of metrics. The candidate may give examples of types of metrics that are not included in the unit, such as: • Mean time between failures (MTBF) • Error and success rates • Service failures and restarts • Resource usage • Error rates • Packet loss • Bandwidth utilisation • Operational costs 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: 1.2** **AO1**
LO	323.1 Recognise network performance and management			

Q10	Explain how the following countermeasures operate when mitigating against threats in a network environment. • Public key encryption. • Private key encryption. • SSL.			
Q10	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q10	**2 marks for each explanation, maximum of 6 marks:** • Public key encryption mitigates against threats when the message sender uses the recipient's public key to encrypt the message (1) and the recipient's private key is used to decrypt the sender's message (1). • Private key encryption mitigates against threats when both the sender and recipient use the same key (1) to encrypt and decrypt the data (1). • SSL mitigates against threats by establishing an encrypted link (1) between a web server and a browser using SSL certificates (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**	**323: 2.1** **AO2**
LO	323.2 Determine network security threats			

Q11	State **two** techniques that are commonly used to gather information regarding a fault reported by an end-user.			
Q11	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q11	**1 mark for each technique, maximum of 2 marks:** • Questioning the end-user (1) • Identifying any changes made (1) to the system • Reviewing fault logs (1) • Reviewing helpdesk reports (1) • Observation (1) • Feedback (1)	The list contains techniques. The candidate may give examples of techniques that are not included in the unit, such as: • Online forums • Surveys • Emails • System Logs • Monitoring tools and utilities 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: 1.3** **AO1**
LO	324.1 Identify techniques for providing technical support			

Q12	Describe how the following methods can be used to determine a probable cause to a fault. • Trend analysis. • What if scenario.			
Q12	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q12	**2 marks for each description, maximum of 4 marks:** • Trend analysis establishes a theory of probable causes by gathering data from various sources (1) and analysing the data to identify emerging patterns (1). • What if scenario establishes a theory of probable causes by looking at a given situation and changing one single factor at a time (1) and observing the impact of the change (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**	**324: 1.3** **AO2**
LO	324.1 Identify techniques for providing technical support			

Q13	Explain how **each** of the following can contribute to the effective maintenance of technical support within a business environment. • Service Level Agreements (SLA). • Remote Support Services.			
Q13	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q13	**2 marks for each explanation, maximum of 4 marks:** • Service Level Agreements (SLA): contributes through the use of legally binding contracts (1) to define the scope of technical support agreed (1). • Remote Support Services: contributes by allowing a technician to assist an end user in solving computer problems (1) either showing what steps to take via screen sharing or with permission, taking control of the desktop and performing a task remotely (1).	Candidates may give very different explanations from those in the model answers, but the answers must be technically accurate. For example, candidates when explaining SLAs may consider fees time periods or response times. 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			

Q14	List **four** benefits that can be achieved by implementing a formal infrastructure management strategy.			
Q14	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q14	**1 marks for each benefit, maximum of 4 marks:** • Adherence to standards (1) • Enhance flow of services (1) • Enhance flow of data (1) • Interoperability of systems (1) • Fault prevention (1) • Fault detection (1) • Fault resolution (1) • Financial planning (1) • Improved productivity (1) • Complexity reduction (1) • Cost reduction (1) • Alignment of business and strategies (1) • Security optimisation (1) • Automation of processes (1) • Maintaining availability of service (1)	The list contains core benefits. The candidate may give examples of benefits that are not included in the unit. 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 1.3** **AO1**
LO	325.1 Identify infrastructure management roles and benefits			

Q15	Explain one benefit to an organisation of using **each** of the following centralised computing facilities. • Edge computing. • Grid computing.			
Q15	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q15	**2 marks for each explanation, maximum of 4 marks:** • Edge computing benefits an organisation by improving efficiency of data processing (1) through allowing load sharing of processes across a range of systems (1). • Grid computing benefits an organisation by implementing processor architecture that combines computer resources from various domains (1) through the use of multiple CPUs solving the same complex problem (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**	**325: 3.1** **AO2**
LO	325.3 Determine internal infrastructure			

Q16	Explain the type of technical support that an organisation can expect to receive from the following. • Tier 1 support. • Escalated support.			
Q16	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**
Q16	**2 marks for each explanation, maximum of 4 marks:** • Tier 1 support: provides the first point of technical support contact for the organisation's users (1) and can respond effectively to the majority of support calls within their level of authority (1). • Escalated support: provides support for problems beyond the technical ability /authority of Tier 1 support (1) as well as providing specialist support or advice (1) to users and the organisation.	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.	**4**	**325: 1.2** **AO2**
LO	325.1 Identify infrastructure management roles and benefits			

Q17	You are currently employed as an infrastructure technician for a car rental chain. They are currently connected to the Internet via an ADSL connection. They want to have a single system that improves their connection to external networks and offers a facility to connect to their vehicles. Discuss the available technologies and any considerations that must be taken into account when planning the upgrade.			
Q17	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**

Q17	**Indicative content:**
	A candidate's discussion may include consideration of:
	• Planning
	  ○ Life cycle models
	  ○ Sourcing
	  ▪ Budget
	  ○ Hardware
	  ○ Networks
	  ▪ Wireless
	  ▪ Wired
	  ○ User requirements
	  ○ Legislation
	  ○ Regulations
	  ○ Compliance
	• Design
	  ○ Skill requirements
	  ○ Development timescales
	  ○ Data requirements
	  ○ Data storage
	  ○ Security
	  ▪ Threats
	  ▪ Vulnerabilities
	  ▪ Risks
	  ▪ Data
	  ▪ Countermeasures
	  ○ Hardware
	  ○ Networks
	  ▪ Topologies
	  ▪ Media
	  ▪ IP addressing schemes
	• Implementation
	  ○ Device configuration
	• Testing
	  ○ Test plan
	• Maintenance
	  ○ Security
	  ○ User support
	  ○ Accounts
	  ○ Fault log
		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	An engineering company is considering the use of an entirely remote, third party Cloud-based service to store and back up their Computer Aided Design (CAD) drawings and client data. Discuss the available technologies and any considerations that must be taken into account when planning the new system.			
Q18	**Acceptable answer(s)**	**Guidance**	**Max mks**	**Ref**

Q18	**Indicative content:**
	A candidate's discussion may include consideration of:
	• Planning
	  ○ Life cycle models
	  ○ Sourcing
	  ▪ Budget
	  ○ Hardware
	  ○ Networks
	  ▪ Wireless
	  ▪ Wired
	  ○ Data migration
	  ○ User requirements
	  ○ Legislation
	  ○ Regulations
	  ○ Compliance
	• Design
	  ○ Skill requirements
	  ○ Development timescales
	  ○ Data requirements
	  ○ Data storage
	  ▪ Capacity
	  ▪ Data Transfer rate
	  ○ Security
	  ▪ Threats
	  ▪ Vulnerabilities
	  ▪ Risks
	  ▪ Data
	  ▪ Countermeasures
	  ▪ Backup
	  • Types
	  ○ Hardware
	  ○ Networks
	  ▪ Topologies
	  ▪ Media
	• Implementation
	  ○ Device configuration
	• Testing
	  ○ Test plan
	• Maintenance
		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 the correct 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

	○ Security ○ User support ○ Accounts			
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**			