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

Exam date: June 2018

1	Explain what takes place during the 'Deployment' phase of the Systems Development Life Cycle (SDLC).		
	Acceptable answer(s)	**Guidance**	**Max mks**
	2 marks for an explanation, maximum of 2 marks. The product is formally released into the intended business environment (1) where it is 'real world tested' [UAT – User Acceptance Testing] (1). This may be completed in stages to identify and correct any remaining bugs.	Any of the following or any other reasonable answer	2
2a	State **four** factors that can be included in a scoping document used in Systems Development.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	1 mark for **each** factor stated, 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)	Any of the following or any other reasonable answer	4
2b	Explain the purpose of **two** of the factors stated in Question 2a).		
	Acceptable answer(s)	**Guidance**	**Max mks**

| | 2 marks for **each** explanation, maximum of 4 marks.

<u>business requirements</u> – to ensure that all the stated objectives of the business have been included (1) in the brief in order to prevent 'project creep' (1). <u>function(s) of the system</u> - to ensure that the expected functions are within the capabilities of the project team to produce (1) and are all clearly documented at the outset (1). <u>user requirements</u> – to ensure that all user requirements are formally listed (1) and fully defined and documented (1). <u>regulatory / compliance requirements</u> – to ensure that all current regulatory / compliance requirements that affect the project are stated (1) and that the implications of any known future regulatory / compliance requirements are incorporated at the start (1). | Any of the following or any other reasonable answer | 4 |

	3	Explain the purpose of 'prototyping' a system.		

		Acceptable answer(s)	**Guidance**	**Max mks**
		2 marks for an explanation, maximum of 2 marks. To allow for a system to be built, tested, then adjusted (1) or re-worked until all requirements are met (1) as defined in the specification.	Any of the following or any other reasonable answer	2

4a	State **two** standard feasibility or justification metrics used in the deployment of cloud technologies.		

	Acceptable answer(s)	**Guidance**	**Max mks**
	1 mark for **each** metric stated, maximum of 2 marks. - predicted costs savings (1) - improvements to productivity justifies cost (1) - upload/download speeds (1) - increased business (1) - improved allocation of resources across development/maintenance (1) - reduced wage costs (eg technicians) (1) - security of data storage (1) - client feedback (1) - user feedback (1)	Any of the following or any other reasonable answer	2

4b	Explain how **each** of the two metrics chosen in Question 4a) provide an advantage when transitioning to cloud-based services for a business.

Acceptable answer(s	Guidance	Max mks
2 marks for **each** explanation, maximum of 4 marks. • <u>Predicted costs savings</u> – compared to current expenditure (1) or predicted expenditure without the transition to cloud-based services (1). • <u>Improvements to productivity</u> – forecasted increase in productivity (1) through adoption of improved (cloud based) collaborative working (1). • <u>Increased business</u> – through improvement in average time to market (1) with an increase in process efficiency (1). • <u>Reduced wage costs</u> – reduced wage costs involved in the management business IT infrastructure (1) and maintenance of IT Systems (1). • <u>Security of data storage</u> – data stored in a secure off-site facility (1), less likely to be lost eg theft of laptop (1).	Any of the following or any other reasonable answer	4

5	Explain one benefit for **each** of the following 'Cloud Technologies'. • Personal data storage and retrieval • Virtual meetings • Cloud computing.		

Acceptable answer(s)	Guidance	Max mks
2 marks for **each** explanation, maximum of 6 marks. • <u>Personal data storage and retrieval:</u> where personal files or information such as documents, photos or legally owned music, can be easily stored and retrieved (1) from almost any location with internet access (1). • <u>Virtual meetings:</u> where business personnel no longer need to travel long distances to hold meetings (1), but can see and hear each other use sound and video technology via the 'cloud' (1). • <u>Cloud computing:</u> internet-based computing allowing the sharing of hardware, software and processing resources (1) to maximise their efficiency and availability (1).	Any of the following or any other reasonable answer	6

6	State **two** network devices that allow wireless connectivity to network infrastructure.		

Acceptable answer(s)	Guidance	Max mks
1 mark for **each** stated, maximum of 2 marks. • Wireless access point (WAP) (1) • Wireless router (1)	Any of the following or any other reasonable answer	2

7	Explain **three** types of installation documents that need to be completed when installing a network.

Acceptable answer(s)	Guidance	Max mks
2 marks for **each** explanation, maximum of 6 marks. • <u>Physical (or Installation)</u> – a floor plan identifies the hardware, network devices (1) that comprise the network with their locations (1). • <u>Logical (or configuration)</u> – identifying the (IP) addressing scheme with subnets (1) in the network, considering any Broadcast domain that may result (1). • <u>Testing</u> – identifying the testing conducted across the network to ensure device connectivity (1) and appropriate access rights and permissions (1).	Any of the following or any other reasonable answer	6

8	State **two** factors of network design that directly affect the process of network management.		

Acceptable answer(s)	Guidance	Max mks
1 mark for **each** factor stated, maximum of 2 marks. • scalability (1) • traffic patterns (1) • performance (1) • data traffic and formats (1) • Heisenberg uncertainty principle (1) • standards compatibility (1) • resilience/availability (1)	Any of the following or any other reasonable answer	2

9	Explain a countermeasure/mitigation that can be successfully deployed for **each** of the following network threats. • Unauthorised Access • Logic Bomb • Malware.		

Acceptable answer(s)	Guidance	Max mks
2 marks for **each** explanation, maximum of 6 marks. • <u>Unauthorised Access</u> - Install and correctly configure a firewall (1) to prevent access via specified ports (1). • <u>Logic Bomb</u> – ensure a business continuity and disaster recovery plan is in place and up to date (1) and follow good security practices eg do not open unsolicited attachments to emails. (1). • <u>Malware</u> - update the operating system, browsers, and plugins (1) to enable any patches to be installed, and remove any unused legacy software (1).	Any of the following or any other reasonable answer	6

10	State **two** physical tools that can be used by network technicians to diagnose connectivity issues.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	1 mark for **each** tool stated, maximum of 2 marks. • Cable tester (1) • Tone tester (1) • Multimeter (1)	Any of the following or any other reasonable answer	2

11	Describe the use of the following **two** techniques during a diagnostic process. • Substitution • Replication.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	2 marks for **each** explanation, maximum of 4 marks. • substitution - swapping a possible defective hardware component (1) for a 'known good' component to determine if the original component was in fact faulty (1). • replication - reproducing the existing problem to demonstrate it (1) to a technician in order that a diagnosis may be completed (1).	Any of the following or any other reasonable answer	4

12	Explain one advantage for **each** of the following technical support communication methods: • Email • Forums.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	1 mark for **each** explanation, maximum of 4 marks. • email – electronic record of support request (1), is usually received quickly (1) enabling technicians to provide a fast response. • forums - forum members may be able to answer each other's questions (1) thereby reducing support costs (1).	Any of the following or any other reasonable answer	4

13	Explain the following **two** backup strategies. • Incremental • Differential.		
	Acceptable answer(s)	**Guidance**	**Max mks**

	2 marks for **each** explanation, maximum of 4 marks.	Any of the following or any other reasonable answer	4
	- Incremental backup - where on the first backup – all data is copied – (1) subsequently only data that has changed – since the last backup (1) - is copied to the backup media. - Differential backup - where on the first backup – all data is copied – (1) subsequently all data that has changed since the first full backup (1) – is copied to the backup media.		

14	Identify **four** core benefits of formal infrastructure management.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	1 mark for **each** benefit identified, maximum of 4 marks. - adherence to standards (1) - enhanced flow of services and data (1) - interoperability of systems (1) - fault prevention, detection and resolution (1) - disaster planning (1) - recovery planning (1) - financial planning (1) - improved productivity (1) - complexity reduction (1) - cost reduction (1) - alignment of business and it strategies (1) - security optimisation (1) - automation of processes (1) - maintaining availability of service (1)	Any of the following or any other reasonable answer	4

15	Explain **two** ways to diagrammatically represent an organisation's system infrastructure.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	2 marks for **each** explanation, maximum of 4 marks. - A structure diagram - is a development tool used to graphically model the different parts of a system (1), including details of all system interactions and individual components (1). - Hierarchy chart – shows layers or tiers (1) which indicate the relationship between the entities in the layers (1) of model in a parent, child, sibling format eg organisational chart. - Conceptual model – is a logical abstraction (1) of the domain entities (1) to be considered.	Any of the following or any other reasonable answer	4

16	Discuss the threats to existing data faced by a medium-sized business that is planning migration to cloud-based storage.		

	Consider the activities that can be undertaken to mitigate these threats, justifying any choices made.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	Band 1: **1 – 3 marks** There is little consideration given to the appropriate System Methodologies such as the Analysis, Design and Implementation of an Information System. The considerations of Network security threats is weak, with little understanding of countermeasures linked to cloud services evidenced. There is little discussion of Network Management and the technical support and backup strategies necessary to manage a network. **Band 2:** **4 – 6 marks** There is adequate consideration given to the appropriate Analysis, Design and Implementation of an Information System. The discussions of Network Security threats is adequate, with some understanding of countermeasures linked to cloud services demonstrated. There is appropriate consideration of Network Management and the technical support and backup strategies necessary to manage a network. **Band 3:** **7 – 9 marks** Comprehensive consideration given to the Analysis, Design and Implementation of an Information System. The discussions of Network security threats is thorough, with a realistic understanding of countermeasures and relevant linking to cloud services demonstrated. There is comprehensive consideration of Network Management and the technical support and backup strategies necessary to manage a network. The discussions of Cloud Technologies and Services is highly effective. Realistic deliberation of Network Management strategies, including Technical Support and Backup and testing is evidenced.	• System Methodologies, Analysis, Design and Implementation • Network security threats and countermeasures, Cloud services • Managing Networks, Technical Support and Backup Strategies ***For no awardable content, award 0 marks.***	9
17	Two multi-national charitable organisations have recently merged and are now seeking to rationalise their IT Infrastructure, systems and technical support. Discuss the processes that can be undertaken in order to provide clear recommendations to the Board of Directors on progressing the proposed rationalisation.		
	Acceptable answer(s)	**Guidance**	**Max mks**

			9
	Band 1: **1 – 3 marks** There is little consideration given to the appropriate scope, analysis and design of the organisation's information system requirements. The considerations of cloud technologies and services is sparse with little relationships drawn between services provided and required. There is a basic discussion of the requirement for data security, infrastructure management and technical support. **Band 2:** **4 – 6 marks** There is adequate consideration given to the scope, analysis and design, of the organisation's information system requirements The discussions of cloud technologies and services is realistic and is related to the perceived organisation's business need. Strategies for managing infrastructure, data security and technical support are thought through with a recommendation made. **Band 3:** **7 – 9 marks** Comprehensive consideration is given to the scope, analysis and design of the organisation's information system requirements. The discussions of cloud technologies and services is highly effective and is matched to the perceived organisation's business need. Strategies for managing infrastructure, data security and technical support are thoroughly considered with clear recommendations made.	**Indicative content** • Scope, analysis and design of an information system • Investigation and justification of cloud technologies and services • Infrastructure management, data security and provision of technical support *For no awardable content, award 0 marks.*	