Unit:
Computer Networks

Assignment title:
Marketing Company

December 2015 – Sample Assignment

Marking Scheme

Markers are advised that, unless a task specifies that an answer be provided in a particular form, then an answer that is correct (factually or in practical terms) **must** be given the available marks. If there is doubt as to the correctness of an answer, the relevant NCC Education materials should be the first authority.

This marking scheme has been prepared as a **guide only** to markers and there will frequently be many alternative responses which will provide a valid answer.

Each candidate's script must be fully annotated with the marker's comments (where applicable) and the marks allocated for each part of the tasks.

Throughout the marking, please credit any valid alternative point.

Where markers award half marks in any part of a task, they should ensure that the total mark recorded for the task is rounded up to a whole mark.

Task	Guide	Maximum Marks
1	**a)** The solution should include the following points: **1.** Ethernet (logical bus, contention based, usually UTP) **2.** Token ring (token access method, logical ring, Copper cable) - dead; **3.** FDDI – Fibre, double ring, token) – dead. **4.** Ethernet has dominated – initially through cost but performance increases dramatic – from 10Mbps to 10+ Gbps. **5.** Recommend Gigabit Ethernet to the desktop for future proof, given media, though 100baseT could be justified on basis of cost. **6.** Cable – discuss difference Cat5/5e/6. Cat 6 twice price of Cat5e, but safe for Gigabit	12
	b) The solution should include the following points: **1.** Baseband – single channel on media. Excellent answer would compare with Broadband (multiplex) **2.** Explanation of CSMA/CD **3.** Improved performance through higher data rates and switching	6
	c) The solution should include the following points concerning cabling: **1.** 10baseT – 10 megabits/ baseband/ UTP **2.** Hub – Layer 1 device – transmits all traffic on all ports **3.** Unsuitable – slow – 100baseT or 1000baseT better **4.** Switches to reduce contention (Layer 2) **5.** Structured cabling – wall plates, Patch panel, Trunking **6.** Local prices comparing Cat5e/ Cat 6./ patch panel/ trunking, switch (possibly installation!)	14
	d) The solution should include the following points concerning Wi-Fi: **1.** He is right that 802.11ac is up to 1Gbps. However, issues of contention, security with Wi-Fi, and 802.11ac is still very new. Better solution probably UTP + Access point with 802.11n for mobile devices. WiFi not as scalable. **2.** Expect table showing 802.11abcgn	8
		40
2	**a)** Valid explanation of Net address for tx/rx	2
	b) The explanation should include the following points: **1.** MAC – 48 bit layer 2 within LAN only **2.** IP 32 bit (IPV4) Layer 3 – Network part/ Host part for routing across networks **3.** Discussion of layers of OSI model (bottom 3 at least) Justification for layered approach	6
	c) The explanation should include the following points: **1.** MAC address – from mfr – hardware (good answers may id that it can be changed) **2.** IP – DHCP or static	3

Task 2 continues on next page

Task	Guide	Maximum Marks
	d) The explanation of routing should include the following point: 1. Discussion of 2-part IP address. Routers connect networks. Extra credit if discuss routing.	4
	e) The explanation of address space exhaustion should include the following points: 1. IPV6 2. NAT + explanation	5
		20
3	a) Concepts include: CIA – Confidentiality (course says Privacy, so accept it) Integrity Availability + definition. Accept others such as authentication, non-repudiation.	3
	b) The solution should include the following points concerning security controls: 1. Cyber Essentials minimum: Access control, Border (firewall), Anti-Malware, Secure configuration (no default pw etc), Patch/updates. Also backup/ UPS – on to HIDS, Proxy though probably a lot for this scale business. 2. Security Policies (technical and managerial, eg Password, acceptable use, backup) Security Training, Physical security 3. Audit/ Vulnerability scan	7
	c) The solution should include the following points concerning ports: 1. The aim here is for students to demonstrate that they know what a port is. A good answer will discuss TCP /IP and give examples of well-known ports. 2. Firewall should block any ports not used.	3
	d) Happy to take any reasonable answer with justification. Arguments can be made for insider threat, or Malware (on volume).	2
		15
4	a) Diagram should include at minimum: DSL Router/ Firewall/ Switch(es)/ Access Point/ Server (rack mounted)/ some client PCs/ Laptop/ mobile device/ should id the patch panel. Ideally separate Email server in DMZ or better still – hosted in the cloud.	6
	b) IP addresses expected to be private in the network. Good answers will id which are static (Router/server) and which are DHCP provided.	2
	c) Valid justifications attract marks, location of server should be secure, AP needs to be central.	5
	d) Prices will vary, but look for evidence of research.	2
		15

Task	Guide	Maximum Marks
5	**a)** Voice over IP – Internet Telephony, digital not analogue	2
	b) VOIP phones, connect to Ethernet, VOIP (PBX) server [could be hosted] with software such as Asterisk PBX system with Free PBX as the user interface. Need to contract a VOIP supplier, configure router and software	5
	c) Performance unlikely to be affected with High speed Fibre DSL connection, but with low speed Broadband (8Mbps/600kbps) the upload speed can be a limiter. Compounded by the QoS selected: 1. **Full Quality Audio (G711 Codec)**\- Uses 87 kbps for each concurrent phone call (NEB) **Compressed Audio (G729 Codec)**\- Uses 33 kbps for each concurrent phone call (NEB)	3
		10
		Total: 100 Marks

Learning Outcomes matrix

Task	Learning Outcomes assessed	Marker can differentiate between varying levels of achievement
1	1,2,4,	Yes
2	1	Yes
3	3	Yes
4	1,2,3,4,5	Yes
5	6	Yes

Grade descriptors

Learning Outcome	Pass	Merit	Distinction
Understand network and communication protocols	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand the principles of common network topologies and architectures	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand the application of network security measures	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Be able to select and configure the hardware components of a computer network to meet the requirements of a precise specification	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Be able to design and install network and server operating systems to meet the requirements of a precise specification	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Be able to install and configure internet telephony and communication systems	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard