



UNIVERSITY EXAMINATIONS: 2013/2014
EXAMINATION FOR THE MASTER OF SCIENCE IN
DATA COMMUNICATIONS
MDC 6204 NETWORK SYSTEM DESIGN

DATE: AUGUST, 2014

TIME: 2 HOURS

INSTRUCTIONS: Answer Question One and Any Other Two Questions

QUESTION ONE: [20 Marks]

KCA University has considered creating a network for their complex that has just been completed. The building is composed of five floors including the ground floor. You have been tasked to be the designer of this network which will later be connected to the rest of the University's network. It is assumed that you will base your design on Ethernet and all the floors will be cabled. It is further assumed that each floor will have approximately 200 computers. On each floor, there will be administrative computers which must be separated from the student computers.

Required:

- (a) Describe four goals that are common to any network design. [4 Marks]
- (b)
 - (i) What is the minimum number of wiring closets you would create for this particular network? [1 Mark]
 - (ii) Where would you place your MDF and why? [2 Marks]
 - (iii) What would be the minimum number of 24-port switches you will use for this network? [2 Marks]
- (c) Assuming that the average UTP cable run for each computer is 40 metres. How many reels of UTP cable would you require for wiring the whole building? Show your working. (*N.B. Assume that the length of one reel of UTP cable is 300m.*) [5 Marks]
- (d) Suppose the network you were to design was not for the company but for a home. Home

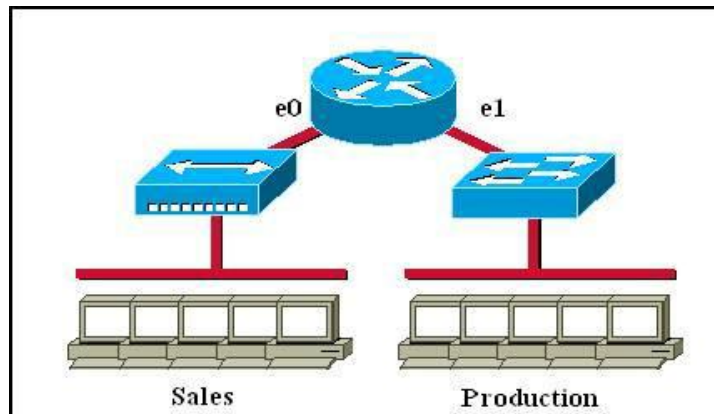
networking has some fundamentally different properties than other network types. Describe briefly six of these properties. [6 Marks]

QUESTION TWO [15 MARKS]

- (a) You are a systems administrator and you are about to assign static IP addresses to various servers on your network. For the network 192.168.20.24/29 the router is assigned to the first usable host address, while the last usable host address goes to your Sales server. Which address would you use for the router, the Sales server and the subnet broadcast? [6 Marks]
- (b) Continuity strategies and tactics should be devised in light of well-defined mission goals. Outline any three objectives to be followed when conducting network continuity planning in order to avoid superfluous or unwanted outcomes. [6 Marks]
- (c) Why is it difficult for some organizations to make a decision to move towards converged networks? [3 Marks]

QUESTION THREE [15 MARKS]

- (a) Study the diagram below carefully. How many collision domains and broadcast domains can you identify? Explain. [6 Marks]



- (b) Discuss the stages involved when gathering symptoms for a network problem. [5 Marks]
- (c) State and briefly discuss **four (4)** consequences of a network security breach. [4 Marks]

QUESTION FOUR [15 MARKS]

- (a) An operating system can be defined generally as the software that manages computer resources. Briefly explain how a NOS manages processes that are running in a networked environment. [4 Marks]

- (b) Ethernet technology defines how information communication is done at the Data Link and Physical Layers of the OSI Reference Model. Briefly discuss the reasons behind the success of this technology when it comes to networking. [3 Marks]
- (c) KCA University has purchased the Class B IP address 169.248.0.0. The Network Engineer has discovered that he needs to create 50 subnetworks for the University. You have been assigned the task of implementing these subnetworks using the purchased Class B address.
- (i) What is the subnet mask for entire network? Show your working. [3 Marks]
- (ii) Determine the increment and list the IP address ranges for the first five (5) subnetworks. [5 Marks]