

UNIVERSITY OF BOLTON – RAK CAMPUS

**SCHOOL OF BUSINESS AND
CREATIVE TECHNOLOGIES**

**MULTIMEDIA AND WEBSITE DEVELOPMENT
PATHWAY**

SEMESTER 2 EXAMINATION 2009/2010

COMPUTER NETWORKS

MODULE NO: MWD1014

Date: Wednesday 2 June 2010

Time: 1.00 pm – 3.00 pm

INSTRUCTIONS TO CANDIDATES:

There are **SIX** questions.

Answer **FOUR** questions.

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

Electronic calculators may be used provided that data and program storage memory is cleared prior to the examination.

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Question 1

- a. Give a definition of a computer network that includes the following terms: devices, protocols, media, resources, data communications, group.

(2 marks)

- b. With the aid of sketches explain the following local area network topologies...

- i. Physical topology
- ii. Logical topology

(4 marks)

- c. Sketch the RJ45 male connector and describe the difference between the following types of cables:

- i. UTP straight-through
- ii. UTP cross-over
- iii. A router console cable

(9 marks)

- d. Using a sketch, describe how the PCs in 6 adjacent IT suites are interconnected. Each suite uses a different class C network address using the default subnet mask.

The sketch should be clearly labelled and show two PCs per network, one representing the first and the other representing the last theoretically possible.

(10 marks)

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Question 2

- a. Explain the difference between private and public IP addresses. (4 marks)
- b. Using a table, list the ranges of class A, B and C private IP addresses. (6 marks)
- c. Give examples of public class A, B and C IP addresses and their default subnet masks dotted decimal format. (3 marks)
- d. Describe how to determine the network address and the host ID number from the IP address 192.168.130.15 and the subnet mask 255.255.255.0. Your answer should show the IP address and subnet mask in binary format and should involve the use of logical addition and logical inversion operations. (12 marks)

Question 3

- a. Using a class C network address of 192.168.246.0, give details of how to calculate the number of subnetworks and the number of hosts per subnetwork for each of the /26, /27 and /28 subnet mask scenarios. (6 marks)
- b. Referring to the /26 scenario of part 'a', sketch a network diagram showing 2 PCs per subnet, one representing the first and the other representing the last. Label all PC and router interfaces with their IP address and subnet mask. Also label the PCs with their default gateway addresses. (10 marks)
- c. What are the subnet addresses and the subnet broadcast addresses of the first 3 subnets of 192.168.1.0/30? (6 marks)
- d. Using a sketch, briefly describe what a /30 subnet mask is typically used for? (3 marks)

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Question 4

- a. Explain the function of the following devices and identify which of the network devices are said to be 'intelligent' in that they are able to make forwarding decisions.
- | | | |
|------|------------------------|----------|
| i. | Network interface card | (1 mark) |
| ii. | Repeater | (1 mark) |
| iii. | Hub | (1 mark) |
| iv. | Switch | (1 mark) |
| v. | Router | (1 mark) |
- b. With reference to the operation of a router, describe the function of the following items held in the router's memory...
- | | | |
|------|--------------------------------|--|
| i. | The startup configuration file | |
| ii. | The running configuration file | |
| iii. | The routing table | |
- (6 marks)
- c. How is a router connected to a PC for its initial 'out-of-the-box' configuration?
- (4 marks)
- d. Give a detailed list of the operations carried out at a router's CLI in order to configure it for the purpose of interconnecting two class C networks having the network addresses 192.168.2.0/24 and 192.168.3.0/24. State any assumptions made.
- (10 marks)

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Question 5

- a. Sketch and label the layers of the 7-layer OSI model used in the study of computer networks and give a brief description of the primary function of each layer and the names of the PDUs of the lower 4 layers.
(9 marks)
- b. Using a sketch describe the structure of the OSI layer 2 PDU giving the following details:
- i. the purpose of each of its fields
 - ii. the size of each field express in bytes
- (12 marks)
- c. Describe how a switch operates by making reference to the relevant parts of the layer 2 PDU and how it stores information in an internal table used to make forwarding decisions.
(4 marks)

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Question 6

- a. With reference to WANs, briefly describe the following terms:
- i. DTE/DCE
 - ii. CSU/DSU
 - iii. Local loop
 - iv. Demarcation point (8 marks)
- b. Describe the following WAN connection types:
- i. Point-to-Point
 - ii. Circuit switched
 - iii. Packet switched (9 marks)
- c. Briefly describe the following WAN technologies in terms of their basic operating principle and transmission speeds:
- i. Analogue dialup
 - ii. ISDN
 - iii. Leased line
 - iv. X.25
 - v. Frame Relay
 - vi. ATM
 - vii. DSL
 - viii. Cable modem (8 marks)

END OF QUESTIONS