UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2011/2012

COURSE NAME	:	NETWORK DESIGN
COURSE CODE	:	BIT 3303/ BIT 33003
PROGRAMME	:	BACHELOR OF INFORMATION TECHNOLOGY
EXAMINATION DATE	:	JUNE 2012
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS.

THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

Instruction: Answer **ALL** questions

Q1 (a) In addition to analyzing business goals and determining your customer's need to support new and existing applications, it is important to analyze any business constraints that will affect your network design.

Discuss **TWO (2)** of the following constraints:

(i) Politics and policies
(ii) Budgetary and Staffing Constraints
(iii) Project Scheduling

(6 marks)

(b) A network design customer has a goal of 99.80 percent uptime.

(i) Calculate how much down-time will be permitted in hours per week.
(ii) Calculate how much downtime will be permitted in minutes per day and seconds per hour.
(iii) Determine which values are acceptable in which circumstances.

(8 marks)

(c) A packet switch has five users, each offering packets at a rate of 10pps. The average length of the packets is 1024 bits. The packet switch needs to transmit this data over a 56 kbps WAN circuit. Calculate the following:

(i) Network Load
(ii) Utilization
(iii) Average number of packets in the queue (Queue Depth).

(6 marks)

(d) Consider the following scenario:

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UTHM has installed a web application called SMAP for its students.
After collecting the response time for the SMAP Web application it
was averaged at 112 ms.
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(i) Is this response time reasonably good?
(ii) State your reasoning.

(5 marks)

Q2 (a) Describe **FOUR (4)** types of traffic flow.

(8 marks)

(b) Characterizing traffic load can help you design networks with sufficient capacity for local usage and internetwork flows. Discuss how we calculate the traffic load of a network.

(6 marks)

(c)   Explain why we should not set the frame size larger than the medium supported.

(5 marks)

(d)   Using suitable diagram, demonstrate how routing loop occur.

(6 marks)

Q3   Consider the following scenario:

The city of Bolayan, Bota Pahat, which owns and operates its own power utility, built a fiber-optic network to monitor power meters at residents' homes. The network is called Bolayan Fiber Network (BFN). Because BFN had more capacity than was needed to monitor meters, the city expanded its services to offer access to the network for city businesses. The businesses use the network to communicate with each other and to access the Internet. At the BFN head end, which is located with the city government offices, a single router and high speed WAN links connect to the Internet for use by the city. The businesses on BFN also use this router to reach the Internet. In addition to the business service, BFN also offers cable modem service to homes. A cable modem router at the BFN head end connects to the fiber-optic network. In the city neighborhoods, hybrid fiber-coax nodes bring coax cabling to each street and into the homes for cable modem Internet access. The BFN backbone consists of a fiber-optic Gigabit Ethernet network that runs through the city in a ring topology. The fiber-optic ring connects the hybrid fiber-coax nodes that bring coax cabling to each neighborhood. Also connected to the ring are six data routers. Each router links one or more Bolayan businesses to BFN via simple point-to-point connections. At the business, the fiber-optic network enters the building and connects to a media (Fiber to UTP) converter. A UTP cable connects to the media converter and typically to a 100-Mbps Ethernet switch. The switch links the business's computers and servers in a star topology via UTP cabling.

(a)   Draw a network map that shows the topology of the BFN (show how the main components are connected).

(9 marks)

(b)   Compare **TWO (2)** possible multihoming options that can be applied to Bolayan Fiber Network to improve its Internet connection.

(6 marks)

(c)   Bolayan is considering expanding the BFN to include wireless access for its residences. Suggest additional investigation that can be done to prepare a citywide wireless network.

(5 marks)

(d)   Evaluate possible security concerns for the proposed citywide wireless network.

(5 marks)

Q4 (a) Differentiate between security policy and security mechanisms.

(2 marks)

(b) Provide **THREE (3)** examples for each of the following:

(i) security policy
(ii) security mechanisms

(6 marks)

(c) Selecting internetworking devices for a campus network design is part of the physical design phase. Compare the **FOUR (4)** interconnection devices from any **TWO (2)** aspects to support easy implementation of the network.

(8 marks)

(d) Consider the following scenarios:

Company A:
Marakuca Sdn Bhd is a big corporate with 10 branches accessing its corporate server farm located at its headquarters in Parit Raja.

Company B:
A small company with 100 employees is running its own web server for marketing purposes.

Propose suitable firewall topologies for each company.

(9 marks)