



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAM
SEMESTER I
SESSION 2012/2013**

COURSE NAME : HIGH SPEED NETWORK
COURSE CODE : BIT 3293 / BIT 32903
PROGRAMME : 3 BIT
EXAMINATION DATE : DECEMBER 2012 / JANUARY 2013
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FOUR(4)** FROM
FIVE(5) QUESTIONS ONLY.

THIS QUESTION PAPER CONSISTS OF EIGHT (8) PAGES

SECTION A

Instruction: Answer **ALL** questions.

- Q1** (a) 100BaseVG is a fast Ethernet that abandons the access method commonly used in Ethernet 100BaseT.
- (i) Compare the access method used in 100BaseVG and 100BaseT LAN technology. (6 marks)
 - (ii) Provide **TWO(2)** reasons why would one is better than the other. (4 marks)
- (b) With appropriate diagram, demonstrate **TWO(2)** advantages of an improved token passing access method used in FDDI over Token Ring. (9 marks)
- (c) Specify and justify suitable high speed transport media for the following case studies:
- (i) Sintiriana College Main Campus is located nearby the Klang River. A new branch is to be opened on the other side across the river. The new branch will receive its Internet connection via the main campus.
 - (ii) Core Switch 1 is to be connected to a core switch 2 in a campus wide network.
 - (iii) A student rented double storey house home network with 10 notebooks to a router with high speed broadband Internet connection. (6 marks)

Q2 (a) Both high speed technology such as ATM and Gigabit Ethernet offer great advantages to its adopters.

(i) Provide **THREE(3)** key advantages of each technology.

(12 marks)

(ii) Consider the following case study:

A new campus is to be setup in Pagoh, Johor for 8 universities all at one location to run many diploma programs with shared facilities. The network size will be like a new full size university campus. From network infrastructure aspect, a good technology that can offer high speed and reliable communication for the new campus backbone network is needed.

Specify and justify which technology – ATM or GE is more suitable for Pagoh campus network.

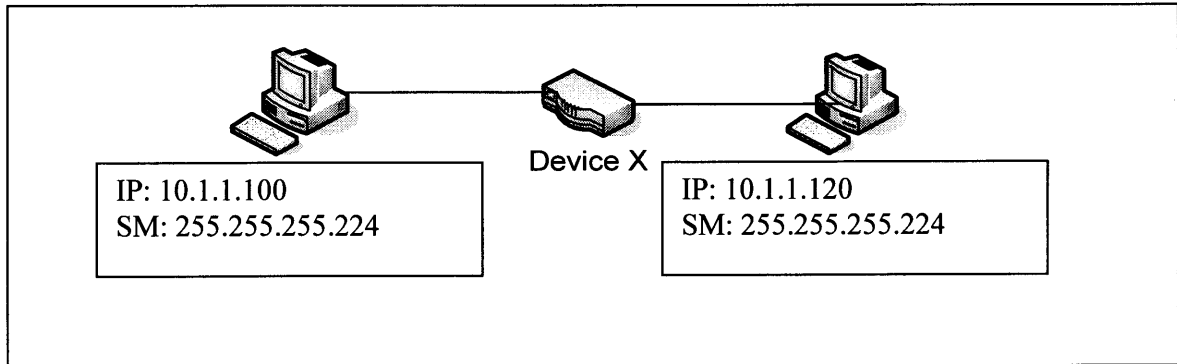
(5 marks)

(b) High speed LAN Wireless technology has evolved into 4 versions. Compare **TWO(2)** important features that distinguish the different versions.

(8 marks)

Q3 (a) Given the following scenario:

Pak Kundang and Pak Setahil from Kundang Setahil Sdn Bhd have prepared several questions and preconfigured the following network for an interviewing purpose. Using the following figure, answer all of the following questions.

**FIGURE Q3(a)**

- (i) Compare the difference between physical and logical addressing used in a network. (2 marks)
- (ii) Calculate the number of networks in a Class B IP address with default subnet mask. (1 mark)
- (iii) Which device cut broadcast domain into smaller ones? (1 mark)
- (iv) Assuming pinging from Computer A to Computer B is not successful, demonstrate necessary steps to determine what interconnection device X is. (5 marks)

(b) Given the following **TWO(2)** case studies:

Case A: Faculty of Computer Science, University of Royal Kerepek, Parit Raja has 2 buildings in the West Zone and 1 building in the East Zone. A packet sent from a computer in the West Zone will pass through 2 internal routers, 2 university distributor switches and 1 access layer switch before it reaches the Internet gateway located in the East Zone.

Case B: Taksuka and his wife Sukasuka are moving to their newly purchased home at Puri Kencanaka, Sri Gading. A packet sent from his wife's notebook will talk to a server located in Taksuka's computer before it goes out to Internet via a tmnet streamyx switch and router. From Taksuka's home the packet finally goes through several Internet routers/gateways before it reaches a website named www.ultraman.com in Japan.

(i) Draw a suitable packet layer flow diagram via various interconnection devices from the sender to the receiver.

(8 marks)

(ii) Propose a suitable high speed WAN technology for each case (state your reasoning to support your choice).

(8 marks)

SECTION B

Instruction: Answer **ONE(1)** question **ONLY**.

Q4 Given the following scenario:

Hai Spid Networks Sdn Bhd has hired you to advice on their new high speed enterprise network. After interviewing its IT Head, Dr. Sapiee Gamelov, the following information has been determined:

Headquarters: Kuala Lumpur

No.	Department	Number of network node required
1.	Deployment Access	150
2.	Deployment Infra	120
3.	R&D Department	50
4.	Strategic Planning	14

Southern Branch: Batu Pahat

No.	Department	Number of network node required
1.	Sales	123
2.	Executives	5
3.	Product Development	22

3 legal IPs have been purchased from Jaring - 190.1.1.0, 190.1.2.0, 190.1.3.0 each with default subnet mask 255.255.255.0. Besides that, they also have decided to provide email service to their staff, a web site to promote their company and also a streaming server. All nodes will be accessing the Internet using these legal IP, no internal IP addressing is allowed.

- (a) Design a network diagram for Hai Spid Networks Sdn Bhd. (4 marks)
- (b) Calculate how many subnets are needed in Hai Spid Networks Sdn Bhd (list all of these subnets). (2 marks)

- (c) Produce a table that tabulates all the subnets. Consider the following information to be included in your table:
- (i) Given IP
 - (ii) Subnet Address
 - (iii) Subnet Mask
 - (iv) Number of Host Supported
 - (v) Number of Host Needed
 - (vi) Address Range
 - (vii) Broadcast Address
 - (viii) Gateway Address
 - (ix) Assigned to which department
- (12 marks)

- (d) Generate configurations for the following device:

- (i) routers (2 marks)
- (ii) servers (3 marks)
- (iii) one(1) PC from each department. (2 marks)

- Q5** (a) Frame Check Sequence is an error checking mechanism specified in all LAN frame format. Assuming a message 1001011101101 is to be transmitted using a CRC polynomial $x^4 + x^3 + x + 1$.
- (i) Calculate the transmitted message using Cyclic Redundancy Check (show your work). (5 marks)
 - (ii) Demonstrate how the receiver side knows that the message has been corrupted. Assume the 5th bit of the transmitted message flipped (1 becomes 0 or 0 becomes 1). (5 marks)

(b) A switch has the following individual component MTBF and MTTR:

	MTBF	MTTR
Power Supply #1 Availability	= 300000	40
Power Supply #2 Availability	= 250000	60
CPU Availability	= 200000	32
Interface Card #1 Availability	= 250000	120
Interface Card #2 Availability	= 230000	100

Calculate the following:

- (i) Individual components availabilities
- (ii) Parallel parts availability
- (iii) End-to-end availability

(6 marks)

(c) A packet switch has 10 users, each offering packets at a rate of 20pps. 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:

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.

- (i) Is this response time reasonably good?
- (ii) State your reasoning.

(3 marks)

-END OF QUESTIONS-