



UNIVERSITY EXAMINATIONS: 2013/2014
EXAMINATION FOR THE MASTER OF SCIENCE IN
DATA COMMUNICATIONS

MDC 6301 NETWORK SYSTEMS IMPLEMENTATION AND MAINTENANCE

DATE: AUGUST, 2014

TIME: 2 HOURS

INSTRUCTIONS: Answer Question One and Any Other Two Questions

QUESTION ONE: [20 Marks]

- (a) Explain the following terms:
- i. Fairness as applied to a Routing Protocol
 - ii. Active Hub
 - iii. Network maintenance
 - iv. Routing table convergence
 - v. IP Bogon. (5 Marks)
- (b) Compare and contrast between a Switch and a Hub. (4 Marks)
- (c) A Ping is important network troubleshooting utility. During a network troubleshooting session, a network administrator obtained the following inform:
- ```
D:\Documents and Settings\Administrator>ping -t -l 64 -i 10 www.yahoo.com
Pinging ds-any-fp3-real.wa1.b.yahoo.com [46.228.47.114] with 64 bytes of data:
Reply from 4.69.143.133: TTL expired in transit.
Reply from 4.69.143.133: TTL expired in transit.
Reply from 4.69.143.133: TTL expired in transit.
Reply from 4.69.143.133: TTL expired in transit.
Reply from 4.69.143.133: TTL expired in transit.
Reply from 4.69.143.133: TTL expired in transit.
```

Reply from 4.69.143.133: TTL expired in transit.

Ping statistics for 46.228.47.114:

Packets: Sent = 7, Received = 7, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

Control-C

^C

D:\Documents and Settings\Administrator>

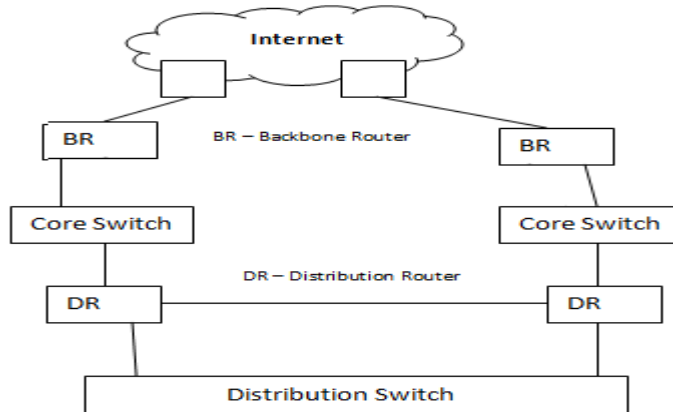
- i. Describe the parameters used in the ping utility above. (3 Marks)
  - ii. What is TTL? (1 Mark)
  - iii. Discuss the ping results statistics above. (2 Marks)
- (d) Describe the three IP address allocation mechanisms used by the DHCP. (5 Marks)

## **QUESTION TWO (15 MARKS)**

- (a) Discuss the following techniques of network design and their importance:
- i. Data partitioning
  - ii. Multi-Homing (4 Marks)
- (b) Outline the three guiding principles in network congestion control. (3 Marks)
- (c) Explain the classifications of congestion control algorithms. (5 Marks)
- (d) Briefly, discuss how the class boundaries of the IPv4 addresses are evaluated. (3 Marks)

## **QUESTION THREE (15 MARKS)**

- (a) Compare and Contrast between Connection and connectionless oriented services. (4 Marks)
- (b) Describe the three components of Access Control. (3 Marks)
- (c) The core network of a business enterprise consists of two backbone routers and two distribution routers connected as shown in the figure below.



i. Explain the following terms:

I. Subnet mask

II. Supernet.

III. Public IP address.

(3 Marks)

ii. The IP address range reserved for the backbone connectivity by the organization is

218.67.89.70/24, devise an IP addressing plan for the core network.

(5 Marks)

#### QUESTION FOUR (15 MARKS)

(a) Outline any four maintenance activities carried out on Routers.

(4 Marks)

(b) Briefly, discuss any three advantages and three disadvantages of using NAT.

(6 Marks)

(c) Explain how the following utilities are used in network maintenance:

i. ARP.

ii. Traceroute.

iii. IPconfig.

(3 Marks)

(d) Briefly, discuss the following network services:

i. DNS.

ii. Web.

(2 Marks)