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University Examinations 2018/2019

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATIONS FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY,BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND FORENSICS, BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY, BACHELOR OF BUSINESS INFORMATION TECHNOLOGY,BACHELOR OF SCIENCE IN INFORMATION SCIENCE AND BACHELOR OF SCIENCE MATHEMATICS AND COMPUTER SCIENCE AND BACHELOR OF EDUCATION SCIENCE

CIT 3202: NETWORK DESIGN AND IMPLEMENTATION/MANAGEMENT

DATE: SEPTEMBER 2019 **TIME: 2 HOURS**

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

a) Discuss any two signaling techniques applied in data transmission over copper media. (4 marks)
b) Explain the limitations of copper media and how they can be resolved. (4 marks)
c) Distinguish between the TCP verses UDP communications and provide examples of applications or services relying on each. (4 marks)
d) Using a table with entries, explain the nature of information captured by the following: (4 marks)
    (i) Arp cache
    (ii) Routing table
    (iii) Mac table
e) Discuss the client/server paradigm and design a network where a user can access a local network remotely via an internal gateway to access a web server. (4 marks)
f) Distinguish between a physical topology verses a logical topology. (4 marks)
g) Using a diagram, explain the data forwarding scenario between Host A and B using the PDU headers at each abstraction layer. (4 marks)
h) What is a 3-way handshake. (2 marks)

QUESTION TWO (20 MARKS)

a) From the example below, Host A needs to reach host B: (4 marks)
   (i) Configure static routes within the routers
   (ii) Display the arp entries in Host A and B

b) In the above topology:
   (i) Configure ip addresses for the router's interfaces. (4 marks)
   (ii) If the link to host B failed, explain 2 issues which may arise. (4 marks)
   (iii) Explain the role of the TTL value. (2 marks)
c) Why is frame relay not popular in today's networks. (4 marks)
d) Discuss the protocol used when Host A pings Host B. (2 marks)

QUESTION THREE (20 MARKS)

a) Give a brief history of the internet we enjoy today. (4 marks)
b) Explain the mechanisms of the Bellman-Ford algorithm in data transmission. (4 marks)
c) Distinguish between full-duplex verses half-duplex. (4 marks)
d) Using the Dijkstra algorithm, compute the cost metric of an interface with a bandwidth of 200Mbps. (4 marks)
e) List and explain any 4 network troubleshooting commands which rely on icmp. (4 marks)

QUESTION FOUR (20 MARKS)

a) How long would it take to download a 40MB file over a 128kbps link. (4 marks)
b) Design a network for an organization which manages a web server and a database server which is accessed by five remote users in each of the two sites, each site having three subnets. (4 marks)
c) From the above network design calculate the number of links using:
   (i) 2-tiered network design (2 marks)
   (ii) 3-tiered network design (2 marks)
d) Discuss the qualities expected of a network designer. (4 marks)
e) Distinguish between packet switching verses circuit switching. (4 marks)

QUESTION FIVE (20 MARKS)

a) When monitoring network performance, which tools can administrator use for the following: (4 marks)

   (i) Latency

   (ii) Hop count

b) Explain the following device features and give examples of where they apply: (4 marks)

   (i) Collusion domains verses broadcast domains

   (ii) Network scalability Verses Link redundancy

c) Distinguish between CSMA/CD verses CSMA/CA. (4 marks)

d) Discuss four types of network sizes and identify the internetworking devices applied. (4 marks)

e) What are the network security concerns of a network designer? (4 marks)