



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL INFORMATICS AND INNOVATIVE SYSTEMS
UNIVERSITY EXAMINATION FOR THE DEGREE OF SCIENCE
COMPUTER SECURITY & FORENSICS
2ND YEAR 1ST SEMESTER 2013/2014 ACADEMIC YEAR
CENTRE: MAIN

COURSE CODE: IIT 3217

COURSE TITLE: NETWORK DESIGN AND IMPLEMENTATION

EXAM VENUE: LR 6

STREAM: BSc. Computer Security & Forensics

DATE: 13/12/2013

EXAM SESSION: 11.30 – 1.30 PM

TIME: 2 HOURS

Instructions:

- 1. Answer question 1 (Compulsory) and ANY other 2 questions.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE

- a) Explain why CSMA/CA is used for wireless network. [3 Marks]
- b) Explain the hidden station and exposed station problem of wireless. What is the solution to this problem? [5 Marks]
- c) An 8-bit byte with binary value 10101111 is to be encoded using an even-parity Hamming code. What is the binary value after encoding? [7 Marks]
- d) State and explain the different types of errors [5 Marks]
- e) Briefly explain your understanding and the importance of subnetting of a network [4 Marks]
- f) State the difference between CIDR and the traditional IP addressing. Why is CIDR regarded as important? [6 Marks]

QUESTION TWO (20 Marks)

- a) An organization is granted the block 211.17.180.0/24. The administrator wants to create subnets. [8 Marks]
 - i) Find the subnet mask.
 - ii) Find the number of addresses in each subnets.
 - iii) Find the first and last addresses in subnet 1.
 - iv) Find the first and last addresses in subnet 32
- b) Explain the token and the leaky bucket algorithms [6 Marks]
- c) Explain the three fundamental characteristics that determine the effectiveness of the data communication system? [6 Marks]

QUESTION THREE (20 Marks)

- a) Briefly explain the three criteria necessary for an effective and efficient network. [6 Marks]
- b) Explain the different criteria used to evaluate transmission medium [6 Marks]
- c) Explain simple parity check code and checksum with example [4 Marks]
- d) You have configured a scope with an address range of 192.168.0.11 through 192.168.0.254. However, your DNS server on the same subnet has already been assigned a static address of 192.168.0.200. With the least administrative effort, how can you allow for compatibility between the DNS server's address and DHCP service on the subnet? [4 Marks]

QUESTION FOUR (20 Marks)

- a) JOOUST., has a branch office connected to corporate headquarters with a slow WAN link. The company wants to minimize the amount of traffic generated by the local DNS server on this link and minimize DNS administration in the branch office. How would you configure the DNS server to meet these requirements? Justify why the answer you have chosen is correct and why each of the remaining choices are incorrect. [6 Marks]
 - i). Disable round-robin and netmask ordering.
 - ii). Reduce the refresh interval in the SOA resource record for the primary zone.
 - iii). Do not configure any forward or reverse zones, but configure the server to use a forwarder.

- iv). Configure the forward lookup zone with a WINS lookup record, and decrease the cache time-out value.
- b) You are the system administrator for JOOUST. The University has grown rapidly over the past year, and currently JOOUST is using only a single DNS zone. Recently, the Procurement department has made several requests for DNS changes that were delayed. Users would like the ability to make their own DNS updates. What should you do to try to address this problem? [4 Marks]
- c) You set up Performance Logs and Alerts to send a message to ComputerB to notify an operator when the network bandwidth utilization on ComputerA reaches a certain level. However, ComputerB never receives the message sent from ComputerA. What must you do to enable messages to be sent by ComputerA and received by ComputerB? [4 Marks]
- d) Explain briefly how firewalls protect network [6 Marks]

QUESTION FIVE

- a) Explain network security. What are the types of security features used in client server types of network? [7 Marks]
- b) A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receivers end. [8 Marks]
- c) How is performance improved in CSMA/CD protocol compared to CSMA/CA protocol? [5 Marks]