(15)

(*Knowledge for Development*)

KIBABII UNIVERSITY
(KIBU)

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR ONE SEMESTER TWO EXAMINATIONS

FOR THE DEGREE OF MASTER OF SCIENCE IN (INFORMATION TECHNOLOGY)

COURSE CODE : MIT 825

COURSE TITLE : NETWORK MANAGEMENT

DATE: 19/06/2022 **TIME: 2.00 P.M – 5.00 NOON**

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [20 MARKS]

a) Explain how layer 2 switches make forwarding decisions and learn about potential destinations. **[3 marks]**

b) The users of a particular department are spread across a number of offices within a 500 meter area. Assuming UTP 5e cable is used and that you have a number of managed switches at your disposal discuss how those users could be added into a logical LAN. **[4 marks]**

c) Membership to VLANs can be either static or dynamic. Briefly explain what is meant by each of these terms and then compare and contrast the two methods – what are their advantages and disadvantages? **[5 marks]**

d) Explain how switches can be used to introduce redundancy to your network design and how loops can be avoided. **[4 marks]**

e) Explain the differences between bottom up and top down approaches to network troubleshooting. What approach would you take in order to solve a problem assuming you have no idea regarding its cause? **[4 marks]**

QUESTION TWO [20 MARKS]

a) Discuss in detail what might affect latency in transmissions? You must include all potential influences that could reduce the overall speed and effectiveness of a TCP traffic flow. **[4 marks]**

b) A router has discovered two possible routes to a particular network – the first route has been learned using Routing Information Protocol (RIP) and the second route using Enhanced Interior Gateway Routing Protocol (EIGRP). Which of these two routes will be added to the routing table and why? **[4 marks]**

c) Kibabii University is in the process of setting up a dedicated Internet Service Provider (ISP) to offer services to the International students amid Covid-19. The University Network Architect has decided to implement a telecommunication network to serve students in the region. Discuss the components of this telecommunication network required to reliably serve these students in the entire region. **[6 marks]**

d) With the globalization of telecommunications, the International Standards Organization

(ISO) developed the OSI model (open system) in order to organize protocols. Explain the benefits of the open system approach experienced by users who were used to proprietary protocol structure of a specific manufacturer. **[6 marks]**

QUESTION THREE [20 MARKS]

a) The operating system consists of various built-in, command-line networking utilities that are used for network troubleshooting and management. Explain each of the listed networking Commands.

i Ping **[2 marks]**

ii NetStat **[2 marks]**

iii Nslookup **[2 marks]**

b) Kenya Education Network (KENET) is a National Research and Education Network that promotes the use of ICT in Teaching, Learning and Research in Higher Education Institutions in Kenya. Discuss the main fundamental design goals that KENET should apply towards the provision of cost-effective, fast and reliable network connectivity and related services to enhance education and research. **[4 marks]**

c) Suppose you are a Network Design Engineer for Kibabii University why would you consider employing a hierarchical network design in the implementation of University Enterprise network? **[4 marks]**

d) You have been contacted to provide a solution to a broken Internet connectivity in your esteemed establishment. After troubleshooting, it turns out to be that a piece of network-protection software had installed a specific IP address entry for an alternative DNS server.

i What should have provided the correct DNS entry? **[1 mark]**

ii By concentrating on how DNS is intended to work, describe why network applications may not work correctly. **[3 marks]**

iii How would you diagnose this problem? **[2 marks]**

QUESTION FOUR [20 MARKS]

a) After a review of your network you discover that a single server is deployed for the purpose of providing the Dynamic Host Configuration Protocol (DHCP) service. Why is this a problem and how could this problem be addressed? **[4 marks]**

b) Discuss the advantages of utilizing router devices when implementing the network design for a corporate LAN. **[5 marks]**

c) You are designing the network for the campus of a large organization. The company owns a large amount of old hubs and old 10MB switches and due to budget limitation you have decided to redeploy a small number of them. Discuss which of those devices would you chose to use and how you would do so in the context of the three tier network design model. **[5 marks]**

d) In the context of the three tier architecture, discuss the functions and roles of the distribution and core layers. Would it be a good idea for a small company with 80 employees located in a single building to merge these two layers into one? **[6 marks]**

QUESTION FIVE [20 MARKS]

a) Explain what is meant by connection-oriented and connectionless communication. **[2 marks]**

b) Which layers of the ISO/OSI does the Frame Relay protocol operate on and would it be a better choice than X.25 if we wanted fast data transmission over reliable digital lines? **[4 marks]**

c) Explain the difference between the push and pull methods employed by SNMP (Simple Network Management Protocol). **[4 marks]**

d) Discuss the strategies than can be deployed in order to avoid risk, providing an example for each strategy presented. **[5 marks]**

e) Assuming a social engineering attack has been successful on a network and either some high privilege credentials have been compromised or some malware installed, what aspects of network design could limit the possible damage to data security and network functionality. **[5 marks]**