MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2012/2013

THIRD YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE
(HOMA BAY CAMPUS)

CCS 315: NETWORK ADMINISTRATION

Date: *3ʳᵈ August, 2013*   Time: *11.00 a.m.- 1.00 p.m.*

INSTRUCTIONS:

◆ Attempt Question ONE and any other TWO questions.

QUESTION ONE (30 Marks)

ABC is an IT Service Provider with an Internet based network of branches and extranet involving customers and trading partners. The operations of the company rely wholly on the communications network comprising underlying wired and wireless infrastructure spanning LAN, WLAN, MAN, WAN and public Internet. They have lately been unable to meet the 99.999% uptime of the network and are of the view that implementing the current SNMP tools will help them achieve the availability requirement. You have been engaged as a consultant in this effort and the company has asked you to provide an initial concept paper outlining the features of SNMP and high availability concerns covering the following aspects.

a) The functional model of SNMP and how this blends with the ISO FCAPS network administration model.   [4 mks]

   i) The organizational model of the protocol, with components and their relationships and architectures.   [3 mks]

   ii) The information model, concerning information structure and storage within the whole company network.   [3 mks]

   iii) The communications model, addressing the way information is exchanged between system components.   [3 mks]

b) A typical ISP network architecture to ensure how high availability may be assured.   [3 mks]

c) A dependent serial system comprises two switches and a router, through which packets must flow during an exchange between two hosts connected at each end. The router has an availability figure of 0.99998, while the two switches have an availability value of 99.95%.

   i) Determine the overall down time one is likely to experience in a year of 365 days.   [6 mks]

   ii) If the three devices are now connected in parallel, what will be the overall availability?   [6 mks]

   iii) If the downtime costs Kshs 200,000 per hour, what is the cost of the downtime?   [2 mks]

QUESTION TWO (20 Marks)

As a Network Administrator you have been asked to recommend for purchase a number of network components, including servers, network controller cards, backup storage, etc. Your recommendations will include a summary paper on

a) The salient features and characteristics that would influence your choice of one type of NOS. **[5 mks]**

b) A Comparison of the features, merits and demerits of the following types of hardware servers:
   i) Stand-alone servers
   ii) Rack mounted servers
   iii) Blade servers **[6 mks]**

c) Virtualization features of typical NOS and the benefits of using this technology in your network. **[5 mks]**

d) The functions of and positions within the NOS layers of NDIS and TDI interface standards. **[4 mks]**

QUESTION THREE (20 Marks)

The network at the XYZ Company has been expanding over the years. Originally it was largely a 10BaseT networks with several hubs, switches and routers interconnected by CAT-3 UTP. With modern applications such as graphics-intensive increasingly being used, the limitations imposed by the legacy Ethernet led to the adoption of Fast Ethernet technologies. The company is, however, now considering migration to a converged network environment in which 1000Base-T networks is being envisaged. To guide this process you are required to make brief notes on the following areas, for management review and decision making.

a) The principal benefits the company will realize upon migrating to 1000Base-Tinfrastructure. **[3 mks]**

b) How the following features of Gigabit Ethernet and its implementation will impact on network performance
   i) Frame bursting
   ii) Auto-negotiation
   iii) Link aggregation
   iv) The phases and the steps in the deployment of gigabit Ethernet. **[10 mks]**

c) Outline the characteristics and features that you would use to select between various Ethernet switch options. **[7 mks]**

QUESTION FOUR (20 Marks)

Wireless LANs are increasingly being deployed in enterprise networks. Your company has tasked you with the responsibility of introducing wireless solutions in your current network infrastructure. Before the final authority can be given for the project to be undertaken you are required to make a summary document on features, challenges, benefits and performance issues of wireless solutions. Prepare the document under the following headings:

a) Wireless LAN technologies 802.11b/g/n physical layer features and speeds   [6 mks]

b) Challenges posed by radio communications in WLANs and how they may limit performance in certain areas.   [2 mks]

c) Why CSMA/CD cannot be used for MAC.   [2 mks]

d) Ad hoc and Infrastructure architectures   [3 mks]

e) Procedure for Device association   [3 mks]

f) Roaming in WLANs, benefits and challenges.   [4 mks]

QUESTION FIVE (20 Marks)

a) Network troubleshooting can be associated with the various layers of the TCP/IP model. Give a brief outline of the typical network problems and the tools for detecting these problems at each of the following layers
   i) Physical layer
   ii) Datalink layer
   iii) Network layer
   iv) Transport layer
   v) Application layer   [10 mks]

b) A packet capture tool, such as Wireshark, gives the following basic information captured in a host within a LAN. Use the information to show the encapsulation at the Application, Transport, Network and datalink layers.

   00e0 f923 a820 00a0 2471 e444 0800 4500 002c 9d08 4000 8006 8bff
   808f 8990 808f 4715 065b 0050 0009 465b 0000 0000 6002 2000 598e
   0000 0204 05b4.   [10 mks]