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**University Examinations 2014/2015**

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

**HBT 2204: NETWORK SYSTEM DESIGN AND MANAGEMENT**

**DATE: DECEMBER 2014 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one (Section A)*** *and any other* ***two*** *questions in section B*

 *Marks are awarded for clear and concise answers*

 *Note that only question one (section A) and the first two attempted questions in*

 *section B will be marked.*

**SECTION A (Compulsory)**

**QUESTION ONE**

1. Differentiate between
2. Network availability and network reliability (3 marks)
3. Throughput and response time (2 marks)
4. Ping and trace route commands (2 marks)
5. Polling and traps as used in network management systems (2 marks)
6. Give the **FIVE** areas of network management as suggested by ISO (5 marks)
7. Diagrammatically show the OSI network management architecture model (5 marks)
8. Transport layer protocols provide end to end delivery of application data. Give the ONE transport layer protocol used by SNMP to achieve this task and why the protocol is considered to be simple (3 marks)
9. Give **TWO** examples of network monitoring tools available for each of the following categories
10. Active tools (2 marks)
11. Passive tools (2 marks)
12. Automated tools (2 marks)
13. Critical Network Service monitoring tools (2 marks)

**SECTION B –Answer only TWO questions from this section**

**QUESTION TWO (20 MARKS)**

You have been contracted by a busy telecommunications company to perform capacity planning for their network

1. What do you understand from the term capacity planning (2 marks)
2. Give **THREE** issues capacity planning is concerned with (3 marks)
3. Why is capacity planning important when designing a network (5 marks)
4. Briefly describe **THREE** key elements that describe adequate system capacity
5. marks)

e) While describing what a managed device is, explain why they are preferred over unmanaged ones (4 marks)

**QUESTION THREE (20 MARKS)**

You head an organization that critically depends on internet sources, and management wants you to come up with a solution that will reduce users complaints regarding the slowness of the internet. You consider that web caching will go along in addressing the problem.

1. With the aid of the basic architecture of your solution, briefly explain how web caching works (6 marks)
2. Identify all possible benefits that web caching would bring into an institutional network (4 marks)
3. Identify and describe three principal administrative groups that are classified as network management functional groups in an organisation (6 marks)
4. Network troubleshooting is an essential part of network management. Explain under what functional area(s) troubleshooting belongs. Explain using a diagram/flow-chart or otherwise the general fault management process (4 marks)

**QUESTION FOUR (20 MARKS)**

It is well known that tracking and ensuring accuracy of every configuration essential to a network is an enormous task with modern networks having several devices

1. Suggest the key features you will look for in a tool needed for network configuration management (6 marks)
2. Different applications have different requirement and different protocols have been developed to meet them. Differentiate between jitters and latency. Explain the impact of each in network performance (4 marks)
3. Briefly describe **THREE** kinds of network monitoring systems and tools (6 marks)
4. Describe the operation of SNMP (6 marks)

**QUESTION FIVE (20 MARKS)**

An autonomous system in a medium-sized organization consisted of fifty personnel all with personal computers or workstations. The entire group was on a single Ethernet LAN segment connected to one port of a six-port bridge. The single logical segment consisted of five (5) physical segments connected by four repeaters. The topology was thus a bus configuration and the cable drop to the desktop was with a coax T. Most of the activities of the group were internal to the segment, as were the servers, except the mail server, which was common to the entire corporation. Thus, most of the traffic was internal to the LAN segment, except for email and backup operations, which were across the bridge.

1. Capture the network topology described above diagrammatically, showing all information described and explaining the purpose of each network element (5 marks)

As the volume of activities increased, the network segment would go down frequently. The problem was especially severe during heavy data bursts such as code compilation. Initially, the problem was attributed to people disturbing the cable or to the failures of the repeaters because only one group’s segment went down. In an attempt to solve the problem, the cables and repeaters were replaced. However, the problem did not go away

1. Based on your knowledge of networking and interconnection devices, trace the problem

(5 marks)

Every time the network went down, the bridge had to be reset. This involved all the hosts in the segment going down and when the bridge came up, it needed to acquire all the addresses for routing purposes. To solve the problem, the LAN segment was split into two and used two ports of the bridge.

1. Capture the network topology described above diagrammatically (3 marks)

The problem was not, however, eliminate by the action described above.

1. As the network manager, and on the basis of your networking knowledge, propose a permanent solution to the problem in a cost-effective manner. Diagram your solution (7 marks)