**KIBABII UNIVERSITY COLLEGE**

**(A constituent College of Masinde Muliro University of Science and Technology)**

**UNIVERSITY EXAMINATIONS**

**2013/2014 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER EXAMINATIONS**

**FOR THE DEGREE**
**OF**
**BACHELOR OF SCIENCE (COMPUTER SCIENCE)**

**COURSE CODE:** CSC 322

**COURSE TITLE:** COMPUTER NETWORKS

**DATE:** **TIME: 3 Hours**

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**INSTRUCTIONS**

Answer **QUESTION ONE a**nd attempt **ANY OTHERTWO** questions

**QUESTION ONE**

a) Define the "open system" concept. [2mks]
b) The IP Protocol and most LAN and WAN protocols are classified as "unreliable". Briefly explain what this "unreliable" description refers to. [3mks]
c) Explain the difference between the two packet data transfer techniques referred to as "connectionless" *and* "connection-orientated". [6mks]
d) List three reasons why most network specialists prefer Link State Routing instead of Distance Vector Routing. [6mks]
e) Briefly describe circuit switching and packet switching. [2mks]
f) Differentiate between routing and forwarding [2mks]
g) Differentiate between a bridge and a switch? What are the motivations to use bridges and switches? [4mks]
**h)** Differentiate between Link-Layer and Transport-Layer reliable data transfers (Hint: With the TCP reliable data transfer, why does the underlying link layer support data transmission reliability? [2mks]
i) Briefly describe the factors influencing the need to adopt IPv6 and replace IPv4.
j) Please briefly describe the sameness and differences between switches and routers. [4mks]

**QUESTION TWO**

a) Name, in order, the seven OSI Layers **AND** provide a **one** sentence statement as to the function of each layer in the OSI Reference Model. [10mks]

b) Assume an IP packet carrying an HTTP request is going from a local (i.e. home) area network onto the wider Internet through a NAT router. Name all header fields that the NAT router needs to change in the given packet? Explain your answer. (Hint: encapsulation as well as the syntax/semantics of all involved protocols must be taken into consideration.) [10mks]

**QUESTION THREE**

a) What are the four causes of packet delay? [4mks]
b) Name three fundamental measures of interest for a communications system? [3mks]

c) Suppose the link A-B goes down. As a result, A advertises a distance of infinity to B. Describe in detail a scenario where C takes a long time to learn that B is unreachable [7mks]
d) The sum of four types of delays: [6mks]
$d_{nodal} = d_A + d_B + d_C + d_D$
Complete the table below, to specify and explain which delays are meant by $d_A$, $d_B$, $d_C$, $d_D$.

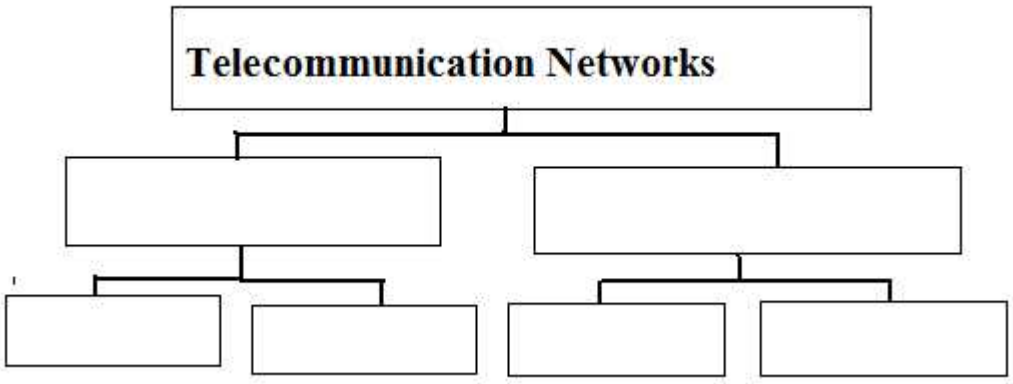
| *Abbreviation* | *Name* | *Explanation* |
|---|---|---|
| $d_A$ = ***dproc*** | nodal processing delay | Time required to examine a packets headers and determine where to direct the packet. Can include e.g., bit-level error checking |
| $d_B$ = _____ | | |
| $d_C$ = _____ | | |
| $d_D$ = _____ | | |

**QUESTION FOUR**

a) Explain how TCP flow control works. [4mks]

b) Complete the following taxonomy of telecommunications networks with the items.

i) Circuit-switched
ii) Datagrams
iii) FDM
iv) Packet-switched
v) TDM
vi) Virtual Circuits [3mks]




c) Describe what **TCP slow start** means. [5mks]

d) Briefly describe circuit switching and packet switching. [4mks]

e) State four causes of packet delay. [4mks]

**QUESTION FIVE**

a) What are the three desirable properties of secure communications? Describe each property in one sentence. [3mks]

b) The three legs of the "security trinity," prevention, detection, and response, comprise the basis for network security. Explain the importance of each. [6mks]


c) Explain how TCP/IP and Ethernet work together to transmit data. (5mks)

d) Fill out the following table according to the features of the named connecting devices. [6mks]

| | Repeater | Bridge | Router | Gateway | Switch |
|---|---|---|---|---|---|
| Operating Layer | | | | | |
| Creates separate segments | | | | | |
| Connect different protocol networks | | | | | |
| Connect same protocol networks | | | | | |
| Maximum number of ports | | | | | |