**CHUKA UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE AWARD of B.Sc. (Computer Science)**

**YEAR 3 SEMESTER 2**
**COSC 363: Computer Networks 11**

**Duration**: 2 Hrs

**INSTRUCTIONS**

**Attempt **Question 1** and any other **TWO** from **SECTION B**

**Marks are awarded for clear and concise answers

*ONLY the first **THREE** Questions attempted will be marked **(Question one inclusive)**

## Question ONE [30 Marks]

(a) Give examples of atleast one protocol belonging to the following categories **[6 Marks]**

   (i)Classless distance vector routing protocols

   (ii)Classless linkstate routing protocols

   (iii)Classless Path Vector Protocols

(b)You have been recruited as a network administrator of an organization with medium-large number of computers who frequently change with seasons e.g an hotel, University etc.

   (i)Describe **TWO** configuration management aspects you would automate and how you would do it **[4 Marks]**

   (ii)What are the key security concerns you would consider to cater for **[3 Marks]**

   (iii)Give atleast **THREE** faults that you think will be quite common **[3 Marks]**

(c) Give a brief description of the operation of SNMP **[4 Marks]**

(d)Differentiate between the following in relation to routing:

   (i)Linkstate and Distance vector routing algorithms **[4 Marks]**

   (ii) Flow control and congestion control **[4 Marks]**

(e)What is the role of sequence number field in a TCP segment **[2 Marks]**

**Question TWO [20 Marks]**

(a)Suggest **THREE** techniques that a network administrator can use to improve network performance **[6 Marks]**

(b)The following figure shows an arrangement of routers in a certain area.
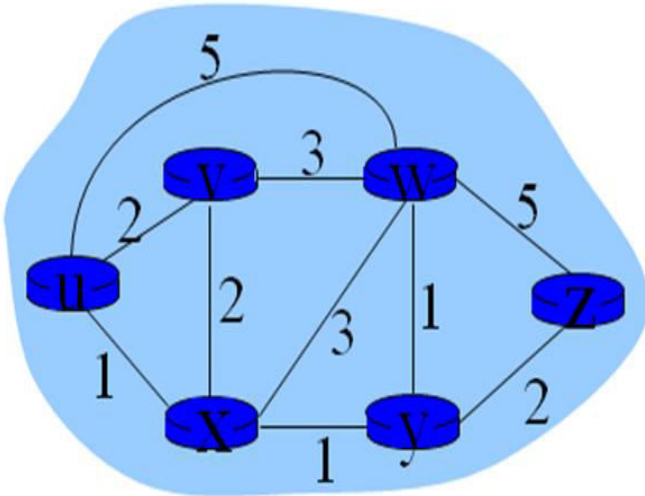


 (i)Using Distance Vector Protocol's Bellman-Ford equation, compute **Du(w)** .Clearly show the

working **[3 Marks]**

 (ii)Using Dijkstra algorithm, compute the cost of the shortest path from **u** to **v, w, x, y** and  **z**

respectively. Clearly show the workings in every step **[9 Marks]**

 (iii)What is the shortest path from **u** to **z. [2 Marks]**

**Question THREE [20 Marks]**
The following figure illustrates a network connected with switches A, B and C, router D that connects to the internet, two servers and several other hosts. Study it and use it to answer questions that follow.
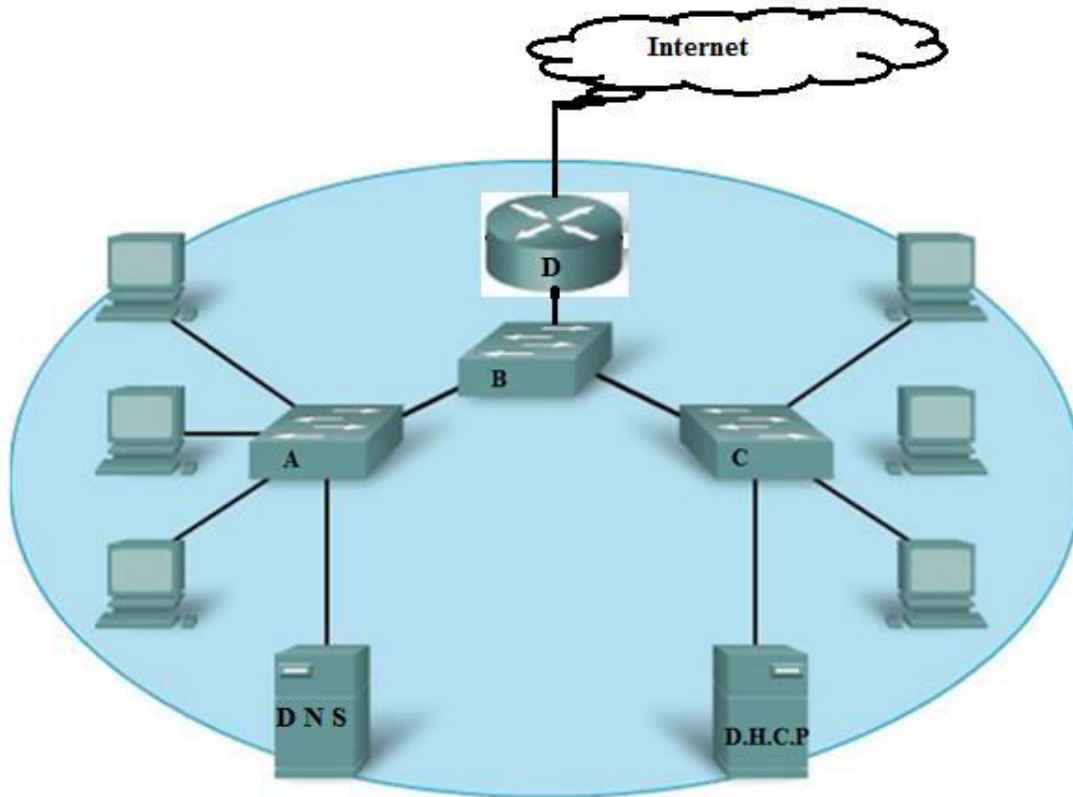
(i)Which OSI layer protocols do devices **A, B, C** and **D** expected to operate in **[4 Marks]**

(ii)What is the name given to the addresses that devices **A, B** and **C** use to forward data across the hosts. Additionally, give the number of bytes in each address **[4 Marks]**

(iii) What is the name given to the addresses that device **D** use to forward data across the hosts. Additionally, give the number of bytes in each address **[4 Marks]**

(iv)What is the role of the Servers labeled D.H.C.P and that labeled DNS **[ 4 Marks]**

(v)Describe the operation of devise labeled **D [4 Marks]**

## Question FOUR [20 Marks]
Network management focuses on faults, configurations, accounting, performance and security of a network.
(a)Justify why a network administrator needs to measure network performance **[4 Marks]**

(b)Consider a computer **X** with the following **IPV4** network configurations:

| | |
|---|---|
| **IP Address** | **192.168.2.2** |
| **Subnet Mask** | **255.255.0.0** |
| **Default Gateway** | **192.168.2.3** |
| **DNS Server** | **192.168.2.1** |

(i)Suppose the addresses are based on CIDR, how would you represent the IP address of machine

**X** using slash (/) notation **[4 Marks]**

(ii)Suppose computer **X** requests a web access to **https://www.chuka.ac.ke,**
which **IP** address will computer **X** query in order to determine the IP address of
**www.chuka.ac.ke [4 Marks]**

(iii)Suppose the above addresses are based on classes, which class would you classify the
network that Computer **X** is attached to **[4 Marks]**

(iv)What is the IP address of the machine that computer **X** would **route** its requests/packets to in

order to get them out of the network it's attached to **[4 Marks]**

**Question FIVE [20 Marks]**
(a)Given the following routing table information

| Network | Interface |
|---|---|
| **192.168.2.2/24** | **1** |
| **192.168.7.2/24** | **2** |
| **192.168.10.2/24** | **3** |
| **192.168.15.2/24** | **4** |

(i)Illustrate how the router makes the decision on the possible route(s) to forward a packet whose
destination IP address is 192.168.5.2/24 **[12 Marks]**

(ii)Identify the most specific route/interface to forward this packet **[2 Marks]**

(b)The data below was captured from a Cisco router. The data represents routing information
generated by a routing protocol.

```
R       10.1.1.0 [120/1] via 192.168.2.2, 00:00:08, FastEthernet 0/0

R       10.1.2.0 [120/1] via 192.168.2.2, 00:00:08, FastEthernet 0/0

C       192.168.1.0/24 is directly connected, FastEthernet 0/0

S*      0.0.0.0/0 [1/0] via 192.168.2.2
```

(i)Identify the route of the last resort **[2 Marks]**

(ii)Identify the Network address that this router belongs to **[2 Marks]**

(iii)Identify the interface that a packet with destination IP address 10.1.3.0 will be forwarded to
**[2 Marks]**