

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR  
OF SCIENCE IN COMPUTER SCIENCE

COSC 363: COMPUTER NETWORKS 11

STREAMS: BSC.COMP SCI (Y3S2)

TIME: 2 HOURS

DAY/DATE: FRIDAY 09/7/2021

11.30 A.M. – 1.30 P.M.

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**)

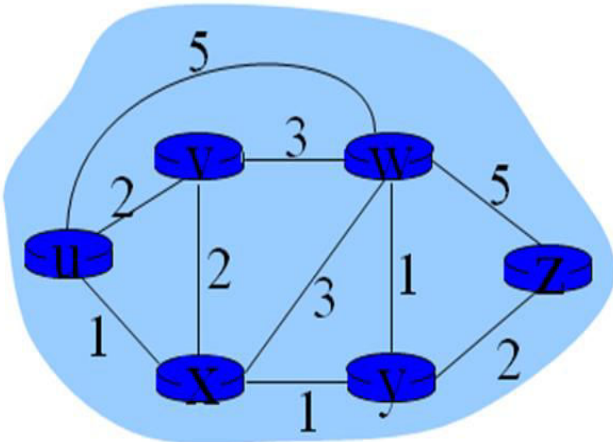
**QUESTION ONE [30 MARKS]**

- (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]

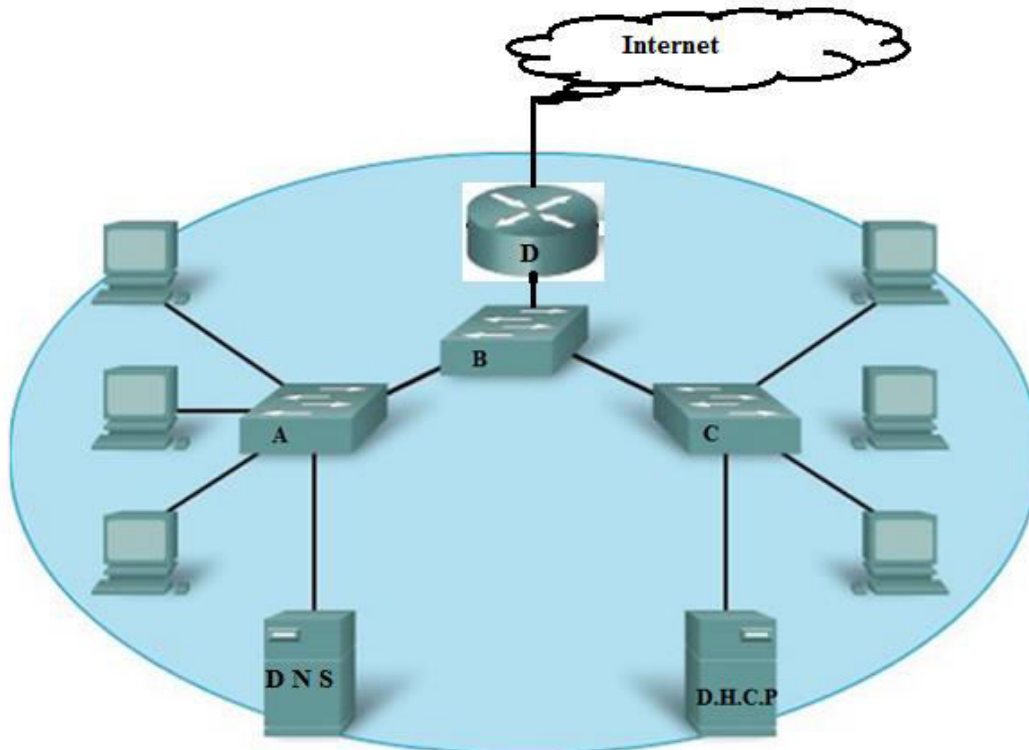
(b) The following figure shows an arrangement of routers in a certain area.



- (i) Using Distance Vector Protocol's Bellman-Ford equation, compute  $D_u(w)$ . 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.



## COSC 363

- (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 device 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]

## COSC 363

- (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]**
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