



**THE CO-OPERATIVE UNIVERSITY OF KENYA (CUK)
END OF SEMESTER EXAMINATIONS 2022/2023**

EXAMINATION FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

(YR III SEM I)

UNIT CODE: BCSC 2256

UNIT TITLE : DATA COMMUNICATIONS

DATE: 14TH DECEMBER 2022

TIME: 9.00 AM-11.00 AM

INSTRUCTIONS: Answer Question **ONE** and any **OTHER TWO** Questions

QUESTION ONE (30 MARKS COMPULSORY)

- (a) Briefly explain the following data communication concepts
- i. Mobile IP (2 marks)
 - ii. Multicast routing (2 marks)
 - iii. Autonomous System (2 marks)
- (b) State the two main reasons why modulation is important in radio networks (2 marks)
- (c) Explain the difference between
- i. Baseband modulation and bandpass modulation (2 marks)
 - ii. Data rate and Baud rate (2 marks)
 - iii. Low pass and band pass channel (2 marks)
- (d) Draw a graphs for NRZ-I scheme for each of the following bit stream (4 marks)
- i. 11011001
 - ii. 01011011
- (e) Explain the following classes of multimedia traffic
- i. Conversational Voice- and Video-over-IP (3 marks)
 - ii. Streaming Live Audio and Video (3 marks)
- (f) Suppose you are provided with a class C address 192.168.130.0/24 and you are required to come up with 8 subnets. Determine:
- i. New mask for the subnets (2 marks)
 - ii. Addresses for the subnets (2 marks)
 - iii. Broadcast for the send subnet (2 marks)

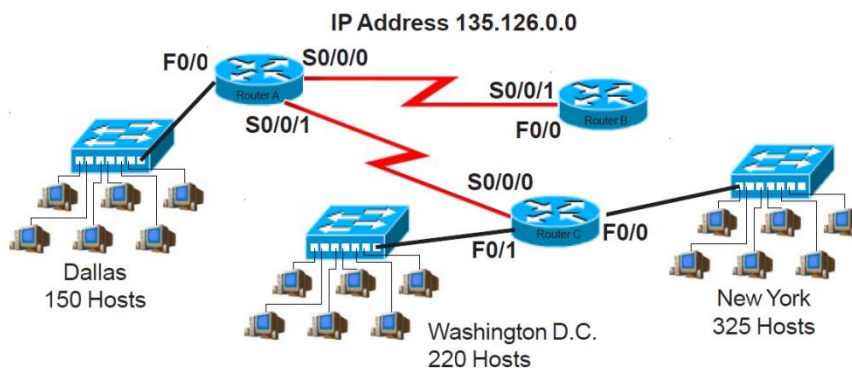
QUESTION TWO

(a) Explain the role of the following network addresses (6 Marks)

- i. MAC Address
- ii. IP Address
- iii. Port Address

(b) Based on the information in the diagram shown below (where the IP address provided is 135.126.0.0), design a classful network addressing scheme that will supply the minimum number of hosts per subnet, and allow enough extra subnets and hosts for 20% growth in all areas. Determine:

- i. The class of the IP address 135.126.0.0 (2 marks)
- ii. Minimum number of subnets needed (hint: router to router connection is counted as a subnet) (2 marks)
- iii. Extra subnets required for 20% growth (2 marks)
- iv. Total number of subnets needed (2 marks)
- v. List all the subnets (networks). (6 marks)



QUESTION THREE

(a) Explain IPV6 Address format (6 marks)

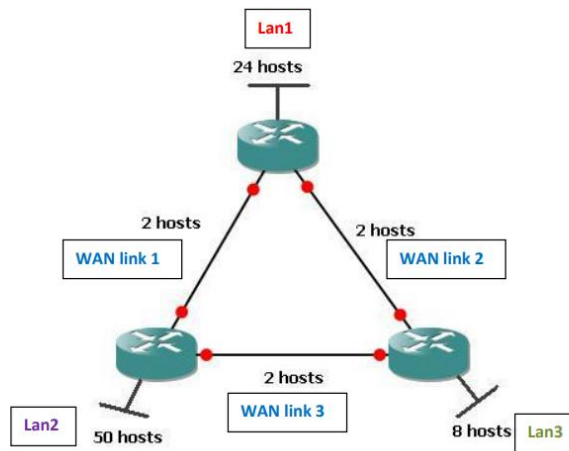
(b) Using a well labelled diagram discuss the intra-Autonomous and Inter-Autonomous routing.

For each case state the routing protocols applied (10 marks)

(c) Explain two main challenges of the Border Gateway Protocol (BGP) (4 marks)

QUESTION FOUR

- (a) Explain use Variable Length Subnet Mask (VLSM) in Network addressing (4 marks)
- (b) Explain the role of the following protocols in internet routing (4 marks)
- i. BGP
 - ii. OSPF
- (c) Suppose the available network address is 192.168.2.0/24 and you are required to come up with the subnets given in the figure below. Using LSM determine
- i. Network mask for each segment (subnet) (6 marks)
 - ii. Network address for each segment (subnet) (6 marks)



QUESTION FIVE (20 marks)

- (a) Briefly discuss the following multimedia data communication protocols (12 marks)
- i. RTP
 - ii. RTSP
 - iii. SIP
 - iv. RCTP
- (b) Using a well labelled diagram explain how Alternate Mark Inversion Line encoding scheme works (5 marks)
- (c) Explain why TCP protocol is not appropriate protocol for Video streaming (3 marks)