



The Co-operative University of Kenya

END OF SEMESTER EXAMINATION DECEMBER-2019

**EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN STATISTICS
& INFORMATION TECHNOLOGY**

UNIT CODE: BCIT 1208

UNIT TITLE: COMPUTER NETWORKS

DATE: DECEMBER, 2019

TIME:

INSTRUCTIONS:

- Answer question **ONE (compulsory)** and any other **TWO** questions

QUESTION ONE

- Briefly describe how the following switching techniques are realized (4 marks)
 - Circuit switching
 - Packet switching
- State the role of the following networking devices and draw a diagram to show where they are positioned in the network. (6 marks)
 - Switch
 - Router
 - Firewall
- Explain the following phenomenon of communication channel. In each case state how the phenomenon is statistically modeled (6 marks)
 - Interference
 - Noise
 - Fading
- Differentiate between TCP and UDP transport protocols (4 marks)
- Explain three factors which affects the amount of information bits per second that can be transmitted in a channel (6 marks)
- Explain how the following layers of the OSI model guarantee reliable delivery of data (4 marks)
 - Datalink layer
 - Transport layer

QUESTION TWO

- Draw TCP/IP model and indicate the key protocols in each layer (6 Marks)
- Describe the physical construction and characteristics of the following transmission media (4 marks)
 - Coaxial cable
 - Optical Fiber Cable
- Describe the following network performance metrics (6 marks)
 - Jain index
 - Network Throughput
 - Delay Jitter

- d) Calculate the channel Capacity for a channel with spectrum 1MHz to 2MHz and signal to Noise ratio of 20dB (4 Marks)

QUESTION THREE

- a) Suppose an ISP assigns the following block of addresses: 172.16.20.0/24. You want to create **four** subnets from this block, with each block containing the same number of IP addresses. What are the addresses of the subnets?
(8 marks)
- b) Explain any two method of error correction (4 marks)
- c) Using neat diagrams, explain the following network topologies (6 marks)
- i. Star
 - ii. Bus
 - iii. Mesh
- d) Draw a well labeled diagram of the IEEE 802.3 frame format (2 marks)

QUESTION FOUR

- a) Explain the following
- i. Synchronous Transmissions (3 marks)
 - ii. Asynchronous Transmissions (3 marks)
- b) Explain the role of the following protocols, stating where they are implemented in the network (8 marks)
- i. DHCP
 - ii. ARP
 - iii. DNS
 - iv. FTP
- c) Explain how collisions can be minimized in a CSMA network with Hidden Terminals (6 marks)

QUESTION FIVE

- a) Using probability, show that the efficiency of Slotted ALOHA is 0.37 for a large number of network users (8 marks)
- b) Explain the following types of transmission modes (4 marks)
- i. Half duplex
 - ii. Full duplex
- c) With aid of diagrams Explain the following digital modulation schemes (6 marks)
- i. Amplitude Shift Keying
 - ii. Frequency Shift eying
- d) State two types of errors (2 marks)