MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIVERSITY POSTGRADUATE EXAMINATION

2018/2019 ACADEMIC YEAR

FIRST YEAR **FIRST** SEMESTER EXAMINATION FOR, MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

SIT 602 – COMMUNICATION NETWORKS TECHNOLOGIES

DURATION: 3 HOURS

DATE: 21/12/2018

TIME: 9 – 12 P.M.

Instructions to candidates:

1. Answer **Question one** and **Any other three** questions.

2. Mobile phones are not allowed in the examination room.

3. You are not allowed to write on this examination question paper.

QUESTION ONE (25 MARKS)

a) Substantiate how various components of data communication enhance the communication.
(5 Marks)

b) For n devices in a network, what is the number of cable links required for a mesh, ring, bus and star topology? (4 Marks)

c) For each of the following four networks, discuss the consequences if a connection fails.
(4 Marks)

      i. Five devices arranged in a mesh topology
      ii. Five devices arranged in a star topology (not counting the hub)
      iii. Five devices arranged in bus topology
      iv. Five device arranged in a ring topology

d) Explain how the layers of the internet model correlate to the layers of the OSI models.
(6 Marks)

e) Explain how OSI and ISO relate to each other. (3 Marks)

f) What are the reasons for wireless LAN's not popular, if we look at recent past and make them popular now? (4 Marks)

QUESTION TWO (25MARKS)

a) In figure 1 (attached), computer A sends a message to computer D via LAN_1, router R_1, and LAN_2. Show the contents of the packets and frames at the network and data link layer for each hop interface. (6 Marks)

b) In the figure above, assume that the communication is between a process running at computer. A with port address i and a process running computer D with port address i. show the contents of packets and frames at the network, data link and transport layer for hop. (8 Marks)

c) Suppose a computer sends a frame to another computer on a bus topology LAN. The physical destination address of the frame is corrupted during the transmission. What happens to the frame? How can the sender be informed about the situation. (8 Marks)

d) If the data link layer can detect error between hops. Why do you think we need another checking mechanism at the transport layer? (3 Marks)

QUESTION THREE (25 MARKS)

a) Translation, encryption and compression are some of the duties of presentation layer in OSI model, which layer is responsible for these duties in the internet model? Explain your answer. (8 Marks)

b) In the recent past advancement in network and communication has improved human likelihood in terms of how they live, learn and work? Discuss. (5 Marks)

c) In order for transport layer to execute its duties to the fullest, it is mandated to follow various protocols, discuss how various protocols are utilized in it. (8Marks)

d) Assume six devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device? (4 Marks)

QUESTION FOUR (25 MARKS)

a) Explain transmission characteristics of coaxial cables. (8 Marks)

b) Network must be able to meet certain number of criteria. Explain the three most crucial ones. (3 Marks)

c) Suppose a computer send a packet at the network layer to another computer somewhere in the internet, the logical destination address of the packet get corrupted, what happens to the packet? How can the source computer be informed of the situation? (6 Marks)

d) Discuss various reasons which led to the development of wireless LANS. (8 Marks)

QUESTION FIVE (25 MARKS)

a) Explain Multi-path interference and solution to it in brief. (6 Marks)

b) Compare and contrast the telephone network and internet. (6 Marks)

c) Match the following to one or more layers of the OSI model. (5 Marks)
   i. Format and code conversion services.
   ii. Establishes, manages and terminates sessions.
   iii. Ensures reliable transmission of data.
   iv. Log-in and log-out procedures.
   v. Provides independence from differences in data representation

d) Highlight the difference among a port address, a logical address and a physical address. (6 Marks)

e) When a party makes a local telephone call to another party, is this a point-to-point or multipoint connection. Explain your answer. (2 Marks)