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KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR
FIRST YEAR, SECOND SEMESTER EXAMINATION
FOR THE DIPLOMA IN BUSINESS & INFORMATION TECHNOLOGY
DIT 1010 DATA COMMUNICATION & NETWORKS

Date: 6TH AUGUST 2024
Time: 11:30AM – 1:30PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Define the following terms:
   i) Computer network **(1 Mark)**
   ii) Data communication **(1 Mark)**
   iii) Network topology **(1 Mark)**

b) Using appropriate illustrations, discuss the components of a data transmission system that model a data communication system. **(5 Marks)**

c) The government of Kenya is on a mission to connect all her government offices via fibre optic cable. Explain two advantages of using the type of cable compared to other types. **(4 Marks)**

d) A small public relations firm leases two groups of offices in Building A and Building C of a suburban office park. The business staff, including human resources and accounting has 12 people and is located in two offices in building A. The creative staff, including copy writing, graphics and production, with a total of 22 employees, is in Building C. Building A and Building C are about 600 metres apart. The business staff in a peer-to-peer workgroup. The creative staff in Building C has a conglomeration of computers including Apple Macintoshes and personal computer - compatibles. They are not networked. The owners of the company would like to network all of the computers for the creative staff, and connect the creative staff network to the business staff network. They would also like to standardize on the type of network used in both buildings to keep troubleshooting issues to a minimum
   i) Identify a suitable transmission medium to be used by the firm to connect the creative staff in Building C and justify your decision. **(3 Marks)**
   ii) Suggest a network type to the owners for the entire firm and give a rationale to your decisions. **(3 Marks)**
   iii) Explain three reasons why you think the company took the initiative to have a network. **(6 Marks)**
   iv) Highlight three reasons why full mesh topology could be preferred as compared to the other topologies? **(3 Marks)**
   v) Name three network devices that you are likely to use to complete the networking installation and highlight how they will be utilized. **(3 Marks)**

QUESTION TWO (20 MARKS)

a) Describe the following terms
   i) Network traffic **(1 Mark)**

ii) Network throughput **(1 Mark)**

b) Assume that you are the Administrator of your organization and you are asked by the management to define the security measures undertaken to secure your data, explain how you would go about solving the problem. **(6 Marks)**

c) Explain five factors to consider when selecting the type of physical media to deploy in a computer network. **(5 Marks)**

d) With the aid of a well labeled diagram, discuss the OSI model. **(7 Marks)**

QUESTION THREE (20 MARKS)

a) i) Define the term VoIP? **(2 Marks)**

ii) Highlight four key benefits of VoIP technology. **(4 Marks)**

b) Carrier Sense Multiple Access (CSMA) is a network technology that allows for multiple-access of an Ethernet network. Discuss the two strategies used to deal with collisions in CSMA. **(4 Marks)**

c) Jane, a network administrator, has embarked on a plan to acquire a new network/server operating system for his newly configured network, Discuss two factors that she should consider when choosing the system. **(4 Marks)**

d) When two communicating nodes are connected through a media, it generally happens that bandwidth of media is several times greater than that of the communicating nodes. Multiplexing is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link. Using illustrations, discuss the two types of multiplexing that can be applied. **(6 Marks)**

QUESTION FOUR (20 MARKS)

a) Describe the role of the following network protocols.

i) SMTP **(1 Mark)**

ii) HTTP **(1 Mark)**

iii) TCP **(1 Mark)**

iv) HTTP **(1 Mark)**

b) Discuss the three network security goals. (**3 Marks)**

c) Security is the greatest challenge of computer networks. Describe four security threats that exist in computer networks and identify the appropriate control measures for each threat. **(8 Marks)**

d) Briefly describe five responsibilities of a Data Communications Engineer in a Networked environment. **(5 Marks)**

QUESTION FIVE (20 MARKS)

a) Highlight the role of the following media access protocols.

i) Token bus

ii) Token ring

iii) Token passing **(3 Marks)**

b) Explain three application areas of computer networks. **(6 Marks)**

c) Error correction techniques find out the exact number of bits that have been corrupted and as well as their locations. There are two principle ways of error correction, namely forward error correction and backward error correction. Discuss their differences and justify why forward error correction technique is commonly applied. **(5 Marks)**

d) An internet service provider (ISP) is a company that provides access to the internet. ISPs can provide this access through multiple means, including dial-up, DSL, cable, wireless and fibre-optic connections. Explain three factors you should consider when selecting an ISP in Kenya **(6 Marks)**