CHINHOYI UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING SCIENCE AND TECHNOLOGY

DEPARTMENT OF ICT AND ELECTRONICS

B.SC (HONS) DEGREE IN INFORMATION TECHNOLOGY

COURSE: DATA COMMUNICATION AND NETWORKS (MAIN PAPER)

CODE: CUIT213

TIME: 3 HOURS

INSTRUCTION TO CANDIDATES

- This question paper consists of three (3) printed pages.
- Answer Question ONE (1) and ANY FOUR (3) Questions.
- Each question carries twenty-five marks.
- If any doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, clear statements of any assumptions made.
- You are encouraged to present your answers neatly in the answer scripts provided.

Question 1

The Chinhoyi University of Technology has just completed the construction of a three-story Administration block. Three departments namely Accounts, Human Resouces and Registry will be moving into the new block. Accounts have 30 hosts, Human Resources 27 and Registry 102 hosts. Each department requires a separate network. You are given the ID 192.168.4.0/24

1a.) As the network Administrator you are required to design an IP plan listing each subnet network ID, subnet mask, host ID range, number of usable host IDs, and broadcast IDs. Use a table to illustrate your answer [15 marks]

1b.) Given the subnetting plan you provided, if the Accounts and Human Resources departments need to expand in the future and require additional IP addresses, Describe any changes you would make to the existing subnet allocations and how would you modify the subnet plan to accommodate this. [10 marks]

Question 2

2a.) Using a diagram explain different layers in the OSI Model.[15 marks]

2b.) Compare and contrast TCP/IP and UDP protocols [10 marks]

Question 3

3.) Describe how the GSM network prepares for a handover when a user device moves from the coverage of one cell to another. Include details about how the user device and the serving Base Transceiver Station (BTS) interact to trigger the handover process. [25 marks]

Question 4

4a.) Describe the roles of SSL/TLS, IPsec, and HTTPS in ensuring secure communication over networks. [9marks]

4b.) How do these protocols protect data from interception, eavesdropping, and tampering? [16marks]

Question 5

5a.) Compare and contrast circuit-switching and packet-switching techniques [10 marks]

5b.) Discuss their advantages and disadvantages providing examples of their applications [15 marks]

Question 6

6.) Discuss the importance of the following security measures in protecting an organization's network resources. Use relevant examples.

a.) firewalls, [9 marks]

b.) encryption [9 marks]

c.) access control [7 marks]

END OF PAPER