"Investing in Africa's future"

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCIS 307: DATA COMMUNICATION & COMPUTER NETWORKS

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2021

LECTURER: DR. YOGESH AWASTHI

TIME: 5 HOURS

INSTRUCTIONS

Answer any five questions

Start each question on a new page on your answer sheet.

The marks allocated to each question are shown at the end of the section.

Q1. Explain your understanding about OSI and TCP/IP model. Out of these which reference model is being frequently used? A channel has a signal-to-noise ratio of 2000 and a bandwidth of 5000 KHz. What is the maximum data rate supported by this line? **(20 marks)**

Q2. Sixteen-bit messages are transmitted using a Hamming code. How many check bits are needed to ensure that the receiver can detect and correct single bit errors? Show the bit pattern transmitted for the message 1101001100110101. Assume that even parity is used in the Hamming code. **(20 marks)**

Q3. An organization is requires 8 subnet each having at least 63 hosts. If the allotted IP address is 193 .1 .1.0 determine the class of IP address, default mask, subnet mask, number of subnet id bits, and the broadcast address of the subnets.

(20 marks)

Q4. Two networks each provide reliable connection-oriented service. One of them offers a reliable byte stream and the other offers a reliable message stream. Are these identical? If so, why is the distinction made? If not, give an example of how they differ. **(20 marks)**

Q5. (a) Is an oil pipeline a simplex system, a half-duplex system, a full-duplex system, or none of the above? What about a river or a walkie-talkie-style communication? **(20 marks)**

(b) What are the advantages of fibre optics over copper as a transmissions medium? Is there any downside of using fibre optics rather than copper?

Q6. An ISP is granted a block of addresses starting with 50.80.0.0.116). The ISP needs to distribute these to 1000 customers as follows:

(i) The first group has 200 customers; each needs 128 addresses,

(ii) The second group has 400 customers; each needs 16 addresses.

(iii) The third group has 2000 customers: each needs 4 addresses.

Find out first address and last address of each group. **(20 marks)**

END OF PAPER