

CS 3006D Computer Networks / End Sem Examination

Max. Marks: 20 / Time: 1.5 Hours

Clearly mention your assumptions if any

- 1 What are the header fields missing in IPv6 with respect to IPv4. Why do you think these options/fields are unnecessary? **2 Marks**
- 2 If the starting congestion window size is last two 'digits' of your roll number (M180562CA means – 62 bytes), what will be the congestion window size after 4th round of *slow start*? **1 Mark**
- 3 Calculate the UDP checksum for the bit stream given: 1010110101100001 1000100011000001 1100100111011100 **1 Mark**
- 4 Assume that you are the address administrator at an ISP. You have a 128.20.224.0/20 address block. You have two customers with networks of size 1000 nodes each; two customers whose networks have 500 nodes each; and three customers whose networks have 250 nodes each. What are the address blocks you will assign to these customers? Use notation similar to 128.20.224.0/20 to denote the address blocks you allocate. Suppose that all your remaining customers have networks of size 50 nodes each. For how many customers can you allocate address blocks with the remaining addresses you have? Please provide your answer in *a.b.c.d/x* notation, where *a, b, c, d*, and *x* are decimals. **2 Marks**
- 5 Consider transferring an enormous file of *L* bytes from Host A to Host B. Assume an MSS of 1460 bytes. What is the maximum value of *L* such that TCP sequence numbers are not exhausted? **1 Mark**
- 6 Compare and contrast between CSMA/CD and CSMA/CA. **1 Mark**
- 7 A router receives datagram of size equal to your roll number (only digits -eg M180562CA means – 180562 bytes) from a network with a MTU of 20000 bytes and determines that it must be forwarded to a network with an MTU of 5000 bytes. Show the fragmentation needed for the successful forwarding of the datagram by filling the necessary fields of the following table. You may fill in decimal values if required. **2 Marks**

| Length | ID | Flag | Offset |
|--------|----|------|--------|
| | | | |

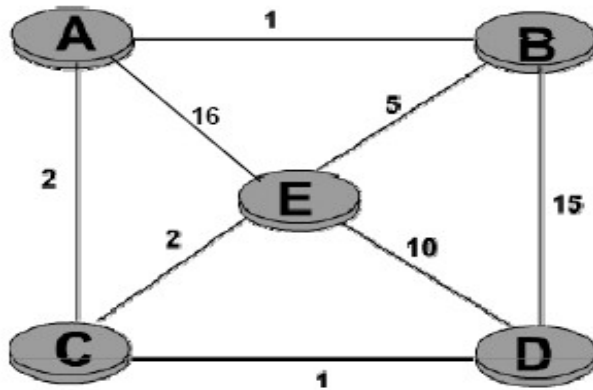
- 8 Consider the following forwarding table for a router with four outgoing interfaces. **2 Marks**

| Prefix Match | Link Interface |
|----------------------------|----------------|
| 10001100 01110001 00010 | 0 |
| 10001100 01110001 00011000 | 1 |
| 10001100 01110001 00011 | 2 |
| Otherwise | 3 |

Give the interface through which packets with following destination addresses will be forwarded.

- a) 10001100 01110001 00010110 10100001
- b) 10001100 01110001 00011000 10101010
- 9 For the topology given below compute the least cost paths from node A to all **2 Marks**

the other nodes using link state routing.



- 10 Given that the frame data to be transmitted using CRC is binary equivalent of decimal number in your roll number (for example 180256 for M180256CA). Assuming the generator polynomial coefficients are given by the bit string 10011, how many CRC bits we need? Calculate the CRC bits, showing all the steps. **2 Marks**
- 11 Design receiver FSM for **selective repeat** reliable data transfer mechanism. **1.5 Marks**
- 12 In the slowstart phase of TCP congestion control the the congestion window size increases _____. **0.5 Marks**
- 13 An IPv6 address can have up to _____ hexadecimal digits **0.5 Marks**
- 14 In cyclic redundancy code, _____ forms the CRC. **0.5 Marks**
- 15 There are _____ fields are there in UDP header. **0.5 Marks**
- 16 _____ handshakes are needed before establishing a UDP connection between client and server processes? **0.5 Marks**