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Paper Code: TCS 605

(B.Tech.(CS/IT))

Mid Semester Examination 2017

VI. Semester

Paper Name: - Computer Network II

Time: 1:30 Hours

MM: 50

Note:

- (i) This question paper contains two sections.
- (ii) Both sections are compulsory.

Section – A

Q1. Fill in the blanks/True-False

(1 X 5 = 5 Marks)

- a) A station in a network forwards incoming packets by placing them on its shortest output queue. The routing algorithm is being used is \_\_\_\_\_.
- b) RIP advertisements typically announce the number of hops to various destinations. BGP updates, on the other hand, announce the \_\_\_\_\_ to the various destinations.
- c) The size of a MAC address is \_\_\_\_\_ bits.
- d) Ethernet uses \_\_\_\_\_ encoding.
- e) To achieve stability in CSMA/CD back off scheme, a technique known as \_\_\_\_\_ is used.

Q2. Attempt any five parts.

(3 X 5 = 15 Marks)

- a) Do routers have IP addresses? If so, how many?
- b) How does BGP use the NEXT-HOP attribute? How does it use the AS-PATH attribute?
- c) Is it necessary that every autonomous system use the same intra-AS routing algorithm? Why or why not?
- d) In CSMA/CD, after the third collision, what is the probability that a node chooses  $K = 4$ ?
- e) Suppose that  $N$  switches supporting  $K$  VLAN groups are to be connected via a trunking protocol. How many ports are needed to connect the switches?
- f) Why do you require a limit on the minimum size of Ethernet frame?
- g) How throughput is improved in slotted ALOHA over pure ALOHA?

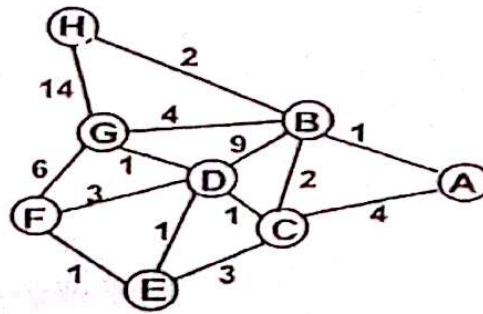
Section – B

Each question contains three parts a, b & c. Attempt any two parts of choice from each question.

Q3.

(5 X 2 = 10 Marks)

- a. What is the difference between a group-shared tree and a source-based tree in the context of multicast routing? Explain with example.
- b. Let us consider some of the pros and cons of a connection-oriented versus connectionless architecture.
  - i). Suppose that in the network layer, routers were subjected to "stressful" conditions that might cause them to fail fairly often. At a high level, what actions would need to be taken on such router failure? Does this argue for a connection-oriented or a connectionless environment? [2]
  - ii). Suppose that in order to provide a *guarantee* regarding the level of performance (e.g., delay) that would be seen along a source-to-destination path, the network requires a sender to declare its peak traffic rate. If the declared peak traffic rate and the existing declared traffic rates that have been declared are such that there is no way to get traffic from the source to the destination that meets the required delay requirements, the source is not allowed access to the network. Would such an approach be more easily accomplished within a connection-oriented or connectionless paradigm? [3]
- c. Consider the network shown below, with the indicated link costs. Use Dijkstra's shortest path algorithm to compute the shortest path from A to all Network nodes.



Q4.

(5 X 2 = 10 Marks)

- Explain the various services provided by the Data Link Layer.
- For packet switched network Distance vector routing is used. The vectors below have just been received by router C from routers B, D and E. The measured delays from router C to B, D, and E are 7, 3, and 4 respectively.

Vectors received by router C

TO	B	D	E
A	5	16	7
B	0	12	6
C	7	6	4
D	12	0	9
E	6	9	0
F	2	10	4

What is router C's new routing table? In the table provide next hop and cost to each node information.

- Consider the polynomial generator,  $P(G)=1011$ , and suppose that D has the value 10101101010. What is the value of CRC?

Q5.

(5 X 2 = 10 Marks)

- Suppose two nodes start to transmit at the same time a packet of length  $L$  over a broadcast channel of rate  $R$ . Denote the propagation delay between the two nodes as  $d_{prop}$ . Will there be a collision if  $d_{prop} < L/R$ ? Why or why not? [2+3]
- Why is an ARP query sent within a broadcast frame? Why is an ARP response sent within a frame with a specific destination MAC address? [2+3]
- Encode the following bit stream using Manchester and Differential-Manchester. Assume the signal is initially at the positive pol. 101100011101