Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

END SEMESTER EXAMINATIONS, APRIL/MAY 2019

SUBJECT: COMPUTER NETWORKS [ICT 2201]

REVISED CREDIT SYSTEM
(24 / 04 /2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data, if any, may be suitably assumed.

1A. Suppose a Transport Layer segment of 3100 Bytes is passed to the Network Layer for delivery across 2 networks of the internet, from source host A to destination host B. Assume that host A is connected to host B through router R1. The first network (from host A to router R1) can allow an IP datagram of size 1200 bytes to pass through it, while the second network (from router R1 to host B) allows an IP datagram of size 780 bytes to pass through it. If all the fragments reach safely at the destination, show the offset and flag values for each of the fragments. Assume all IP headers are 20 bytes. **5**

1B. How does RIPv2 protocol differ from RIPv1? Mention at least 3 points. **3**

1C. What type of error reporting ICMP messages will be sent for the following scenarios?

i. There is an error or ambiguity in the HLEN field of an IP datagram.
ii. Only three out of four fragments of an IP datagram have been received until time-out.
iii. A router is facing congestion problem and must discard a datagram.
iv. The incoming queue associated with an UDP port number is full and a user datagram must be discarded for the same reason. **2**

2A. TCP opens a connection using an initial sequence number (ISN) of 14,534. The other party opens the connection with an ISN of 21,732.

i. Show the three TCP segments during the connection establishment.
ii. Show the contents of the segments during the data transmission if the initiator sends a segment containing the message "Hello customer" and the other party answers with a segment containing "Hi seller".

Assume: size of each alphabet is 1 byte, size of whitespace is 1 byte, window size is 500 bytes. **5**

2B. Suppose that slotted ALOHA protocol is used in a 56-kbps channel. The frames are 1000 bits long. Find the maximum throughput of the system in frames/second. **3**

2C. What is the significance of URG and PSH control fields of TCP header? **2**

3A. An ISP is granted a block of addresses starting with 140.80.0.0/16. The ISP wants to distribute these blocks to customers as follows:

i. The first group has 64 medium-size businesses; each need 512 addresses.

ii. The second group has 16 small businesses; each need 128 addresses.

Design the sub-blocks and give the slash notation for each sub-block. **5**

3B. Consider the Fig. **Q.3B.** Assume that the data rate is 100 Mbps, the distance between station A and C is 1500 m, and the propagation speed is 2 x 10^8 *m/s*. Station A starts sending a long frame at time t_1 =0; station C starts sending a long frame at time t_2 =4μs. The size of the frame is long enough to guarantee the detection of collision by both stations. Find:

i. The time when station C hears the collision, *t3'*

ii. The time when station A hears the collision, *t4'*

iii. The number of bits station A has sent before detecting the collision.

iv. The number of bits station C has sent before detecting the collision.

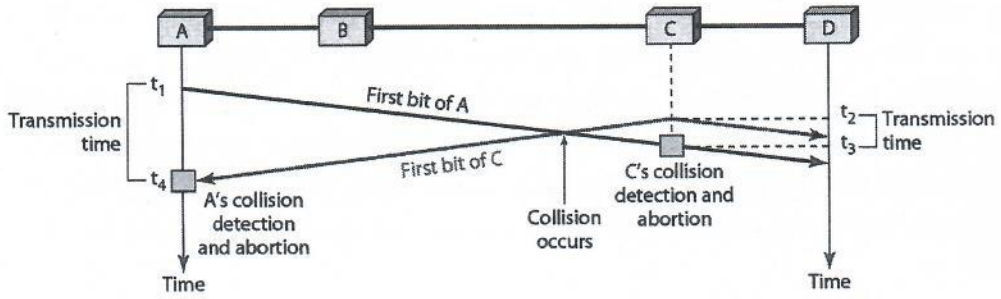

Fig. Q.3B.

3 **3C.** What are the different kinds of packets used in OSPF? **2**

4A. Consider the Fig. **Q.4A.** The node IP address 129.21.3.17 and physical address 'C' sends a message to the node with IP address 192.168.15.101and physical address 'B'. Assume that the sender sends the data through port 'q' and the receiver receives through port number 'n'. Show the flow of datagrams from the source to destination. Showcase all the 3 different addresses (IP address, physical address, and port number) in the flow of datagrams from the source to the destination.

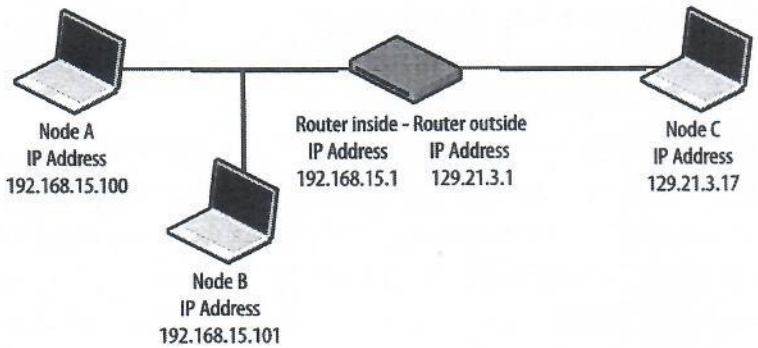

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Fig. Q.4A.

4B. What are the different timers used by RIPv1 routing protocol? **3**

4C. An UDP header has been received with the following information (in hexadecimal):
06 32 00 11 00 1C E2 17

i. What is the length of the user datagram?
ii. What is the length of the data?
iii. What is the source port number?
iv. Give reason to state whether the destination port is a client or a server process. **2**

5A. Consider the initial routing tables for the Autonomous System given in **Fig. Q.5A.** Assume:

i. Router A sends its initial routing table to its neighbors, routers B, C, and D.
ii. Router D sends its routing table to router C.

Show the procedure involved in updating the routing tables of router C, if the Autonomous System uses Distance Vector Routing Algorithm. Also, find the final routing tables of router C.

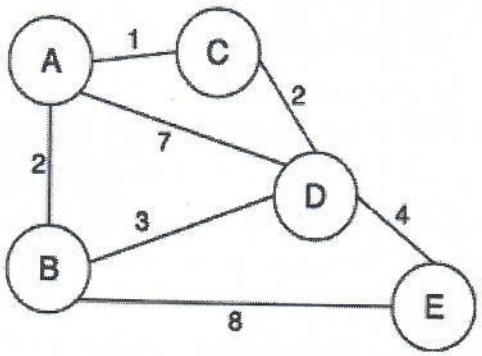

Fig. Q.5A.

5B. What are the responsibilities of Presentation and Session Layer? **5** **3**

5C. Show suitable differences between physical ring and bus ring in token passing access method. **2**