Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

I SEMESTER M.TECH. (COMPUTER NETWORKING AND ENGINEERING)
END SEMESTER EXAMINATIONS, NOVEMBER 2018
SUBJECT: COMMUNICATION NETWORK PROTOCOLS[ICT 5101]
REVISED CREDIT SYSTEM
(20/11/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. In the design of Internet protocol, discuss the role of forwarding module and the fragmentation module. **5**

An organization is granted the block 211.14.140.0/24. The administrator wants to create 32 subnets.

i. Find the subnet mask.
ii. Find the number of addresses in each subnet.
iii. Find the first and the last address in the first subnet.
iv. Find the first and the last address in the last subnet (subnet 32).

1B. What is the limitation of record route option when compared to trace route application in IP. Discuss the implementation logic of trace route application. **3**

1C. Which fields of the IP header change when packet is forwarded from a router to a router? What are the benefits of address aggregation in IP routing table? **2**

2A. Discuss the Denial of Service attack in TCP. How is it eliminated in the implementation of SCTP? **5**

Draw a time-line diagram for the following scenario (ignore error control and congestion control):

i. Time 1: The client sends a SYN segment with seqNo = 301.
ii. Time 2: The server sets its buffer size to 2,000 bytes.
iii. Time 3: The server acknowledges the SYN segment.
iv. Time 4: The client sends a segment of 300 bytes in the SYN + ACK segment.
v. Time 5: The client sends a segment of 400 bytes.
vi. Time 6: The server process pulls 400 bytes.
vii. Time 7: The server sends an ACK.
viii. Time 8: The client sends a segment of 300 bytes.
ix. Time 9: The server process pulls 300 bytes.
x. Time 10: The server sends an ACK.

2B. Write the server side socket program for data transfer using system calls. Assume that the transport layer is UDP. **3**

2C. Given a sample network as shown in Fig.Q.2C, show the router link and network link for the router B. Assume suitable interfaces wherever necessary. **2**

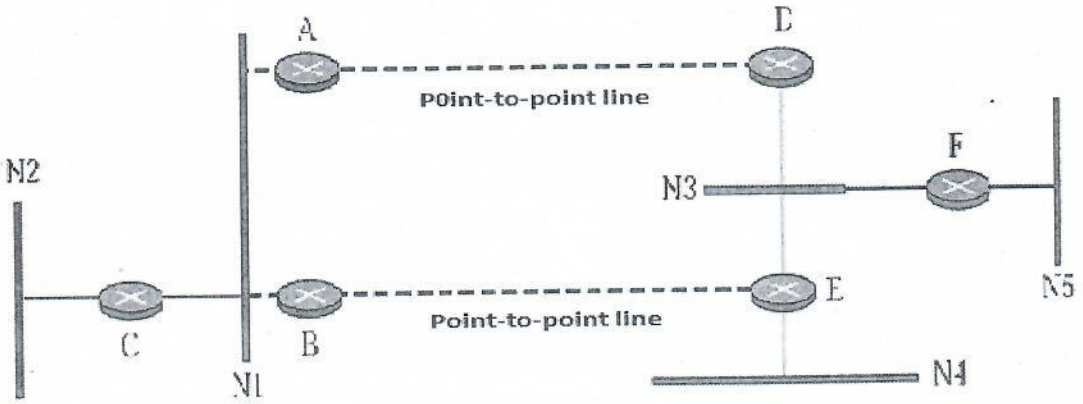

Fig. Q.2C

3A. Discuss the need for Timers and the purpose of each timer in TCP. **5**
A window holds bytes 2001 to 5000. The next byte to be sent is 3001. Draw a figure to show the situation of the window after the following two events. Assume TCP connection.

i. An ACK segment with the acknowledgment number 2500 and window size advertisement 4000 is received.
ii. A segment carrying 1,000 bytes is sent.

3B. Describe the procedure for the implementation of OSPF using link state principles. **3**
The explanation need not include frame formats used in the implementation.

3C. Write the sample routing tables of BGP and RIP routing protocols and compare the functional differences. **2**

4A. What is multi-streaming in SCTP? How does it enhance the performance of transport protocol when compared to TCP ? **5**
An SCTP client opens an association using an initial tag of 1005 , an initial TSN of 21568, and a window size of 20000. The server responds with an initial tag of 5000, an initial TSN of 2770, and a window size of 14000. Show the contents of all four packets exchanged during association establishment. Ignore the value of the cookie. If the client sends 7600 data chunks and the server sends 570 data chunks, show the contents of the three packets exchanged during association termination

4B. Discuss the different ways of occurrence of congestion. How does TCP control congestion? **3**

4C. Draw the state transition diagram of SCTP client. **2**

5A. What is the role of IGMP in multicasting? With necessary figures explain the process of joining and leaving the multicast group. Discuss the need for PIM-DM and MBONE. **5**

5B. Describe the operation of DVMRP. Does RPB actually create a shortest path tree? Explain. What are the leaves of the tree? **3**

5C. Change the following IP multicast addresses to Ethernet multicast addresses. How many of them specify the same Ethernet address? **2**
i. 224.18.72.8 ii. 235.18.72.8 iii. 237.18.6.88 iv. 224.88.12.