NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA
END - TERM EXAMINATION, Autumn-2016
B.Tech. 7th Semester

Subject code: CS-421 **Subject Name: Computer Networks** Dept. Code: **CS**
No. of pages: 01 Full Marks: 50 Duration: 3 ***Hours***

All parts of a question should be **answered at one place.**

1.	Suppose a 100-Mbps point-to-point link is being set up between Earth and a new lunar colony. The distance from moon to Earth is approximately 385,000km, and data travels over the link at the speed of light, i.e 3 X 10^8 m/s.	
(a)	Calculate the minimum RTT for the link.	3
(b)	Using the RTT as the delay, calculate the delay X bandwidth product for the link.	3
(c)	A camera on the lunar base takes pictures of Earth and saves them in digital format to disk. Suppose Mission Control on Earth wishes to download the most current image, which is 25MB. What is the minimum amount of time that will elapse between when the request for the data goes out and the transfer is finished?	4
2.	The IP address of a host in an organization is 176.58.92.100. Answer the following question:	
(i)	What is the mask of the organization, if it has 1200 sub-networks?	
(ii)	Mention 5 valid subnet addresses of the organization?	5 X 2
(iii)	Mention 5 broadcast addresses of the organization?	
(iv)	Mention 5 valid IP addresses of the organization?	
(v)	If a packet arrives with an IP address as 176.58.130.65, mention the address of the subnet to whom it belongs?	
3. (a)	A packet P= 5000 bytes is generated by a source S (whose ID is XHBC0035) with IP address 192.168.40.231 which is to be forwarded by routers R1 and R2 sequentially. The outgoing path of R1 is connected to a network whose MTU is 2000 bytes. And that of R2 is connected to a network whose MTU is 1000 bytes. Mention the initial two words of the 20 byte header formats of all the fragments that will be received by the receiver, if reliability is the major priority of the transmission.	5 X 2
(b)	Mention the different entries of the cache table of the ARP protocol. Give justification for each of the entries with example?	
4. (a)	Write the pseudocode for the function of the INPUT and OUTPUT modules of the address resolution protocol. Mention each of the possible conditions.	5 X 2
(b)	What are the different operations of user datagram protocol? How does it support process-to-process communication?	
5. (a)	With a neat diagram explain the TCP segment format and justify the presence of each field.	5 X2
(b)	Does TCP support flow control? If Yes, explain the different strategies for flow control. If No, explain the challenges met by the hosts using TCP in their transport layer?	