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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program: B.Tech CSE all IBM Branches

Subject (Course): Data Communication and Computer Networks

Course Code : CSEG 226

No. of page/s: 2

Semester – IV

Max. Marks : 100

Duration: 3 Hrs

Section A (20 Marks)

(Attempt All 5 Questions in this Section. Each question carries 4 marks)

- Q.1) Explain in what way token bucket algorithm is superior to leaky bucket algorithm?
- Q.2) What is MTU and what does it have to do with datagrams?
- Q.3) Discuss the frame relay frame format in brief.
- Q.4) What are some of the metrics for measuring network performance. Describe.
- Q.5) List the differences in a tabular format between IEEE 802.3 and IEEE 802.4.

Section B (40 Marks)

(Attempt All 4 questions. Each question carries 10 marks)

Q.6) Explain two nodes instability problem with the help of a scenario and also explain solutions to overcome this problem.

Q.7) An IP datagram has arrived with the following information in the header (in hexadecimal):

45 00 00 54 00 03 00 00 20 06 00 00 7C 4E 03 02 B4 0E 0F 02

- a. Are there any options?
- b. Is the packet fragmented?
- c. What is the size of the data?
- d. How many more routers can the packet travel to?
- e. What is the identification number of the packet?

Or

Explain IPv4 Header Format. Also describe why there is a total length field in the IPv4 header.

Q.8) A Slotted ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces:

- a) 1000 frames per second
- b) 500 frames per second

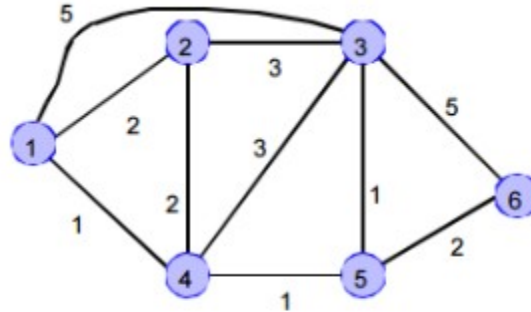
c) 250 frames per second

Q.9) An administrator have 192.168.1.0/24 network. He has three different departments with different number of hosts. Sales department has 100 computers, Purchase department has 50 computers, Accounts has 25 computers and Management has 5 computers. Design network for him so that security of network is maintained using CIDR sub netting. Mention every subnet address, valid host addresses and Broadcast address.

Section C (40 Marks)
(Attempt all 2 questions each of 20 marks)

Q.10)

a) Assume node 1 has obtained the entire network topology using link state routing protocol. Construct the routing table at node 1 using Dijkstra's algorithm to determine shortest paths from node 1 to all other nodes in the network. **(10 marks)**



b) What is Domain Name System (DNS)? Describe in detail. **(10 marks)**

Q.11)

a) Draw TCP Segment header and describe the purpose of each field. Also explain three-way handshake in TCP. **(15 marks)**

b) Host A sends a datagram to host B. Host B never receives a datagram and host A never receives a notification of failure. Give two different explanations of what might have happened. **(5 marks)**

Or

b) Answer the following questions related to the Selective-Repeat protocol with $m = 7$ bits: **(5 marks)**

a. The sending machine is in the ready state with $S_f = 10$ and $S_n = 15$. The timer for packet 10 times out. How many packets are to be resent? What are their sequence numbers?

b. The sending machine is in the ready state with $S_f = 10$ and $S_n = 15$. An ACK with $ackNo = 13$ arrives. What are the next values of S_f and S_n ? What is the action in response?

to this event?