

Code No: N0421/R07

**Set No. 1**

**IV B.Tech I Semester Supplementary Examinations, March 2013**  
**COMPUTER NETWORKS**  
( Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Mechatronics and Electronics & Telematics)

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Write short notes on the following:
  - (a) Client server model
  - (b) MAN
  - (c) Interfaces and services. [4+6+6]
2. (a) Television channels are 6MHz wide. How many bits/sec can be sent if four level digital signals are used? Assume a noiseless channel  
(b) How does a virtual circuit differ from a physical circuit? What advantages would a virtual circuit provide? [8+8]
3. (a) Explain one-bit sliding window protocol. Give the advantages and disadvantages of one-bit sliding window protocol?  
(b) Discuss the services provided by the data link layer to the network layer? [8+8]
4. (a) What is the prime difference between a token bus and a token ring?  
(b) A large population of ALOHA users manages to generate 50 requests/sec, including both originals and retransmissions. Time is slotted in the units of 40 msec.
  - i. What is the chance of success on the first attempt?
  - ii. What is the probability of exactly k collisions and then a success?
  - iii. What is the expected number of transmission attempts needed? [4+12]
5. Routing can be classified in to two types Source routing and hop-by-hop routing. In source routing, source determines the complete route, places the route in the packet header and intermediate routers just switch packets from one link to other link. In hop-by-hop routing each router maintains a routing table and when packet arrives on input link it places it on output link based on routing table. Compare the relative advantages & disadvantages of these two routing approaches. [16]
6. (a) What do we mean when we say IP is a best-effort delivery service? Explain.  
(b) Which fields in IP header change and which fields are fixed as the packet goes from source to destination?  
(c) How source quench is supported by ICMP?

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- (d) What the advantages of IPv6 over IPv4? [4+3+4+5]
7. (a) What is the relation between Virtual path and Virtual circuit? How they are used for cell switching?
- (b) Why AAL 3 & AAL 4 are combined to form AAL 3/4?
- (c) What is SSCOP? [8+4+4]
8. (a) What is MPEG? How audio & Video are encoded using MPEG?
- (b) How video is played on Demand? [8+8]

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1. (a) Compare point -to-point channels with broadcast channels along with suitable examples?  
(b) A collection of five routers is to be collected in a point-to-point subnet. Between each pair of routers, the designers may put a high speed line, a medium-speed line, a low-speed line, or no line. If it takes 100ms of computer time to generate and inspect each topology, how long will it take to inspect all of them to find the one that best matches the expected load? [8+8]
2. (a) With a neat diagram discuss about the electromagnetic spectrum?  
(b) Make a comparison of circuit switching, message switching and packet switching with a diagram showing the timing of events? [6+10]
3. (a) Discuss the error control technique which is commonly used in data network. What value of N is used in go-back-N ARQ technique used in ARPANET and why?  
(b) Imagine that you are writing the data link software for a line used to send data to you, but not from you. The other end uses HDLC, with a 3-bit sequence number and a window size of seven frames. You would like to buffer as many out of sequence frames as possible to enhance efficiency, but you are not allowed to modify the software on the sending side. Is it possible to have a receiver window greater than one, and still guarantee that the protocol will never fail? If so, what is the largest window that can be safely used? [8+8]
4. (a) Compare the five different types of cabling (Ethernet )  
(b) A 1-km long, 10-Mbps CSMA/CD LAN (not 802.3) has a propagation speed of 200 m/ $\mu$ sec. Data frames are 256 bits long, including 32 bits of header, checksum, and other overhead. The first bit slot after a successful transmission is reserved for the receiver to capture the channel to send a 32-bit acknowledgement frame. What is the effective data rate, excluding overhead, assuming that there are no collisions? [8+8]
5. Consider establishing physical connection, establishing virtual circuit, and using datagrams. In the context of wired networks which one is preferred and why. In the context of mobile networks which one is preferred and why. [16]
6. (a) How Tunneling helps in connecting two different networks?

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- (b) How routing in inter-network is different from routing in subnet? [8+8]
7. (a) Network layer can provide both connection oriented service and connection less service. Similar is the case with Transport layer, then why two different layers are required.
- (b) What are the Transport layers Quality of Service parameters? [8+8]
8. (a) What is multimedia? What are the problems with Audio and Video transfer over computer network?
- (b) How images are compressed using JPEG? [8+8]

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1. (a) What are the advantages of having layered architecture? Mention the layers of ISO-OSI reference model?  
(b) What is Internet? Mention some of the applications of Internet? [8+8]
2. (a) Television channels are 6MHz wide. How many bits/sec can be sent if four level digital signals are used? Assume a noiseless channel  
(b) How does a virtual circuit differ from a physical circuit? What advantages would a virtual circuit provide? [8+8]
3. (a) Discuss the error control technique which is commonly used in data network. What value of N is used in go-back-N ARQ technique used in ARPANET and why?  
(b) Imagine that you are writing the data link software for a line used to send data to you, but not from you. The other end uses HDLC, with a 3-bit sequence number and a window size of seven frames. You would like to buffer as many out of sequence frames as possible to enhance efficiency, but you are not allowed to modify the software on the sending side. Is it possible to have a receiver window greater than one, and still guarantee that the protocol will never fail? If so, what is the largest window that can be safely used? [8+8]
4. (a) Discuss the principle of operation of control token MAC method and with the aid of diagram. Explain how it may be used with both a bus and ring network topology ?  
(b) A LAN uses Mok and Ward's version of binary countdown. At a certain instant, the ten stations have the virtual station numbers 8, 2, 4, 1, 7, 3, 6, 9, and 0. The next three stations to send are 4, 3, and 9, in that order. What are the new virtual station numbers after all three have finished their transmissions? [8+8]
5. (a) Consider a networking environment which is highly dynamic and in which topology & traffic changes quickly. In such an environment, what are characteristics that should be possessed by a routing algorithm.  
(b) How multipath routing helps in such an environment. [10+6]
6. (a) How congestion is controlled in ATM?

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- (b) Explain ATM LAN emulation. [8+8]
7. Explain in detail about ATM AAL layer protocols? [16]
8. (a) What are the facilities available on the web for locating information?  
(b) How web can be used for e-commerce? [8+8]

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1. (a) Make a technical comparison between OSI & TCP/IP reference model.  
(b) "Novell Netware looks more like TCP/IP than like OSI". Justify. [8+8]
2. (a) Television channels are 6MHz wide. How many bits/sec can be sent if four level digital signals are used? Assume a noiseless channel  
(b) How does a virtual circuit differ from a physical circuit? What advantages would a virtual circuit provide? [8+8]
3. (a) Discuss about character stuffing and bit stuffing framing techniques with examples? Mention their advantages and disadvantages?  
(b) Discuss about the simple protocol for a noisy channel? [8+8]
4. (a) What is the prime difference between a token bus and a token ring?  
(b) A large population of ALOHA users manages to generate 50 requests/sec, including both originals and retransmissions. Time is slotted in the units of 40 msec.
  - i. What is the chance of success on the first attempt?
  - ii. What is the probability of exactly k collisions and then a success?
  - iii. What is the expected number of transmission attempts needed? [4+12]
5. (a) Consider a networking environment which is highly dynamic and in which topology & traffic changes quickly. In such an environment, what are characteristics that should be possessed by a routing algorithm.  
(b) How multipath routing helps in such an environment. [10+6]
6. (a) When RARP is required. Explain how it works. What is the limitation of RARP? How BOOTP provides solution for it?  
(b) What is the difference between classful addressing and classless addressing? How classless addressing results in decrease in the table size?  
(c) Give an argument why the leaky bucket algorithm should allow just one packet per tick, independent of how large the packet is. [6+5+5]
7. (a) Give a potential disadvantage when Nagle's algorithm is used on a badly congested network.

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- (b) Consider the effect of using slow start on a line with a 10-msec round trip time and no congestion. The receive window is 24KB and the maximum segment size is 2 KB. How long does it take before the first full window can be sent?
- (c) Suppose that the TCP congestion window is set to 18K bytes and a timeout occurs. How big will the window be if the next four transmission bursts are all successful? Assume that maximum segment size is 1 KB. [6+5+5]
8. (a) How POP works? What are the advantages of IMAP over POP?
- (b) What is the role played by message transfer agent? Explain. [6+10]

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