

M.TECH/CSE/2ND SEM/CSEN 5203/2015

(vii) Choose the most appropriate:

- (a) BGP is Distance Vector, OSPF is Link State
- (b) BGP is Distance Vector, OSPF is Distance Vector
- (c) BGP is Link State, OSPF is Link State
- (d) BGP is Link State, OSPF is Distance Vector.

(viii) Which of the following is correct?

- (a) Flow Control in the Link Layer is Rate Based
- (b) Flow control is a primary responsibility of the Physical Layer
- (c) Feedback based flow control is established in the Link Layer
- (d) The Network and the Transport Layers need not have explicit flow control mechanism.

(ix) A coding mechanism uses a transition in the middle of a bit transmission. For sending bit '1' it uses 0 to 1 transition in the middle. For sending bit '0', it uses a 1 to 0 transition. Which of the following is true for this code?

- (a) The bit rate is doubled
- (b) The bit rate is halved
- (c) The bit rate remains the same
- (d) None of the above.

(x) What are the sizes of the IP address and Port Number in IPv4 (in bits)?

- | | |
|------------|-------------|
| (a) 32, 32 | (b) 16, 16 |
| (c) 16, 32 | (d) 32, 16. |

Group - B

2.(a) Explain p-persistent CSMA/CD protocol.

(b) An Ethernet Network consists of a few nodes with transmission capacity 10^5 bps. The maximum distance between any two nodes in the network is 300 mtrs. (Assume speed of light is 3×10^{10} cm/sec). How much time would be required to detect a collision in the worst case? Please explain your answer briefly.

(c) For Satellite communication which one of the following is not suitable - Go-Back-N or Sliding Window?

(d) Why is a modem required for signal transmission? Explain the most important principle behind high-speed modem design.

3+3+2+(2+2)=12

3.(a) Distance between two stations is x km. Transmission capacity of the channel is y bps. Each frame is z bits in length. Assume propagation speed of light is c km/sec. Processing delay is negligible. What would be the maximum window size if a sliding window protocol is followed?

(b) How does the RTS/CTS mechanism solve the Hidden and Exposed Terminal problem?

(c) What is Backward Learning algorithm used by bridges?

5+4+3=12

Group - C

- 4.(a) Design a subnetting scheme for an assigned network (IP) address : 198.60.12.0.
LAN A contains 30 machines
LAN B contains 60 machines
LAN C contains 30 machines
LAN D contains 60 machines
Assign subnet addresses in that order (i.e. addresses for LAN A to appear earlier than LAN B etc.). In particular show the starting and ending addresses for each LAN and individual subnet masks.
- (b) In CIDR, how is the netmask specified? How is it different from class based mechanism?
- (c) What are the IPv4 addresses not available for assigning to hosts?
6+(2+2)+2=12

- 5.(a) Describe the steps for the Link State Routing protocol with an example.
- (b) Mention how the following design choices can help in solving IPv4 address scarcity problem:
i) NAT ii) CIDR
- (c) Mention only the main steps (no explanation required) of the AODV routing protocol.
4+4+4=12

Group - D

- 6.(a) Prove the inequality: $(m + r + 1) \leq 2^r$, where m is the number of message bits and r is the number of check bits required to detect all single bit errors.
- (b) What do you mean by Virtual Circuit and Datagram? Virtual Circuit is a circuit switching technology – comment whether this is correct or not.
- (c) How is FHSS different from FDM?
4+(4+2)+2=12
- 7.(a) In a CDMA system suppose these are two stations A and B with chip codes 1010 and 1100 respectively. A sends bits '1','1','0', idle information in successive four bit intervals. B sends in the same time idle,'0','1','1'.
i) Describe algebraically the transmitted signals by A,B, in the channel and receiver output at three decoders that use chip codes for A,B and something else (say 0110).
ii) Show the same information as above using a suitable timing diagram.
- (b) WLAN / BlueTooth / Zigbee – all use the free ISM band. Will there be any conflict if they operate simultaneously?
(5 + 5)+2=12

- 8.(a) Explain how the following design choices can be used to make an unreliable protocol (like UDP) behave like a reliable protocol?
i) Sequence No ii) Retransmission iii) Timeout iv) Buffering.

(b) Show a typical NAT table and explain it.

- (c) Suppose you are designing a new client-server oriented application in the Internet. What are the parameters you need to agree upon to make the client / server communication happens? Show the corresponding “socket” code in both the client & the server. You may assume any language of your choice. Also just show the code for the communication part only – no need to write the actual application logic.

4+4+(2+2)=12

- 9.(a) A Token Bucket has a capacity of 9600 KB. Tokens are generated @ 25 MB/sec. How long can this system support a burst of 125 MB/sec.? (Answer should be in milliseconds).

(b) What is meant by Congestion Control? Is it a Network Layer or a Transport Layer responsibility? Mention a known technique of Congestion Control.

- (c) The TCP connection establishment is a 3-way handshaking process whereas the teardown is a 2-way one – explain briefly.

4+(2+1+3)+2=12