



# BRAINWARE UNIVERSITY

Course – MCA

Computer Network (MCA401)

(Semester – 4)

**Time allotted: 3 Hours**

**Full Marks : 70**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

## Group –A

(Multiple Choice Type Questions)

10 x 1 = 10

1. *Choose the correct alternative from the following*

(i) Which topology technique has a point to point configuration?

- a. Mesh
- b. Star
- c. Bus
- d. All of these

(ii) The Hamming code is used for

- a. error detection
- b. error correction
- c. error encapsulation
- d. both (a) and (b)

(iii) For a 4 bit sliding window the sequence number can range from

- a. 1 to 16
- b. 0 to 7
- c. 0 to 15
- d. 8 to 15

(iv) To locate the destination, ARP request packet contains

- a. broadcast address
- b. destination logical address
- c. multicast address
- d. destination port address

(v) 3-way handshaking of connection establishment is associated with

- a. HTTP protocol
- b. UDP protocol
- c. TCP protocol
- d. FTP protocol

- (vi) A class B destination IP address in a packet in the form 0.0.5.25 indicates
- 'this' host in 'this' network
  - a host in 'this' network
  - any host in any network
  - a host in any network
- (vii) A CIDR value of /20 in a class B network indicates
- 8 subnets
  - 16 subnets
  - 32 subnets
  - 64 subnets
- (viii) A digital signal has eight levels. How many bits are needed per level?
- 1
  - 2
  - 3
  - 4
- (ix) The value of SNR for a noiseless channel is
- 0
  - finite
  - infinite
  - 1
- (x) The address space of IPv4 is
- 32
  - infinite
  - $2^{32}$
  - 128

### Group – B

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

2. For each of the following four networks, discuss the consequences if a connection fails.
- Seven devices arranged in a mesh topology
  - Seven devices arranged in a star topology (not counting the hub)
  - Seven devices arranged in a bus topology
  - Seven devices arranged in a ring topology. [5]
3. (a) The power of a signal is 10 mW and the power of the noise is 1  $\mu$ W; what are the values of SNR and SNR<sub>dB</sub>? [3]

- (b) Draw the graph of the Manchester and Differential Manchester scheme using the data stream 01010101, assuming that the last signal level has been positive. [2]
4. Compare Pure ALOHA and Slotted ALOHA with proper diagrams. What are the vulnerable times for these networks? [3+2]
5. An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets.
- Find the number of addresses in each subnet.
  - Find the subnet prefix.
  - Find the first and the last address in the first subnet.
  - Find the first and the last address in the last subnet. [5]
6. Discuss closed loop congestion control methods. [5]

### Group – C

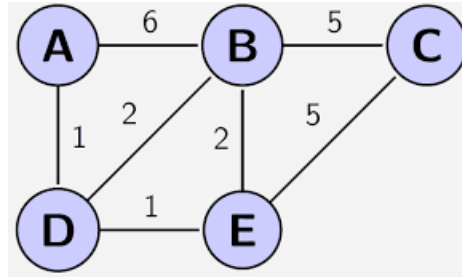
(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

7. (a) What are the three major classes of guided media? Describe briefly each of them with proper diagrams. [7]
- (b) A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network? Compare between the throughput and bandwidth in this case. [4]
- (c) What are the major responsibilities of Data Link Layer? Describe briefly. [4]
8. (a) Given the dataword 101001111 and the divisor polynomial  $x^4+x^2+x+1$  show the generation of the CRC codeword at the sender site. Show how error is detected if the 4<sup>th</sup> bit of the codeword gets corrupted. [6]
- (b) Explain bit stuffing with proper example. [3]
- (c) In case of frame loss, state how differently Go Back N ARQ and Selective Repeat ARQ handles the situation. [6]

9. (a) Explain how NAT can be used when the size of the block assigned to an organization is less than the number of hosts in the organization. [4]
- (b) What is Fragmentation in relation to IPv4 datagram? Discuss the significance of each field, related to Fragmentation. [4]
- (c) Use Dijkstra's algorithm to find the shortest path tree and the forwarding table for node A in the following graph :



- [7]
10. (a) Explain the significance of each field of a TCP segment header. [6]
- (b) Discuss the methods of open loop congestion control. [5]
- (c) Explain Leakey Bucket algorithm for congestion control with proper example. [4]
11. Write short notes on : (any *three*) [3 x 5]
- (a) ARP
- (b) DNS
- (c) FTP
- (d) VPN
- (e) Firewall