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Paper Code : CS-602

COMPUTER NETWORK

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

i) Which layer converts bit into electromagnetic signals ?

a) Physical b) Network

c) Transport d) Session

ii) Which of the following transmission media is not readily suitable to CSMA operation ?

a) Radio b) Twisted pair

c) Fibre optic d) Coaxial.

iii) Phase transition for each bit is used is

a) NRZ encoding

b) Manchester encoding

c) Carrier modulation

d) Amplitude modulation.

iv) The subnet mask 255.255.255.192

a) extends the network portion to 16 bits

b) extends the network portion to 26 bits

c) extends the network portion to 36 bits

d) has no effect on the network portion of an IP address.

v) Router solicitation and advertisement message is used by

a) IP b) ARP

c) ICMP d) DHCP

vi) If source is using IPV6 and destination is using IPV4, which type of address needs to be used ?

a) Loopback b) Mapped

c) Compatible d) None of these.

vii) Which one of the following is a valid host for network 192.168.4.32/68 ?

a) 192.168.4.39 b) 192.168.4.50

c) 192.168.4.47 d) 192.168.4.31.

viii) Exponential increase is used in

a) Slow start

b) Congestion avoidance

c) Congestion detection

d) none of these.

ix) UDP is

a) connection oriented b) connection less

c) both (a) and (b) d) none of these.

x) Port number is

a) process number

b) computer physical address

c) both (a) and (b)

d) none of these.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Suppose a system uses Stop and Wait protocol with propagation delay 20 ms. If the frame size is 160 bits and band-width is 4 kbps when calculate channel utilization of efficiency. What is bit stuffing and byte stuffing ? 3 + 2

3. Apply CRC algorithm, determine the checksum and the transmitted frame for the bit stream 11010111 and for the generator polynomial $x^3 + x^2 + 1$.

4. Differentiate between CSMA/CD and CSMA/CA.

5. What do you mean by subnet masking ? Explain how it can be achieved with an example. 1 + 4

6. What do you mean by classful addressing ? What are the advantages of classless addressing over classful addressing ? What do you mean by netID and hostID ?

1 + 3 + 1

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) What are Bit rate and Baud rate ? An analog signal carries 4 bits in each signal unit. If 1000 signal units are sent per second, find the Baud rate and Bit rate.

   b) A channel has a data rate 4 kbps and propagation delay of 20 ms. For what range of frame size does stop-and-wait give an efficiency of at least 50% ?

(3 + 3 + 3) + 6

8. a) A 10 bit data bit block 0111010111 is to be sent using hamming code for error detection and correction. Show how the receiver corrects an error that occurs in 6th bit position from right.

   b) Differentiate between connection-oriented and connectionless services implemented by the network layer.

c) Differentiate between pure ALOHA with slotted ALOHA.

d) Explain leaky bucket and token bucket algorithm.

5 + 3 + 3 +

9. a) Why is dynamic routing preferred over static routing algorithm in the network, which changes continuously ? What are LLC & MAC ?

b) Why window size of the Go-Back-N protocol is $2^n - 1$, where n is the number of bits required to identify the sequence number of the data frame ?

c) What type of error is not detected by CRC ?

d) Prove that $2^r \geq m + r + 1$, where m is the number of data bits and r is the number of redundancy bits required to correct the error. (3 + 3) + 2 + 2 +

10. a) Write down the advantages of fibre-optic cable over twisted pair and coaxial cable.

b) State the advantage of IPV6 over IPV4.

c) A class *B* network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet ?

d) Write a short note on Cryptography.

e) An ISP has a block of 1024 addresses. It needs to divide the address among 1024 customers. Does it need subnetting ? Justify. 3 + 1 + 3 + 4 + 4

11. Write short notes on any *three* of the following : 3 × 5

a) RIP

b) OSPF

c) BGP

d) Digital Signature

e) ARP packet format.