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CSE 181602

14/6/23

Roll No. of candidate

2023

B Tech. 6th Semester (Regular) End-Term Examination

COMPUTER NETWORKS

New Regulation (w.e.f 2017-18) & New Syllabus (w.e.f. 2018-19)

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

1. Select the correct answer: $(10 \times 1 = 10)$

(i) The number of wires present in CAT 5 cables are:

(a) 4 (b) 8

(c) 16 (d) None of the above

(ii) ARP is used to:

(a) Get the associated IP address for a given physical address

(b) Get the associated physical address for a given IP address

(c) Set an IP address for a given physical address

(d) Set a physical address for a given IP address

(iii) Match the following network devices with the proper OSI layer they work on:

(a)	Router	(1)	Physical Layer
(b)	Modem	(2)	Data Link Layer
(c)	Switch	(3)	Network Layer

(iv) In a broadcast network, which one of the following layer may not be required?

(a) Physical Layer (b) Data Link Layer

(c) Network Layer (d) Transport Layer

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(v) DHCP uses the following port numbers:

(a) Server: 20, Client: 21

(b) Server: 21, Client: 20

(c) Server: 67, Client: 68

(d) Server: 68, Client: 67

(vi) Which one of the following can be used to securely store passwords for login purpose (e.g. user login in a GNU/Linux system)?

(a) RSA (b) SHA

(c) AES (d) SSL

(vii) Choose the correct statement:

(a) In FDM, each station gets the entire bandwidth of the media for a small amount of time, in round-robin fashion.

(b) In TDM, the bandwidth of the media is divided into smaller parts, and each station is allocated one of the parts in a continuous manner.

(c) In statistical TDM, the bandwidth of the media is allocated on demand basis.

(d) None of the above.

(viii) The number of bits used in the IPv6 addressing is:

(a) 32 (b) 64

(c) 128 (d) 256

(ix) Choose the correct statement:

(a) The TCP provides connection-oriented service, while the UDP provides connectionless service.

(b) The TCP provides connectionless service, while the UDP provides connection-oriented service.

(c) Both TCP and UDP can provide connection-oriented service.

(d) Both TCP and UDP can provide connectionless service.

(x) Match the following protocol data units with the appropriate OSI layer:

(a)	Packet	(1)	Physical Layer
(b)	Bits	(2)	Data Link Layer
(c)	Frame	(3)	Network Layer
(d)	Segment	(4)	Transport Layer

2. (a) A station wants to send the data bits or the message M(x) = 11100101. If the chosen divisor or the generator G(x) = 11011: (10 + 5 = 15)

(i) Calculate the CRC, and construct the codeword T(x) for transmission.

(ii) Show how the receiver would check the codeword for error.

Clearly show each step of the calculation and the verification process.

(b) Briefly explain the error handling approaches used in the Sliding Window Protocol.

3. (a) Mention the purpose of the following fields present in the IPv4 header:

(5 + 10 = 15)

(i) Identification

(ii) DF bit

(iii) MF bit

(iv) Fragment Offset

(v) Time To Live

(b) For the IPv4 address 172.16.10.20/22, calculate the following:

(i) The Network Address

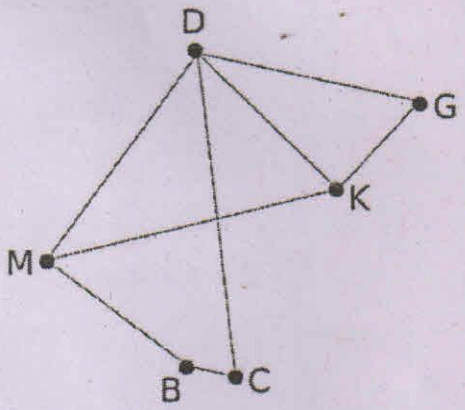
(ii) The Broadcast Address

(iii) The usable Host Address range

4. (a) Briefly explain the TCP connection establishment method (3-way handshake), using proper diagram. (7 + 8 = 15)

(b) What is meant by Congestion in a network? Mention the possible reasons for congestion.

5. (a) For the network topology shown below, calculate the new routing table for router K, using Distance Vector Routing method. Clearly show the steps of the calculation. (10 + 5 = 15)



To	D	M	G
D	0	6	6
M	5	0	10
K	4	5	3
G	4	8	0
B	8	4	12
C	6	7	10
	KD delay is 5	KM delay is 7	KG delay is 3

(Vectors received from K's neighbors)

(b) Briefly explain the 'Count to Infinity' problem with suitable example.

6. (a) Briefly explain the steps followed to obtain an IP address using DHCP. (7 + 8 =15)

(b) What is a Cryptographic Hash Function? Briefly explain the essential properties of cryptographic hash functions.

7. Write short notes (any Three): (3 × 5 = 15)

(a) ARP

(b) DNS

(c) VLAN

(d) Firewall

(e) Leaky Bucket VS. Token Bucket