Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SET A

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester VII - 2020

Course Code : ECE3108

Course Name : Data Communication and Computer Networks

Program : B.Tech.

Date : 08-JAN-2024

Time : 9:30AM - 12:30 PM

Max Marks : 100

Weightage : 50%

Instructions:

(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **5 X 2M = 10M**

1. An address is an identifier for a node or host on a telecommunications network. Addresses are designed to be unique identifiers across the network, although some networks allow for local, private addresses, or locally administered addresses that may not be unique. What are the types of different addresses used in TCP/IP?

(CO1) [Knowledge]

2. Serial data transmission implies that one bit is sent after another (bit-serial) on a single transmission line. What are the types of serial transmission?

(CO1) [Knowledge]

3. The channelization protocol allows numerous stations to access the same channel at the same time by sharing the link's resources. What are different channelization techniques?

(CO1) [Knowledge]

4. A Domain Name System (DNS) turns domain names into IP addresses, which allow browsers to get to websites and other internet resources. What are the types of messages that DNS has?

(CO4) [Knowledge]

5. DNS servers convert URLs and domain names into IP addresses that computers can understand and use. What are the types of resolvers in DNS?

(CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **5 X 10M = 50M**

6. The layered architecture style is one of the most common architectural styles. The idea behind Layered Architecture is that modules or components with similar functionalities are organized into horizontal layers. Name the network model which is having seven layers and explain with necessary diagrams, tasks of each layer of the network model.

(CO2) [Comprehension]

7. There are 3 stations in a network and are trying to send on the shared communication channel only after checking the channel status. If the channel is idle, the station waits for an Inter-frame space (IFS) amount of time and then sends the frame. Which protocol is used for the above transmission? Explain this protocol in detail with necessary flowchart and diagrams?

(CO2) [Comprehension]

8. How is the internet upgrading its IP address system from the old version 4 to the new version 6? Explain the techniques used for this transition with suitable diagrams?

(CO3) [Comprehension]

9. The Transport layer is responsible for delivery of segments between two processes (ports) running between two hosts connected by different nodes. Transport Layer has a protocol which is an unreliable and connectionless protocol. So, there is no need to establish a connection prior to data transfer. What is that protocol, Explain the message format with all fields used for this protocol and what is the format for checksum calculation?

(CO3) [Comprehension]

10. What are the important parts of a mechanism that make the internet's address system work smoothly by binding the domain name with an IP address? How binding is carried out between domain names and IP addresses? Explain in detail with necessary diagrams?

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **2 X 20M = 40M**

11. A)

An ISP is granted a block of addresses starting with 190.100.0.0/16. The ISP needs to distribute these addresses to following groups as follows

1. 64 customers, each needs 256 addresses
2. 128 customers with each needs 128 addresses
3. 128 customers with each need 64 addresses.

How many total number of addresses can be generated, design the sub blocks of addresses for each group of customers and find out how many addresses are allotted to each group and how many addresses are still available after these allocations?

B)

A) Find the class of each address.

i) 00000001 00001011 00001011 11101111

ii) 14.23.120.8

B) Change the following IPv4 addresses from binary notation to dotted-decimal notation.

i) 10000001 00001011 00001011 11101111

ii) 11000001 10000011 00011011 11111111

C) Change the following IPv4 addresses from dotted-decimal notation to binary notation.

i) 111.56.45.78

ii) 221.34.7.82

D) In an IPv4 Datagram, if there are 64 bits are added as optional then what is the length of the IPv4 datagram header in bytes?

E) In a TCP Segment, the header consists of 40 bytes of options and padding bits. What is the value of HLEN field?

(CO3) [Application]

12. A)

A Slotted aloha network transmits 200-bit frames on a shared channel of 200 kbps. What is the total vulnerable time? What is the throughput if the system (all station together) produces? Calculate number of frames that are received correctly at the receiver for the following cases.

1. 1000 frames per second
2. 500 frames per second
3. 250 frames per second

B)

Let us assume we have four stations 1, 2, 3, and 4 connected to the same channel. The data from station 1 is bit 0, from station2 is bit 0, from station3 no transmission and from station4 is bit 1.Explain the procedure in CDMA with encoding and decoding, if Station 3 wants to listen to station 1. The codes assigned to station 1 is C1 [+1 +1 +1 +1], station 2 is C2 [+1 -1 +1 -1], station 3 is C3 [+1 +1 -1 -1] and station 4 is C4 [+1 -1 -1 +1].

(CO2) [Application]