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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKE UP EXAMINATION - JULY 2024**

**Date**: 11/July/2024

**Time**: 09:30am – 12:30pm

**Max Marks**: 100

**Weightage**: 50%

**Semester**: 7

**Course Code**: ECE3108

**Course Name**: DCCN

**Department:** Electronics & Communication Engineering

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

**PART A**

**Answer any Five Questions (5QX2M=10M)**

1. [Data Communication](https://www.geeksforgeeks.org/difference-between-computer-network-and-data-communication/) is defined as exchange of data between two devices via some form of transmission media such as a cable, wire etc. For occurrence of data communication, communicating devices must be a part of communication system made up of a combination of hardware or software devices and programs. What are the components of Data communications?
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?
3. Transport layer is a conceptual division of methods in the layered architecture of protocols in the network stack in the Internet protocol suite. What are the protocols used in transport layer of TCP/IP Protocol Suite?
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 different types of DNS messages?
5. DNS servers convert URLs and domain names into IP addresses that computers can understand and use. What are the types of Servers used in DNS?
6. UDP is one of the core communication protocols in transport layer of TCP/IP suite. Draw the UDP segment structure and explain.
7. Domain Name System maps Hostname to IP address. What are the types of top level domain in DNS? Define with Example

**PART B**

**Answer any Five Questions (5X10=50M)**

1. 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.
2. There are 3 stations in a network and are trying to send on the shared communication channel only after checking the channel status. After identifying a collision, the station stops transmitting, sends a jam signal, and then waits for a random time interval before retransmission. Which protocol is used for the above transmission? Explain this protocol in detail with necessary flowchart and diagrams?
3. How is the internet changing its IP address system? Describe the shift from the older version 4 to the newer version 6. Explain the mechanisms used for this transition with suitable diagrams?
4. 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?
5. What are the essential components of a mechanism that make up the binding between IP address and domain names in internet's addressing system? How binding is carried out between domain names and IP addresses? Explain in detail with necessary diagrams?
6. A quick solution to the problem of shortage of IPV4 addresses is NAT. What is NAT and how can it help in overcoming address depletion? Also illustrate with an example how the address translation takes place with the help of a neat diagram.
7. What are the essential components of a mechanism that make up the binding between IP address and domain names in internet's addressing system? How binding is carried out between domain names and IP addresses? Explain in detail with necessary diagrams?

**PART C**

**Answer any Two Questions (2X20=40M)**

1. **A)** An ISP is granted a block of addresses starting with 190.100.0.0/16. The ISP needs to distribute these addresses to three groups as follows
2. 64 customers, each needs 256 addresses
3. 128 customers with each needs 128 addresses
4. 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?

**16.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].

17 a) Draw TCP segment format and explain its different fields.

b) What is the value of the receiver window (rwnd) for host A if the receiver, host B, has a buffer size of 5000 bytes and 1000 bytes of received and unprocessed data?

c) What are the merits of IPV6 over IPV4.

d) Show the shortest form of the following addresses.

i) 2340: lABC: 119A:AOOO:0000:0000:0000:0000

ii) OOOO:OOAA:OOOO:OOOO:OOOO:OOOO: 119A:A231

1. Show the original (unabbreviated) form of the following addresses
2. O:AA::O
3. 0: 1234::3