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PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF COMPUTER SCIENCE AND ENIGINEERING

SUMMER TERM END TERM EXAMINATION – AUG’ 2024

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| **Semester : 2023-2024** | | **Date :05.08.2024** | |
| **Course Code : ECE3108** | | **Time :9.30AM-12.30PM** | |
| **Course Name : DATA COMMUNICATION and COMPUTER NETWORKS** | | **Max Marks : 100** | |
| **Program : B.TECH** | | **Weightage: 50%** | |
| **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 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | TCP/ IP network model is the basis of Internet technology. Discuss this model with the help of a relevant diagram. | (CO 1) | [Knowledge] |
| 2 | Layers in the TCP/IP protocol suite do not exactly match those in the OSI model. Compare OSI and TCP/IP architecture. | (CO 1) | [Knowledge] |
| 3 | CSMA method was developed to reduce the chance of collision and improve the performance. How is the chance of collision reduced in CSMA and highlight any two methods of persistence. | (CO 2) | [Knowledge] |
| 4 | IPv4 addressing, at its inception, used the concept of classes. Explain the IP address classification. | (CO 3) | [Knowledge] |
| 5 | UDP is one of the core communication protocols in transport layer of TCP/IP suite. Draw the UDP segment structure and explain. | (CO 3) | [Knowledge] |
| 6 | Domain Name System maps Hostname to IP address. What are the types of top level domain in DNS? Define with Example. | (CO 4) | [Knowledge] |
| **PART B** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 10M=40M** | | | |
| 6 | Explain about circuit switching and datagram approach in packet switching with necessary diagrams? | (CO 1) | [Comprehension] |
| 7 | Explain with the help of suitable diagrams the Character oriented framing Protocol. | (CO 2) | [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? | (CO 3) | [Comprehension] |
| 9 | What is Network Address Translation in computer network. List the different address segments of private networks. Also, discuss the important application of NAT with the help of a relevant diagram. | (CO3) | [Comprehension] |
| 11 | Explain the TCP segment format with all fields used for this protocol? | (CO4) | [Comprehension] |
| 12 | 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 2 QUESTIONS 2Q X 20M=40M** | | | |
| 9 | Let a route between Sender with NL address “X” and Receiver NL address “Y” be going through 2 routers, R1 and R2. As we know, at DLL, only the MAC Layer gets encapsulated and de-capsulated at each router, while the logical addresses of NL gets encapsulated and de-capsulated only at the End Machines. Let the route be shown as follows. Show Encapsulation and de-encapsulation at all stages. | (CO 1) | [Application] |
| 10 | **A)** Let us assume we have four stations 1, 2, 3, and 4 connected to the same channel. The data from station 1 is bit 1, from station 2 is bit 1, from station 3 no transmission and from station 4 is bit 0. Explain the principle and procedure of CDMA with encoding and decoding, if Station 3 wants to listen to station. 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].  **B)** A pure 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 | (CO 2) | [Application] |
| 11 | a) What are the restrictions basing the design of Classless IP addressing mechanism.  b)An ISP is granted a block of addresses starting with *190.100.0.0/16 (65,536 addresses)*. The ISP needs to distribute these addresses to three 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. 4. 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?   c)Find the class of each address.  i) 00000001 00001011 00001011 11100000  ii) 200.25.120.8  d)Change the following IPv4 addresses from binary notation to dotted-decimal  notation.   1. i) 10000001 00001011 00001011 11101111 2. ii) 11000001 10000011 00011011 11111111   e)Change the following IPv4 addresses from dotted-decimal notation to binary  notation.   1. i) 111.56.45.78 2. ii) 221.34.7.82   f)In an IPv4 Datagram, if there are 32 bits are added as optional then what is the length of the IPv4 datagram header in bytes?  g)In a TCP Segment, the header consists of 20 bytes of options and padding bits.What is the value of HLEN field? | (CO 3) | [Application] |