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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**
Course Code: 22AM3PCCNS **Max Marks: 100**
Course: Computer Networks **Date: 19.05.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Illustrate data communications system with a diagram. **6**

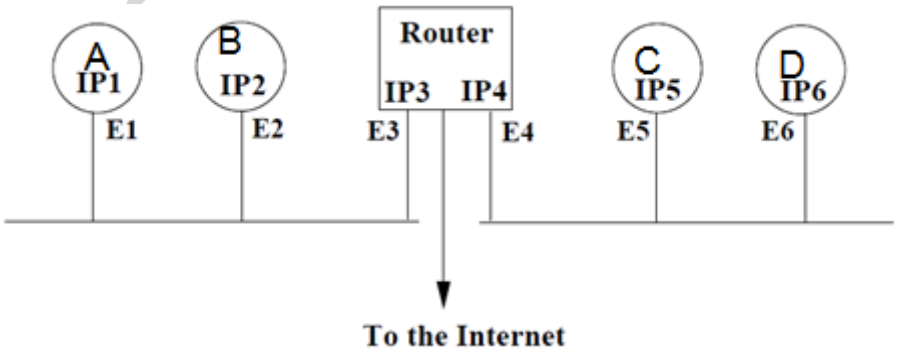
b) Identify the TCP/IP layer which is responsible for the following and explain the functionalities of the same layer in detail. **10**

i) Determining the best path to route packets

ii) Providing end-to-end communications with reliable service

iii) Bit Transmission.

c) The diagram given below shows the number of hosts connected in a network with IP address and Ethernet address. **4**



i) Suppose host A wants to send a packet to the host D. Reason out on what is the destination Ethernet address of the Ethernet frame sent by host A to host D.

ii) Reason out on what will be destination Ethernet address of the Ethernet frame sent by host A to host B.

UNIT - II

2 a) Given the dataword 1010011110 and the divisor 10111. **10**

i) Show the generation of the codeword at the sender side.

ii) At the receiver end, if the dataword has an error in the 5th bit position counting from the right i.e. dataword is transmitted as 1010001110, show the CRC calculation at the receiver end for the received message.

b) One important issue in networking is the performance of the network i.e. how good it is. Discuss the various characteristics used to measure the overall network performance. **10**

OR

3 a) Calculate CRC for a frame 1101011011 using the generator polynomial g(x) = $x^4 + x + 1$. **10**

i) Show the transmitted message at the sender.

ii) Show the CRC calculation at the receiver for the above received message with no errors.

b) With a neat diagram ilustrate the working of a Stop-and-Wait protocol for reliable transmission. **10**

UNIT - III

4 a) An organization is granted a block 201.19.160.0/24. The administrator wants to create 16 subnets with same number of addresses. **10**

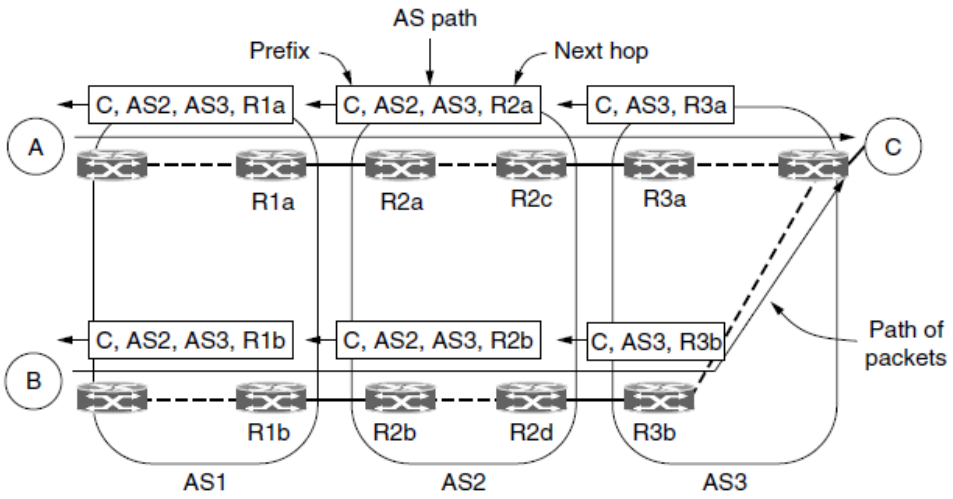
i) What is the subnet mask for the above address?

ii) What is the range of the addresses in first and last subnet?

iii) Is the subnet mask 255.255.0.255 valid for a Class A address? Explain.

iv) Consider two addresses 172.202.2.19 and 192.202.3.29. Are they on the same network? Justify.

b) Answer the following questions with respect to Border Gateway Protocol. Use the diagram given below. **10**



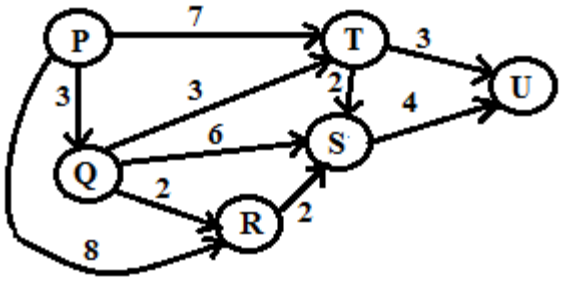
i) Why do we need to advertise routes in Border Gateway Protocol? Justify your answer.

ii) Detail out on the different route advertisements carried out by BGP in the above diagram.

iii) If we need to perform route advertisements from one side of the Internet Service Provider to the other side of the Internet Service Provider, what should we do? Validate.

OR

5 a) The figure below shows a graphical representation of a network containing 6 nodes (P, Q, R, S, T and U) and 10 links. Using Dijkstra's Algorithm, find out the shortest distance from node P to all other nodes. If the link T-U goes down, which is the shortest route from P to U? **10**



b) Explain the factors influencing the need to adopt IPv6 and replace IPv4. **5**

c) Network address of a Class-C network is 192.168.100.0. Calculate network addresses and broadcast addresses for all the subnets if there are 13 subnets and 10 hosts per subnet. Also mention the default subnet mask and subnet mask after subnetting. **5**

UNIT - IV

6 a) "TCP is suitable as the transport layer protocol for real-time multimedia applications". Is this statement True or False? Justify. **10**

b) Illustrate the working of connection establishment and connection termination in TCP with a neat diagram. **10**

UNIT - V

7 a) "Network security is complex and fascinating". Validate the statement with proper reasoning. **5**

b) Assume the global parameters p= 7, q = 13 in RSA Algorithm. Let e = 5 find d, public key and private key. Assume plaintext m = 6, apply encryption and decryption using public and private keys. **10**

c) Using Vigenere cipher generate cipher for the message "BMS COLLEGE OF ENGINEERING" with a shift key as 1234. **5**

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