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

Autonomous Institute Affiliated to VTU

April 2024 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

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) Differentiate OSI and TCP/IP models. Signify each layer's functionality and the protocols that work. **8**

b) Analyse the following requirement: **8**

i. Establish a clear and reliable voice communication channel.

ii. Facilitate multiple voice and data application at the same time.

Justify which switching mechanism is better for the above scenarios.

c) What is the propagation time if the distance between the two points is 12,000 km? Assume the propagation speed is 2.4 × 10^8 m/s in cable. **4**

UNIT - II

2 a) Applying the concepts of Digital Encoding to perform the following operations **5**

i. Convert 0010111101000010 into time vs amplitude using NRL technique

ii. Convert 01001100011 into time vs amplitude using NRZI encoding technique.

b) During data transmission over a network, how do you identify or classify different types of errors by analysing the data packet. Exemplify and Justify. **5**

c) Analyze the follwing series of 7x7 bit items of data that need to be transmissed from source to destination. Anwer the following: **10**

1	1	1	0	1	1	0	
1	1	0	1	0	1	0	
0	1	1	1	1	1	0	
0	1	1	0	1	0	0	
1	1	0	0	0	1	0	
0	0	1	0	1	0	1	
1	1	0	0	0	0	0	

1. Assuming an even parity is followed fill in the parity bit for each blank.
2. Will two-dimensional parity check catch all 2-bit errors?
3. If the first two bits of the first 2 rows are flipped (0 becomes 1 an 1 becomes 0). Predict the behaviour of the above technique. Can it still detect the errors in the data?

OR

3 a) Justify how reliable transmission can be achieved using stop and wait protocol mechanism. **10**

b) In a CRC scheme, the generator polynomial is x^3+x+1, suppose the message 11000 is transmitted, identify if the same data is being received at the receiver side or not? **10**

UNIT - III

4 a) Differentiate circuit switching Vs. Packet Switching **4**

b) How many number of host and networks can be created using IP4 Classful addressing schemes? Show the representation of NetworkID and HostID for each class. **8**

c) Given the CIDR representation 100.1.2.35 / 20, find the range of IP Addresses in the CIDR block. **8**

OR

5 a) We have a big single network having IP Address 200.1.2.0. We want to do subnetting and divide this network into 2 subnets. Determine the following: **10**

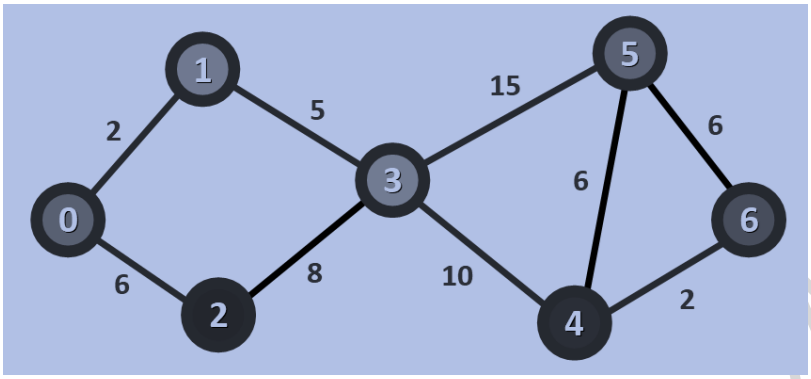
i. IP Class and subnet mask.

ii. Possible sub networks that can be designed

iii. Can the given IP address be used as private IP address?

iv. One subnet network address.

b) Find the shortest path from source node 0 to node 6 using both path count and hop count. Justify which is the best path **10**



UNIT - IV

6 a) Mention the functions of transport layer. **4**

b) TCP three-way handshake mechanism is the best way to establish a strong connection between client and server? Justify. **6**

c) TCP performance is degraded due to some problems during the transmission. What are those problems? Provide potential solutions for the same. **10**

UNIT - V

7 a) Describe the principle of ciphers **4**

b) Using Vigenere cipher, generate cipher text for the message “IATTACK” with key as 234 **6**

c) Write RSA Algorithm and apply the same to find the value of d if p=7, q=11 and e=13 and perform encryption and decryption for the message m=13. **10**

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