## **Question Paper**

Exam Date & Time: 26-Jun-2024 (02:30 PM - 05:30 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

IV SEM MAKEUP EXAMINATIONS, JUNE 2024

## COMPUTER NETWORKS AND PROTOCOLS [ICT 2226]

Marks: 50

1)

## Answer all the questions.

Duration: 180 mins.

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Section Duration: 180 mins

- Assume a taluk is granted a block containing one of the addresses as 32.9.13.5/17. The taluk's (5) government offices need 3 sub-blocks of addresses to assign as follows:
  - a. Taluk office has 6 divisions; each need approximately 136 addresses.
  - b. Municipal office has 15 divisions; each need approximately 54 addresses.
  - c. Session Court has 13 divisions; each need approximately 38 addresses.
  - i. Assign the IP addresses and subnet mask (second level hierarchy) efficiently for each subblock in the same order as shown above.
  - ii. Find the range of host IP addresses not assigned to the systems (from and to IP addresses in first level of the hierarchy)
  - iii. Compute the total IP address that is wasted in each sub-block (first level of the hierarchy).

2) Find the from the different

Find the order of arrival and corresponding delays of the four equal-sized datagrams, all departing (3) from the same source node and heading to the same destination, change when considering different paths. Assume that delay for each router (including waiting and processing) is 13 ms,10 ms, 0.020 second,7 ms and 0.002 second respectively. The propagation speed is 2 x 10<sup>8</sup> m/s. Ignore other delays in transmission.

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Datagram	Path Length	Visited Switches
1	3200 km	1,2,3,5
2	11700 km	1,4,5
3	12200 m	1,2,5
4	2000 km	1,3,4,5

3)

4)

Assume the company has three offices: Central, East, and West. The Central office is connected to (2) the East and West offices via private WAN lines. The company is granted a block of 128 addresses with the beginning address 70.12.100.128. The management has decided to allocate 64 addresses for the Central office and divide the rest of the addresses between the two other offices. Identify the restrictions that must be applied to the allocated block for the proper network operation.

The routing table for router R1 is given in Table 2A. Draw its topology and write the forwarding (5) process if a packet arrives at R1 with the destination address 129.16.17.32.

Table 2A. Routing Table.

Mask	Network Address	Next-Hop Address	Interface Number
/28	130.16.18.16	25.18.17.3	M4
/26	78.12.16.64		M2
/22	129.16.3.0	18.0.0.4	M1
/16	25.18.0.0		M4
/11	18.0.0.0		M1
Default	Default	165.6.7.8	M3

An IP datagram has arrived with the following information in the header (in hexadecimal format) (3) 4500005400030000200600007C4E3249F2. Answer and justify the following:

a. Are there any option?

5)

6)

- b. Is the packet fragmented?
- c. What is the size of the data?
- d. How many more routers can the packet travel to?
- e. What is the identification number of the packet?
- f. What is the type of service?

Distinguish between Interior and Exterior routing protocols. What are various significant Path (2) Attributes useful in BGP?

7) Consider the network given in the figure Figure 3A. **A**pply Dijkstra's algorithm to design the routing (5) table of router B.



Figure 3A. Network with six nodes.

- 8) What is Half Close in TCP? With suitable example, illustrate the half closing scenario in TCP. (3)
- 9) To find the IP address of a destination, we need the service of DNS. DNS needs the service of UDP (2) or TCP. UDP or TCP needs the service of IP. IP needs an IP destination address. Is this a vicious cycle here? Justify your answer.
- 10) Distinguish between cwnd and rwnd in TCP. Illustratre various policies adopted by TCP for handling (5) congestion.
- 11) Consider the following as a dump of a UDP header in hexadecimal format : CB84000D001C001C (3)
  - i. What is the source port number?

- ii. What is the destination port number?
- iii. What is the total length of the user datagram?
- iv. What is the length of the data?
- 12) Assume a router discards a datagram due to congestion, what action does it take, and how does (2) this contribute to network congestion management?
- 13) With suitable diagram, compare recursive resolution and iterative resolution in DNS (5)
- 14) A host with IP address 192.168.4.30 and physical address C3:34:55:10:22:10 has to send a packet (3) to another host B with a IP address 192.168.4.31 and physical address A1:6E:F4:59:83:AB. The two hosts are on the same ethernet network. Show the ARP request and reply packets encapsulated in ethernet frames (hexadecimal representation).
- 15) Using SMI Basic Encoding Rules (BER), show the encoding for the OCTET STRING "COMPUTER (2) NETWORK"

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