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B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Fifth Semester

18CSC302J - COMPUTER NETWORKS

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	The size of the TCP segment header ranges between _____. (A) 16 and 32 bytes (B) 16 and 32-bit (C) 20 and 60 bytes (D) 20 and 60-bits	1	1	1
2.	During error reporting, ICMP always reports error messages to _____. (A) Destination (B) Source (C) Next router (D) Previous router	1	1	1
3.	Two machines can use the timestamp request and timestamp replay messages to determine the _____ needed for an IP datagram to travel between them. (A) Half-trip time (B) Round-trip time (C) Travel time for the next router (D) Time to reach the destination/source	1	1	1
4.	What allows TCP to detect lost segments and in turn recover from that loss? (A) Sequence number (B) Acknowledgement number (C) Checksum (D) Both Sequence and acknowledgement number	1	1	1
5.	TCP transmits data in the form of _____. (A) Packets (B) Segments (C) Frames (D) Datagrams	1	1	2
6.	The network layer at the source is responsible for creating a packet from data coming from another _____ (A) station (B) link (C) node (D) protocol	1	1	2
7.	_____High order byte is stored on the starting address and low order byte is stored on the next address. (A) Big-endian (B) Little-endian (C) System Calls (D) Byte ordering	1	1	2
8.	If an error occurs in the data transfer between the client and the server, the send and receive function will return _____. (A) 0 (B) 1 (C) -1 (D) 0 or 1	1	1	2
9.	How does the recipient of a DHCP message know that it has reached the last option? (A) The end of the DHCP options is identified with a DHCP option called End with value 255. (B) The end of the DHCP options is identified with a DHCP option called End with value 128. (C) The end of the DHCP options is identified with a DHCP option called End with value 512. (D) The end of the DHCP options is identified with a DHCP option called End with value 64.	1	1	3

10. What destination IP address is put on the ARP Request message? 1 1 3

(A) The destination IP address is 255.0.0.0. It is the broadcast address, which means the message is intended for all computers on the network.

(B) The destination IP address is 255.255.0.0. It is the broadcast address, which means the message is intended for all computers on the network.

(C) The destination IP address is 255.0.255.0. It is the broadcast address, which means the message is intended for all computers on the network.

(D) The destination IP address is 255.255.255.255. It is the broadcast address, which means the message is intended for all computers on the network.

11. The _____ domain is used to map an address to the name 1 1 3

(A) Generic
(B) Inverse
(C) Country
(D) Common

12. Which one of the following allows client to update their DNS entry as their IP address change? 1 1 3

(A) authoritative name server
(B) mail transfer agent
(C) telnet
(D) Dynamic DNS

13. The length of IPv6 is _____ bits 1 1 4

(A) 64
(B) 32
(C) 256
(D) 128

14. The meaning of RA in IPv6 is ____ 1 1 4

(A) Reach advertisement
(B) RIP advertisement
(C) Router advertisement
(D) Reach Advance

15. Suppose two IPv6 nodes want to interoperate using IPv6 datagrams, but they are connected to each other by intervening IPv4 routers. The best solution here is _____ 1 1 4

(A) Use dual-stack approach
(B) Tunnelling
(C) No solution
(D) Replace the system

16. Which among the following features is present in IPv6 but not in IPv4? 1 1 4

(A) Fragmentation
(B) Anycast address
(C) Header checksum
(D) Options

17. _____ describes the creation of private networks across the Internet, enabling privacy and tunnelling of non-TCP/IP protocols. 1 1 5

(A) VPN
(B) IPsec
(C) DSL
(D) Cable

18. Suppose that you have a customer who has a central HQ and six branch offices. They anticipate adding six more branches in the near future. They wish to implement a WAN technology that will allow the branches to economically connect to HQ and you have no free ports on the HQ router. Which of the following would you recommend? 1 1 5

(A) PPP
(B) Frame Relay
(C) HDLC
(D) ISDN

19. The PPP encapsulation _____ 1 1 6

(A) Provides for multiplexing of different network-layer protocols

(B) Requires framing to indicate the beginning and end of the encapsulation

(C) Establishing, configuring and testing the data-link connection

(D) Provides an interface for handling the capabilities of the connection/link on the network

20. In point to point Protocol, the framing techniques are done according to the — 1 | 1 | 6

(A) Bit Oriented Protocol (B) Byte Oriented Protocol
(C) High-level Data Link Protocol (D) link Control Protocol

PART - B (5 × 4 = 20 Marks) — Marks | BL | CO

Answer **any 5** Questions

21. Assume that Host A is transmitting a User Datagram Protocol which has 10000 bytes of user data to Host B through Ethernet. The Ethernet frames may carry data up to 1500 bytes. How many total number of IP fragments will be transmitted and what will be the contents of the offset field in the last fragment? — 4 | 3 | 1

Note:
- User Datagram Protocol header size: 8 bytes
- Internet Protocol header size: 20 bytes.
- There is no option field in the IP header.

22. Consider a host with an Ethernet address (F5-A9-23-11-9B-E3) that has joined the network. What would be its global unicast address if the global unicast prefix of the organization is 3A21:1216:2165 and the subnet identifier is A245:1232. — 4 | 3 | 2

23. Explain IPv6 auto-configuration. — 4 | 1 | 4

24. Imagine the length of a 10Base5 cable is 2500 meters. If the speed of propagation in a thick coaxial cable is 200,000,000 meters/second: — 4 | 3 | 3

a. How long does it take for a bit to travel from the beginning to the end of the network?
b. Find the maximum time it takes to sense a collision (worst case).

25. In-Stream Control Transmission Protocol (SCTP) a packet carries two DATA chunks, each containing 22 bytes of user data. — 4 | 3 | 1

What is the size of each DATA chunk?
What is the total size of the packet?

26. The data rate of 10Base5 is 10Mbps. How long does it take to create the smallest frame? Show your calculations. — 4 | 3 | 3

27. Discuss the usage of any four types of resource records that can be used to provide DNS-based data about Computers on a TCP/IP network and discuss the resource record format. — 4 | 2 | 5

PART - C (5 × 12 = 60 Marks) — Marks | BL | CO

Answer **all** Questions

28. (a) Explain the TCP Connection establishment process in detail with a neat diagram. — 12 | 3 | 1

(OR)

(b) Calculate the checksum for the following IP packet:
4500 c 1c46 4000 4006 b1e6 ac10 0a63 ac10 0a0c

29. (a) "If one of the streams is blocked, the other streams can still deliver their data". In a given scenario the user is sending streams of Data using Multiple Streams. choose the appropriate protocol and justify the use of the protocol and the steps involved till data transfer. — 12 | 3 | 2

(OR)

(b) The following is a dump of a TCP header in hexadecimal format
053200217 000000001 00000000 500207FF 00000000

Find the following
1) Source port number?
2) Destination port number?
3) Sequence number?
4) Acknowledgement number?
5) Length of the header?
6) Type of the segment?
7) Window size?

30. (a) A diskless client on a Class C Ethernet network uses DHCP. The DHCP server is on a Class B Ethernet network. Draw a figure of the networks with appropriate IP addresses for the client, server, and relay agent. Fill out a DHCP request and reply packet. 12 2 3

(OR)

(b) Discuss the usage of any four types of resource records that can be used to provide DNS-based data about Computers on a TCP/IP network and discuss the resource record format.

31. (a) i) Show the abbreviations for the following addresses: (6marks) 12 3 4
a) 0000:0000:FFFF:0000:0000:0000:0000:0000
b) 1234:2346:0000:0000:0000:0000:0000:1111
c) 0000:0001:0000:0000:0000:0000:1200:1000
d) 0000:0000:0000:0000:0000:FFFF:24.123.12.6

ii) Demonstrate the three-level hierarchy of global unicast address. (6 marks)

(OR)

(b) Elaborate in brief about IPv6 routing protocols that enable routers to exchange information about connected networks.

32. (a) ATM Switching techniques create a fixed route between the data points before the communication begins and it uses the TDM technique to transmit the data. Explain how the connections are established to transmit the data. 12 2 5

(OR)

(b) Organize the different types of HDLC frames and explain them in detail.

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