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B.Tech Degree Examination, January 2024

Fifth Semester

21CSC302J - COMPUTER NETWORKS

(For the candidates admitted during the academic year 2018-2019 to 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: 75**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	In the OSI model, encryption and decryption are functions of the _____ layer. (A) Transport (B) Session (C) Presentation (D) Application	1	1	1
2.	The _____ topology that involves tokens. (A) Star (B) Ring (C) Bus (D) Daisy-Chaining	1	2	1
3.	How many total links are required to connect 12 devices in a fully connected mesh network? (A) 144 (B) 66 (C) 72 (D) 112	1	3	1
4.	What is the frequency range of the coaxial cable? (A) 100KHz to 500MHz (B) 100MHz to 500MHz (C) 1000 KHz to 500 MHz (D) 10 MHz to 50 MHz	1	2	1
5.	You are given the IP Address of 193.103.20.0 /24 and need 50 Subnets. How many hosts per network, and total networks do you get once subnetted? (A) 20 Hosts and 50 Subnets (B) 6 Hosts and 64 Subnets (C) 4 Hosts and 50 Subnets (D) 2 Hosts and 64 Subnets	1	3	2
6.	Teh _____ implies that all subnets obtained from the same subnet mask. (A) Static subnetting (B) Dynamic subnetting (C) Variable length subnetting (D) Dynamic length subnetting	1	2	2
7.	How many subnets can be gained by subnetting 172.17.32.0/23 into a /27 mask, and how many usable host addresses will there be per subnet? (A) 8 subnets, 31 hosts (B) 8 subnets, 32 hosts (C) 16 subnets, 30 hosts (D) 16 subnets, 32 hosts	1	3	2
8.	If you wanted to have 12 subnets with a Class C network ID, which subnet mask would you use? (A) 255. 255.255.252 (B) 255.255.255.255 (C) 255.255.255.240 (D) 255.255.255248	1	2	2
9.	Packets of the same session may be routed through different paths in _____. (A) TCP, but not UDP (B) TCP and UDP (C) UDP, but not TCP (D) Neither TCP nor UDP	1	2	3
10.	The address resolution protocol (ARP) is used for _____. (A) Finding the IP address from the DNS (B) Finding the IP address of the default gateway (C) Finding the IP address that corresponds to a MAC address (D) Finding the MAC address that corresponds to an IP address	1	1	3

11. In a network of LANs connected by bridges, packets are sent from one LAN to another through intermediate bridges. Since more than one path may exist between two LANs, packets may have to be routed through multiple bridges. Why is the spanning tree algorithm used for bridge routing? 1 2 3

(A) For shortest path routing between LANs
(B) To avoid loops in the routing paths
(C) For fault tolerance
(D) For minimizing collisions

12. Which configuration command must be in effect to allow the use of 8 subnets if the Class C subnet mask is 255.255.255.224? 1 2 3

(A) *Router(config)#ip classless*
(B) *Router(config)#no ip classful*
(C) *Router(config)#ip unnumbered*
(D) *Router(config)#ip subnet-zero*

13. The maximum window size for data transmission using the selective reject protocol with n-bit frame sequence numbers is _____. 1 2 4

(A) 2^n
(B) 2^(n-1)
(C) 2^n – 1
(D) 2^(n-2)

14. Sliding window protocol works on _____ in which there is simultaneous two-way communication. 1 3 4

(A) no duplex
(B) half duplex
(C) full duplex
(D) single duplex

15. A computer on a 10Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 2Mbps. It is initially filled with 16Megabits. What is the maximum duration for which the computer can transmit at the full 10Mbps? 1 3 4

(A) 1.6 Seconds
(B) 2 Seconds
(C) 5 Seconds
(D) 8 Seconds

16. In a token ring network, the transmission speed is 10^7 bps and the propagation speed is 200 meters/microsecond. The 1-bit delay in this network is equivalent to _____. 1 3 4

(A) 500 meters of cable.
(B) 200 meters of cable.
(C) 20 meters of cable.
(D) 50 meters of cable

17. Let G(x) be the generator polynomial used for CRC checking. What is the condition that should be satisfied by G(x) to detect odd number of bits in error? 1 1 5

(A) G(x) contains more than two terms
(B) G(x) does not divide 1+x^k, for any k not exceeding the frame length
(C) 1+x is a factor of G(x)
(D) G(x) has an odd number of terms

18. What is the maximum size of data that the application layer can pass on to the TCP layer below? 1 2 5

(A) Any Size
(B) 2^16 bytes-size of TCP header
(C) 2^16 bytes
(D) 1500 bytes

19. A client process P needs to make a TCP connection to a server process S. Consider the following situation: the server process S executes a socket(), a bind() and a listen() system call in that order, following which it is preempted. Subsequently, the client process P executes a socket() system call followed by connect() system call to connect to the server process S. The server process has not executed any accept() system call. Which one of the following events could take place? 1 3 5

(A) connect () system call returns successfully
(B) connect () system call blocks
(C) connect () system call returns an error
(D) connect () system call results in a core dump

20. Which of the following transport layer protocols is used to support electronic mail? 1 2 5

(A) SMTP
(B) STCP
(C) TCP
(D) UDP

PART - B (5 × 8 = 40 Marks)

		Marks	BL	CO
	Answer **all** Questions			
21.	(a) What is topology? Describe various types of topologies in computer networks with an example.	8	3	1
	(OR)			
	(b) What is the role of the network layer in the OSI model? Explain with working.	8	3	2
22.	(a) An ISP is given a block of addresses beginning with 190.100.0.0/16. The ISP needs to distribute these addresses to 3 groups of customers as follows: a) Group 1 has 64 customers, each needs 256 addresses. (2) b) Group 2 has 128 customers, each needs 128 addresses. (2) c) Group 3 has 128 customers, each needs 64 addresses. (2) Design the sub-blocks and give the slash notation for each sub-block. How many addresses are still available after these allocations? (2)	8	3	3
	(OR)			
	(b) Consider, we have a big single network having IP Address 200.1.2.0. Divide this network into 4 subnets and find the following. a) IP address of the subnet b) Total number of IP addresses c) Total number of hosts d) First host address and last host address e) Direct and limited Broadcast Address	8	3	4
23.	(a) Explain how routing is performed using a link state algorithm. Illustrate with an example. Give the relevance of the age field in a link state packet.	8	3	4
	(OR)			
	(b) Explain how routing is done using BGP.	8	3	5
24.	(a) How collision is avoided in CSMA/CA? Describe the different strategies used for this.	8	3	5
	(OR)			
	(b) Explain how Token management is done in IEEE 802.5.	8	3	5
25.	(a) What is the format of an email? Explain the architecture of a mailing system.	8	3	5
	(OR)			
	(b) Furnish the packet format of Transmission Control Protocol with its fields. How are the data transferred with four-way handshaking?	8	3	5
		Marks	**BL**	**CO**
	PART - C (1 × 15 = 15 Marks)			
	Answer **any 1** Questions			
26.	Illustrate TCP/IP model with a neat diagram.	15	3	1
27.	A message that is to be transmitted is represented by the polynomial $M(x) = x^5 + x^4 + x$ with a generating prime polynomial $G(x) = x^3 + x^2 + 1$. Generate a 3-bit CRC code, $C(x)$ which is to be appended to $M(x)$.	15	4	4

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