SRM Institute of Science and Technology
College of Engineering and Technology
School of Computing
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

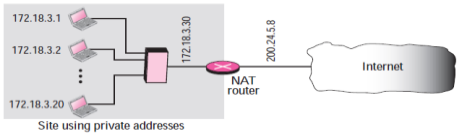
Set - D

Academic Year: 2022-23 (ODD) **Test: CLA-T3** **Year & Sem: III** Year / VI Sem
Date: - **Max. Marks:** 50 **Duration: 1 Hour 40 min**
Course Code & Title: 18CSC302J & COMPUTER NETWORKS

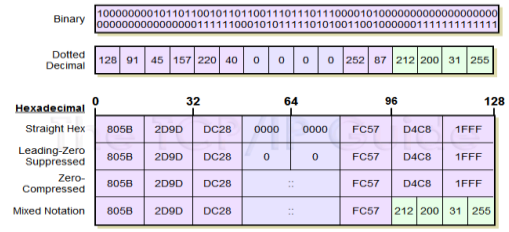
Course Articulation Matrix: ***(to be placed)***

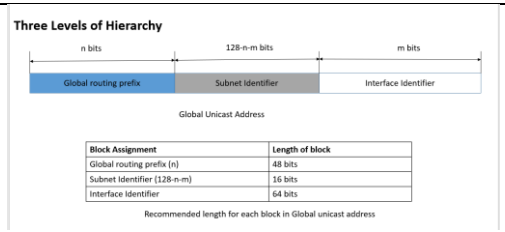
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO1 1	PO1 2
CO 4	M	H	-	H	L	-	-	-	M	L	-	H
CO 5	H	H	-	H	L	-	-	-	M	L	-	H
CO 6	L	H	-	H	L	-	-	-	L	L	-	H

Part – A Instructions: Answer all the questions						**(1 x 10 = 10 Marks)**
Q. No	**Question**	**Marks**	**BL**	**CO**	**PO**	**PI Code**
1	In subcategories of reserved address in IPV6, address that is used by a host to test itself without going into network is called_____ a) Unspecified address **b) Loopback address** c) Compatible address d) Mapped address **Ans-B**	1	L 2	4	1	1.6.1
2	In contrast to IPV4, IPV6 uses_____ times more bits to address a device on the internet. a) 3 **b) 4** c) 5 d) 6 **Ans-b**	1	L 1	4	1	1.6.1
3	When the sender wants to use IPV6, but the receiver doesn't understand IPV6, Header translation uses ____ address to translate an IPv6 address. A) IP B) Physical C) Mapped D) MAC **Answer: C) Mapped**	1	L 1	4	1	1.6.1
4	How IPV6 will communicate with multiple hosts? a) Broadcasting b) Unicasting **c) Multicasting** d) Anycasting **Ans-C**	1	L 2	4	1	1.6.1
5	The existing local loops with Asymmetric Digital Subscriber Line (ADSL) can handleband widths up to a) 1.1 Hz b) 1.1 kHz c) 1.1 MHz d) 1.1GHz **Ans: c**	1	L 2	4	1	1.6.1
6	1. An Asymmetric Digital Subscriber Line (ADSL) is not suitable for	1	L 2	6	1	1.6.1

	a) Games b) Businesses c) Residential users d) Downloading **Ans: b**					
7	A family of network control protocols (NCPs) _____ a) Are a series of independently defined protocols that provide a dynamic b) Are a series of independently-defined protocols that encapsulate c) Are a series of independently defined protocols that provide transparent d) The same as NFS **Ans-B**	1	L 1	5,6	1	1.6.1
8	A Link Control Protocol (LCP) is used for _____ a) Establishing, configuring and testing the data-link connection b) Establishing and configuring different network-layer protocols c) Testing the different network-layer protocols d) Provides for multiplexing of different network-layer protocols ANS-A	1	L 2	5,6	1	1.6.1
9	Choose the multiplexing techniques used by ATM a) Frequency Division Multiplexing b) Asynchronous Frequency Division Multiplexing c) Time Division Multiplexing	1	L 1	5, 6	1	1.6.1
	d) Asynchronous Time Division Multiplexing **Ans: d) Asynchronous Time Division Multiplexing**					
10	In ATM cell network, cells belongs to a single message ----- a) Follow different paths b) Follow same path c) Arrive out of order d) No flow control **Ans: b) Follow same path**	1	L 1	6	1	1.6.1
Part – B	**Instructions: Answer any 4 Questions**			**Marks)**		**(10 x 4 = 40**
11. a)	Explain about Implementation of Network Address Translation . Figure 5.39 *NAT*  • Figure 5.39 shows a simple implementation of NAT. • The private network uses private addresses. The router that connects the network to the global address uses one private address and one global address. • The private network is transparent to the rest of the Internet; the rest of the Internet sees only the NAT router with the address 200.24.5.8. • Generally, the border router is configured for NAT i.e the router which has one interface in local (inside)	10	L 3	4	2	2.6.1

	network and one interface in the global (outside) network. • When a packet traverse outside the local (inside) network, then NAT converts that local (private) IP address to a global (public) IP address. • When a packet enters the local network, the global (public) IP address is converted to a local (private) IP address. • If NAT run out of addresses, i.e., no address is left in the pool configured then the packets will be dropped and an Internet Control Message Protocol (ICMP) host unreachable packet to the destination is sent. **OR**					
11. b)	Interpret the various addressing modes of IPV6 with neat sketches. • **128 bits (or 16 bytes) long:** four times as long as its predecessor. • **2^{128}** : about 340 billion billion billion billion different addresses • **Colon hexadecimal notation**: • addresses are written using 32 hexadecimal digits. • digits are arranged into 8 groups of four to improve the readability. • Groups are separated by colons **2001:0718:1c01:0016:020d:56ff:fe77:52a3** • Note: • DNS plays an important role in the IPv6 world	10	L 4	4	2	2.6.4

	• (manual typing of IPv6 addresses is not an easy thing, • Some **zero suppression rules** are allowed to lighten this task at least a little.  					
12. a)	Draw and explain the three levels of hierarchy of global unicast address. (10 marks) Primary used to address the System for one-one Communication mechanism i.e host to host direct communication over the internet. Global unicast address is equivalent to public IPV4 address Global unicast address objective is to reach any host globally across the internet uniquely Address block refer this is called global unicast address block CIDR Notation for the block is 2000::/3, where 3 refers to that 3 leftmost bit is common for all address in this block (001) The size of the address space is 2^{125} which is more than for expansion of internet in many years	4+6	L 4	4	2	2.6.1



Global Routing Prefix :

The first 48 bits of a global unicast address are called global routing prefix.

They are used to route the packet through the Internet to the organization site such as ISP that owns the block.

The first three bits in this part is fixed (001), Remaining 45 bits can defined up to 245 sites

The global routers in the Internet route a packet to its destination site based on the value of n.

Subnet Identifier :

16 bit block is used to identify the specific subnet of an organization.

An organization can have upto 2^{16} subnets.

Interface Identifier :

Last 64 bits refers to the interface identifier. It is similar to the hostId in IPV4 scheme.

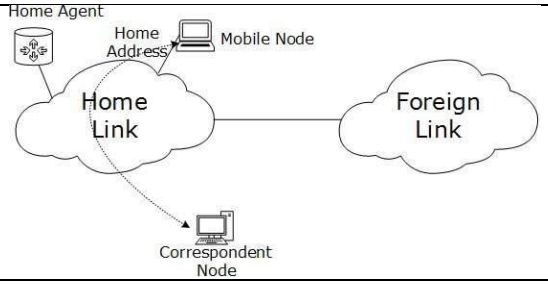
In IPV4 addressing, there is no relation between the hostid (32 bits) and MAC(48 bits) due to the difference in length.

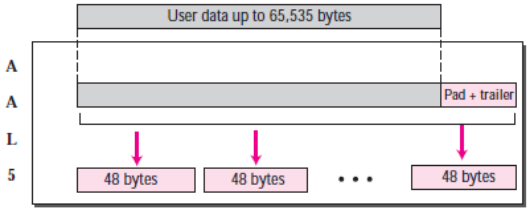
Physical address whose length is less than 64 bits can be embedded as the whole or part of the interface identifier, eliminating the mapping process with the help of IPv6.

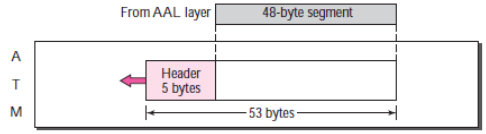
. Two common physical addressing scheme can be considered for this purpose: the 64-bit extended unique identifier (EUI-64) defined by IEEE and the 48-bit physical address defined by Ethernet.

OR

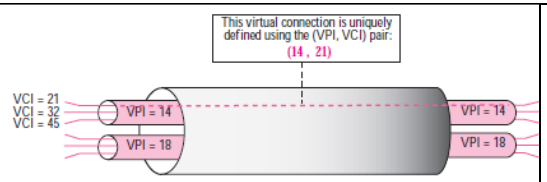
12. b)	Explain IPV6 Mobility in detail. • When a host is connected to a link or network, it acquires an IP address and all communication take place using that IP address on that link. As soon as, the same host changes its physical location, that is, moves into another area / subnet / network / link, its IP address changes accordingly, and all the communication taking place on the host using old IP address, goes down. IPv6 mobility provides a mechanism for the host to roam around different links without losing any communication/connection and its IP address • Mobile Node: The device that needs IPv6 mobility. • Home Link: This link is configured with the home subnet prefix and this is where the Mobile IPv6 device gets its Home Address. • Home Address: This is the address which the Mobile Node acquires from the Home Link. This is the permanent address of the Mobile Node. If the Mobile Node remains in the same Home Link, the communication among various entities take place as usual. • Home Agent: This is a router that acts as a registrar for Mobile Nodes. Home Agent is connected to Home Link and maintains information about all Mobile Nodes, their Home Addresses, and their present IP addresses.	10	L 3	4	2	2.6.4

						
13. a)	The key feature of ATM is to transmit voice, videos and images simultaneously over a single or integrated corporate network with Higher transmission capability. Explain how the different traffic characteristic are handled by the ATM. **ATM Adaptation Layer (AAL) Types** In order for ATM to support a variety of services with different traffic characteristics and system requirements, it is necessary to adapt the different classes of applications to the ATM layer. This function is performed by the AAL, which is service-dependent. The application adaptation layer (AAL) allows existing networks (such as packet networks) to connect to ATM facilities. AAL protocols accept transmissions from upper-layer services (e.g., packet data) and map them into fixed-sized ATM cells. These transmissions can be of any type (voice, data, audio, video)	10	L 4	6	2	2.6.1

	and can be of variable or fixed rates. At the receiver, this process is reversed—segments are reassembled into their original formats and passed to the receiving service. Although four AAL layers have been defined the one which is of interest to us is AAL5, which is used to carry IP packets in the Internet. AAL5, which is sometimes called the simple and efficient adaptation layer (SEAL), assumes that all cells belonging to a single message travel sequentially and that control functions are included in the upper layers of the sending application.  AAL5 accepts an IP packet of no more than 65,535 bytes and adds an 8-byte trailer as well as any padding required to ensure that the position of the trailer falls where the					

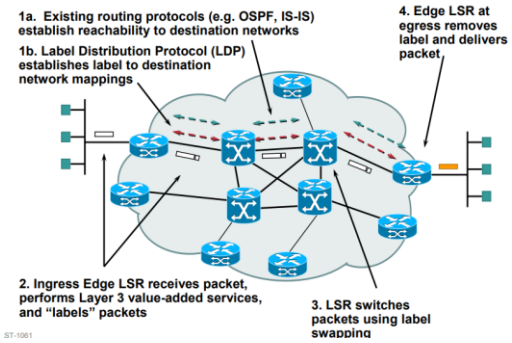
	receiving equipment expects it (at the last 8 bytes of the last cell). Once the padding and trailer are in place, AAL5 passes the message in 48-byte segments to the ATM layer. **ATM Layer** The ATM layer provides routing, traffic management, switching, and multiplexing services. It processes outgoing traffic by accepting 48-byte segments from the AAL sublayer. The addition of a 5-byte header transforms the segment into a 53-byte cell  **OR**					
13. b)	ATM Switching techniques creates fixed route between the data points before the communication begins and it uses TDM technique to transmit the data. Explain how the connections are established to transmit the data Virtual Connection Connection between two end points is accomplished through	10	L 3	5,6	2	2.6.4

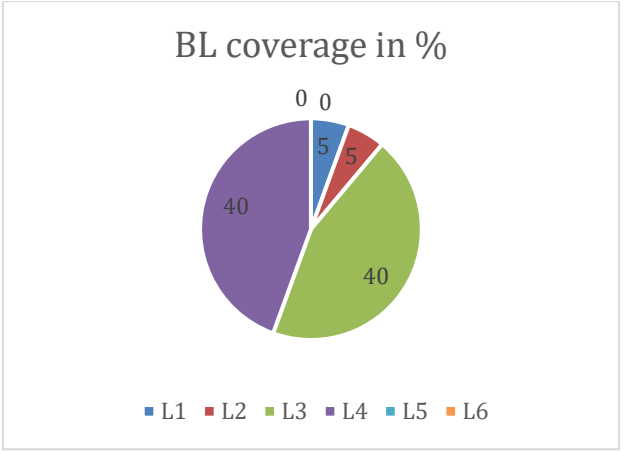
	transmission paths (TPs), virtual paths (VPs), and virtual circuits (VCs). A transmission path (TP) is the physical connection (wire, cable, satellite, and so on) between an end point and a switch or between two switches. Think of two switches as two cities. A transmission path is the set of all highways that directly connects the two cities. A transmission path is divided into several virtual paths. A virtual path (VP) provides a connection or a set of connections between two switches. Think of a virtual path as a highway that connects two cities. Each highway is a virtual path; the set of all highways is the transmission path. Cell networks are based on virtual circuits (VCs). All cells belonging to a single message follow the same virtual circuit and remain in their original order until they reach their destination.					



The figure also shows the relationship between a transmission path (a physical connection), virtual paths (a combination of virtual circuits that are bundled together
because parts of their paths are the same), and virtual circuits that logically connect two
points together.
In a virtual circuit network, to route data from one end point to another, the virtual connections need to be identified. For this purpose, the designers of ATM created a hierarchical identifier with two levels: a virtual path identifier (VPI) and a virtual circuit identifier (VCI). The VPI defines the specific VP and the VCI defines a particular
VC inside the VP. The VPI is the same for all virtual connections that are bundled (logically) into one VP.

14. a)	Explain how VPN is designed to securely connect two geographically-distributed sites. ● VPN is a network that is private but virtual. ● It is private because it guarantees privacy inside the organization. ● It is virtual because it does not use real private WANs; the network is physically public but virtually private. Routers R1 and R2 use VPN technology to guarantee privacy for the organization.  **OR**	10	L 3	6	2	2.6.4
14. b)	MPLS Operations • MPLS - Multi Protocol Label Switching • A protocol to establish an end-to-end path from source to the destination. • To setup this path basically using labels - Require a protocol to set up the labels along the path. It builds the connection oriented service on the IP network • MPLS is an efficient encapsulation mechanism • A hop-by-hop forwarding mechanism • MPLS packets can run on other layer 2 technologies such as ATM, PPP, POS, FR, Ethernet • Labels can be used as designators	10	L 4	6	2	2.6.4

	- example: IP prefixes, ATM VC, or a bandwidth guaranteed path. • This technique designed to speed up and shape traffic flows across enterprise wide area and service provider networks.  					



Approved by the Audit Professor/Course Coordinator

***Program Indicators are available separately for Computer Science and Engineering in AICTE examination reforms policy.**

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions