Register Number															

SRM Institute of Science and Technology
College of Engineering and Technology
School of Computing

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

Set - D

Academic Year: 2021-22 (Even)

Test: CLA-T2 | Date: 30-05-2022
Course Code & Title: 18CSS202J - Computer Communications | Duration: 100 Minutes (2 Periods)
Year & Sem: II Year / IV Sem | Max. Marks: 50

Course Articulation Matrix:

S.No.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	CO1	3	-	-	-	-	-	-	-	-	-	-	3
2	CO2	3	2	3	-	-	-	-	-	-	-	-	3
3	CO3	3	3	3	-	-	-	-	-	-	-	-	3
4	CO4	3	2	-	-	-	-	-	-	-	-	-	3
5	CO5	3	-	-	-	-	-	-	-	-	-	-	2
6	CO6	3	3	3	-	-	-	-	-	-	-	-	3

Part - A
(20 x 1 = 20 Marks)

Instructions: 1) Answer ALL questions. 2) The duration for answering the part A is 30 minutes (this sheet will be collected after 30 minutes). 3) Encircle the correct answer 4) * denotes more than one choice may be correct

Q. No	Question	Marks	BL	CO	PO	PI Code
1	How many leading bits are in IPV4 Class D address? **a) 4** b) 3 c) 2 d) 1	1	1	3	1	1.7.1
2	How many possible networks are there in a class A of an IPv4 address? a) 16384 **b) 128** c) 256 d) 65536	1	1	3	2	2.6.3
3	Choose the binary notation of the IPv4 address 11.201.55.223 a) 1011 11001001 110111 11011111 b) 00001011 11000101 00110111 11001111 c) 00001011 11000111 00110111 10001111 **d) 00001011 11001001 00110111 11011111**	1	2	3	2	2.6.3
4	Choose the class of the given IPV4 address 201.105.121.155 a) B **b) C** c) A d) D	1	1	3	1	1.7.1
5	A block of addresses is granted to a small organization. We know that one of the addresses is 172.18.25.45/25. What is the first address in the block? **a) 172.18.25.0** b) 172.18.25.1 c) 172.18.25.127 d) 128.18.25.45	1	2	3	2	2.6.3
6	The block 224.0.0.0/4 is used for _____ communication. a) Unicast b) Broadcast c) Limited Broadcast **d) Multicast**	1	2	3	1	1.7.1
7	Combining several class C blocks to create a larger range of addresses is _____. a) Supermasking b) Submasking **c) Supernetting** d) Subnetting	1	1	3	1	1.7.1

8	Passive hub operates at layer (s) ____of the OSI model. a) Data link Layer b) Network Layer c) Presentation Layer **d) Physical Layer**	1	2	3	1	1.7.1
9	Choose the correct statement(s) about bridge. a) It sends data in form of packets b) It uses routing table c) It works on more than single broadcast domains **d) It is used to connect various LANs**	1	1	3	1	1.7.1
10	Addresses in a block must be contiguous, one after another is one of the restrictions in _____. a) Private Address b) Classful Addressing **c) Classless Addressing** d) Public Address	1	1	3	1	1.7.1
11	Line coding is the process of converting _____. **a) digital data to digital signals** b) analog data to digital signals c) digital data to analog signals d) analog data to analog signals	1	1	4	1	1.7.1
12	The clocks at the sender and the receiver must have the same bit interval is _____. a) DC components b) Baseline **c) Self synchronization** d) Encoding	1	1	4	1	1.7.1
13 *	The _____ defines the number of data elements sent in 1s **a) data rate** b) signal rate **c) pulse rate** d) message rate	1	1	4	1	1.7.1
14	Choose the correct from the following statements; 1. BPSK has a bandwidth which is lower than that of a BFSK signal. 2. BPSK yields the maximum value of probability of error compared to ail the three digital modulation techniques i.e. ASK, FSK and PSK. 3. Binary FSK has the highest system complexity. 4. Binary ASK is demodulated using coherent detection while binary FSK and PSK are demodulated using envelope detection. **a) 1 and 3** b) 1,2 and 4 c) 2 and 3 d) 2, 3 and 4	1	1	4	1	1.7.1
15	Calculate the value of the signal rate for the case "Four data elements per three signal elements" if the data rate is 1 Mbps and c = 1/2. a) 500 Kbaud b) 1 Mbaud c) 250 Kbaud **d) 375 Kbaud**	1	3	4	2	2.6.3
16	_____ is a technique used to combine and send the multiple data streams over a single medium. **a) Multiplexing** b) Demultiplexing c) Pulse Code Modulation d) Delta Modulation	1	1	4	1	1.7.1
17	In _____ same link is used and link is sectioned by time rather than by frequency **a) TDM** b) SDM c) CDMA d) FDM	1	1	4	1	1.7.1
18	A technique that allocates time slots dynamically is _____. a) TDM b) WDM c) Dynamic TDM **d) Statistical TDM**	1	1	4	1	1.7.1
19	The _____ scheme has more signal transitions and therefore requires a wider bandwidth a) Ploar NRZ b) Polar NRZ-I **c) Ploar RZ** d) Polar RZ-I	1	1	4	1	1.7.1
20	The FDM demultiplexer uses a series of _____ to decompose the multiplexed signal into its constituent signals a) guard bands **b) filters** c) repeaters d) amplifiers	1	1	4	1	1.7.1

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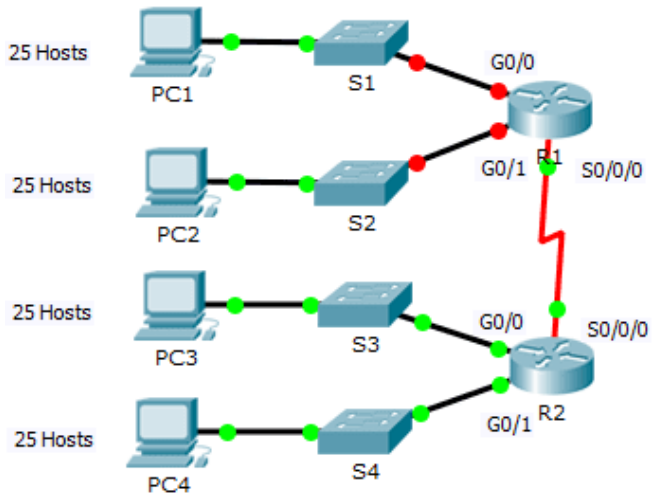
Duration: 100 Minutes (2 Periods)
Max. Marks: 50

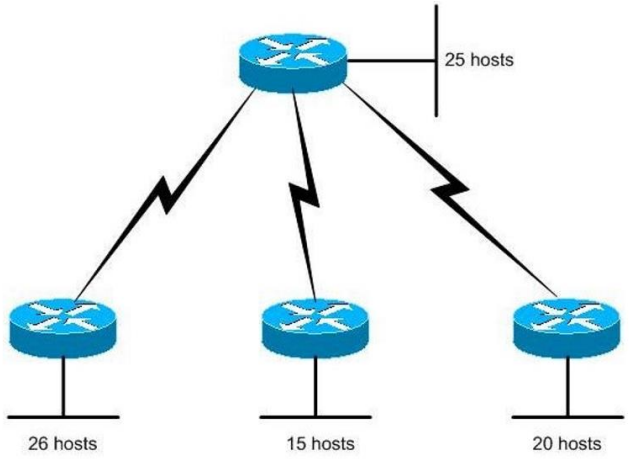
Part – B
(2 x 5 = 10 Marks)

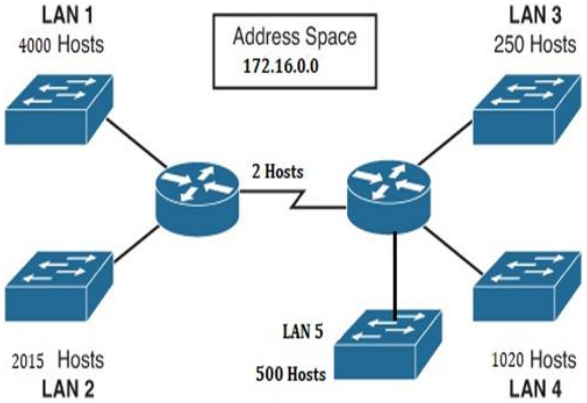
Instructions: Answer ALL questions

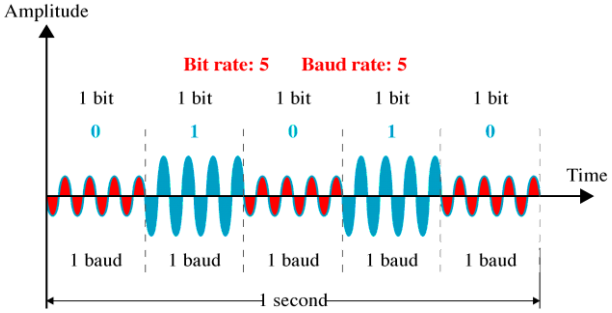
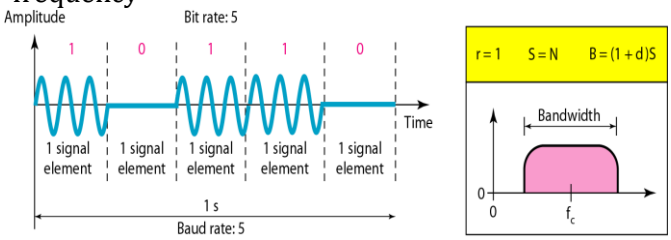
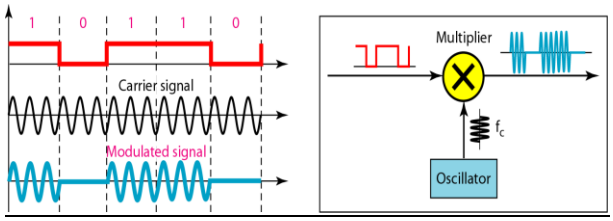
Q. No	Question	Marks	BL	CO	PO	PI Code
21	Identify the addressing range for the hosts in the given scenario, for the network 192.168.100.0  **Answer:** 25 Hosts: Net id: 192.168.100.0/27 First address: 192.168.100.1 Broad cast Address: 192.168.100.31 25 Hosts: Net id: 192.168.100.32/27 First address: 192.168.100.33 Broad cast Address: 192.168.100.63 25 Hosts: Net id: 192.168.100.64/27 First address: 192.168.100.65 Broad cast Address: 192.168.100.95 25 Hosts: Net id: 192.168.100.96/27 First address: 192.168.100.97	5	3	3	2	2.6.3

	Broad cast Address: 192.168.100.127					
22	Define a DC component and its effect on digital transmission. **Answer:** ✓ When the voltage level in a digital signal is constant for a while, the spectrum creates very low frequencies (results of Fourier analysis). ✓ These frequencies around zero, called DC (direct-current) components, present problems for a system that cannot pass low frequencies or a system that uses electrical coupling (via a transformer). ✓ For example, a telephone line cannot pass frequencies below 200 Hz. ✓ Also a long-distance link may use one or more transformers to isolate different parts of the line electrically. ✓ For these systems, we need a scheme with no DC component	5	2	4	1	1.7.1

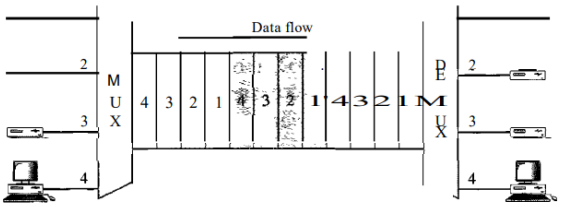
Part – C
(2 x 10 = 20 Marks)
Instructions: Answer ANY two questions

Q. No	Question	Marks	BL	CO	PO	PI Code
23. A	Solve the below given scenario using VLSM for the network 192.168.15.0 and list out the addressing range of all subnets in detail.  **Answer:** 25 Hosts: Net id: 192.168.15.0/27 First address: 192.168.15.1 Last Address: 192.168.15.31 26 Hosts: Net id: 192.168.15.32/27 First address: 192.168.15.33 Last Address: 192.168.15.63 20 Hosts: Net id: 192.168.15.96/27 First address: 192.168.15.97 Last Address: 192.168.15.127	10	3	3	2	2.6.3

	15 Hosts: Net id: 192.168.15.128/28 First address: 192.168.15.129 Last Address: 192.168.15.143					
	Or					
23. B	Resolve and tabulate the range of addresses, Net ID, Broadcast Address, Subnet Mask for each LAN:  **Answer:** **LAN1: 4000 Hosts** 172.16.0.1 – 172.16.15.254, 172.16.0.0/20 , 172.16.15.255, 255.255.240.0 **LAN2: 2015 Hosts** 172.16.16.1 – 172.16.23.254, 172.16.16.0/21 , 172.16.23.255, 255.255.248.0 **LAN4: 1020 Hosts** 172.16.24.1 – 172.16.27.254, 172.16.24.0/22 , 172.16.27.255, 255.255.252.0 **LAN5: 500 Hosts** 172.16.28.1 – 172.16.29.254, 172.16.28.0/23 , 172.16.29.255, 255.255.254.0 **LAN3: 250 Hosts** 172.16.30.1 – 172.16.30.254, 172.16.30.0/24 , 172.16.30.255, 255.255.255.0 **2 Hosts:** 172.16.31.1 – 172.16.31.2, 172.16.31.0/30 , 172.16.31.3, 255.255.255.252	10	3	3	2	2.6.3
24. A	Explain the Amplitude shift keying mechanism with suitable diagram. **Answer:** ✓ In ASK, the amplitude of the carrier signal is varied to create signal elements. Both frequency and phase remain constant while the amplitude changes. ✓ ASK is implemented by changing the amplitude of a carrier signal to reflect amplitude levels in the digital signal. ✓ For example: a digital “1” could not affect the signal, whereas a digital “0” would, by making it zero.	10	2	4	1	1.7.1

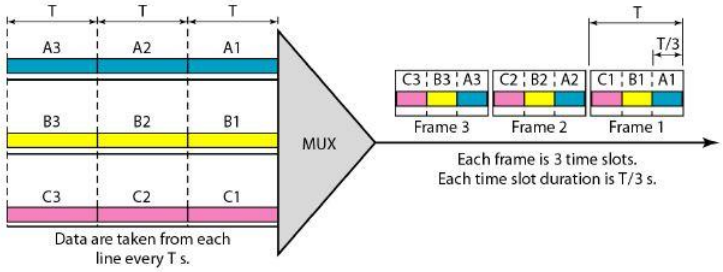
	✓ The line encoding will determine the values of the analog waveform to reflect the digital data being carried.  ✓ The bandwidth B of ASK is proportional to the signal rate S. **B = (1+d)S** "d" is depends on modulation and filtering process ("d" value lies between 0 and 1.) *Binary ASK (BASK)* ✓ ASK is normally implemented using only two levels. ✓ This is referred to as binary amplitude shift keying or on-off keying (OOK). ✓ The peak amplitude of one signal level is 0 ✓ the other is the same as the amplitude of the carrier frequency  *Implementation of binary ASK*  ✓ If digital data are presented as a unipolar NRZ digital signal with a high voltage of I V and a low voltage of 0 V ✓ Implementation can achieved by multiplying the NRZ digital signal by the carrier signal coming from an oscillator. ✓ When the amplitude of the NRZ signal is 1, the amplitude of the carrier frequency is held; ✓ when the amplitude of the NRZ signal is 0, the amplitude of the carrier frequency is zero.					
	Or					
24. B	Explain Time division multiplexing in detail with diagram. **Answer:** ✓ Time-division multiplexing (TDM) is a digital process that allows several connections to share the high bandwidth of a line Instead of sharing a portion of the bandwidth as in FDM, time is shared.	10	2	4	1	1.7.1

- ✓ Each connection occupies a portion of time in the link
- ✓ Note that the same link is used as in FDM; here, however, the link is shown sectioned by time rather than by frequency. In the figure, portions of signals 1,2,3, and 4 occupy the link sequentially.

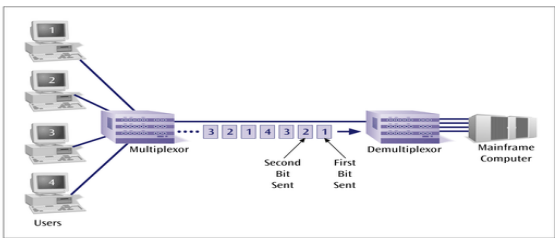


Synchronous Time Division Multiplexing

- ✓ The original time division multiplexing.
- ✓ The multiplexor accepts input from attached devices in a round-robin fashion and transmit the data in a never ending pattern.
- ✓ T-1 and ISDN telephone lines are common examples of synchronous time division multiplexing.
- ✓ In synchronous TDM, the data flow of each input connection is divided into units, where each input occupies one input time slot.
- ✓ A unit can be 1 bit, one character, or one block of data. Each input unit becomes one output unit and occupies one output time slot.
- ✓ However, the duration of an output time slot is n times shorter than the duration of an input time slot. If an input time slot is T s, the output time slot is Tin s, where n is the number of connections.
- ✓ In other words, a unit in the output connection has a shorter duration; it travels faster.



- ✓ In synchronous TDM, the data rate of the link is n times faster, and the unit duration is n times shorter.



Sample Output Stream generated by a Synchronous Time Division Multiplexing

- ✓ If one device generates data at a faster rate than other devices, then the multiplexor must either sample the incoming data stream from that device more often than it samples the other devices, or buffer the faster incoming stream.

	✓ If a device has nothing to transmit, the multiplexor must still insert a piece of data from that device into the multiplexed stream					

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