SRM Institute of Science and Technology
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SET-C

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: EVEN-2022-23

Test: CLA-T2 **Date: 30/03/2023**
Course Code & Title: 18CSS202J-Computer Communications **Duration: 2 Hours**
Year & Sem: II Yr / IV Sem **Max. Marks: 50**

Course Articulation Matrix:

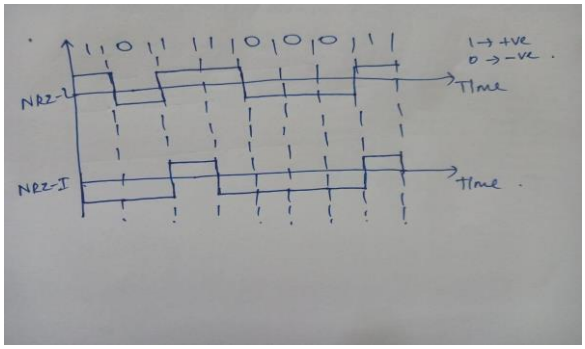
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	3
CO2	3	2	3	-	-	-	-	-	-	-	-	3
CO3	3	3	3	-	-	-	-	-	-	-	-	3
CO4	3	2	-	-	-	-	-	-	-	-	-	3
CO5	3	-	-	-	-	-	-	-	-	-	-	3
CO6	3	3	3	-	-	-	-	-	-	-	-	3

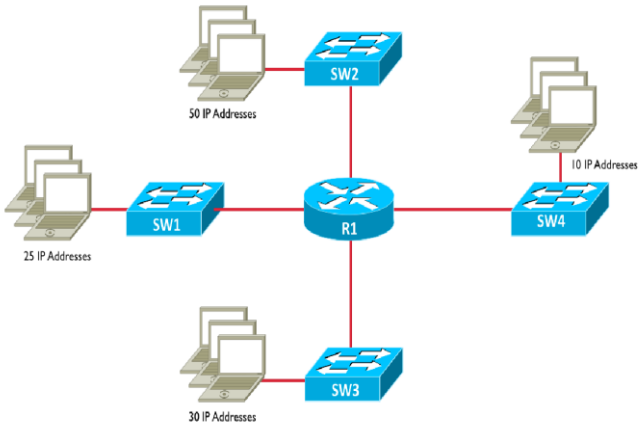
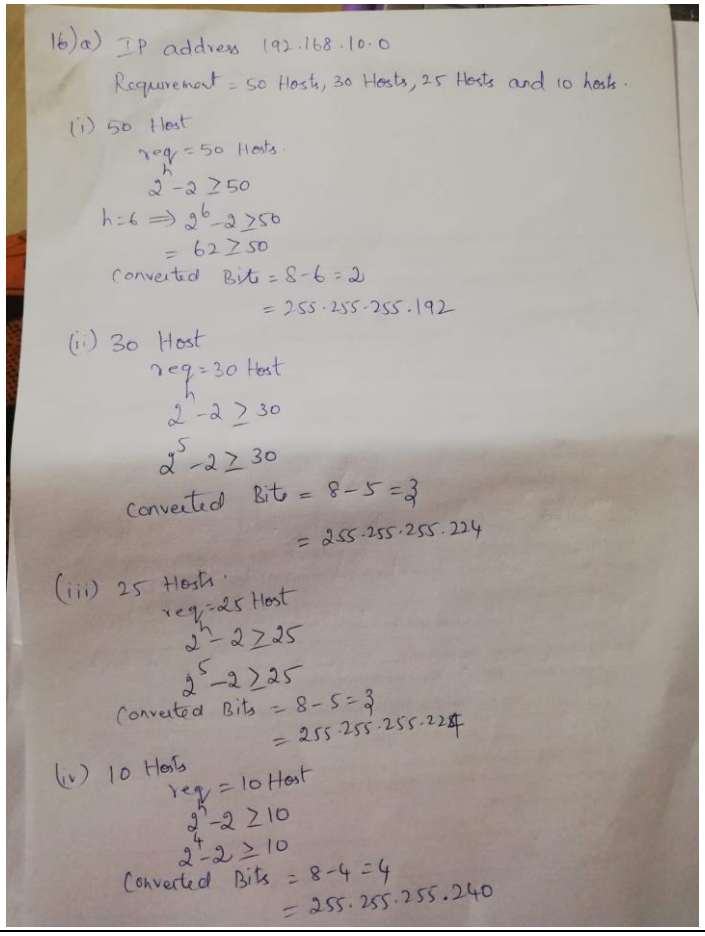
Part – A (10 x 1 = 10 Marks)

Instructions: 1) Answer ALL questions. 2) The duration for answering the part A is 15 minutes (this sheet will be collected after 20 minutes). 3) Encircle the correct answer (if more than one is right answer encircle appropriately)

Q. No	Question	Marks	BL	CO	PO	PI Code
1	In a block 'X', one of the IP address is 172.16.16.16. What is the size of 'X' and the network address of 'X'? a) 256 and 172.16.16.0 b) 256 and 172.16.16.255 **c) 65,536 and 172.16.0.0** d) 65536 and 172.16.16.0	1	2	3	2	2.6.3
2	192.168.10.36/27 is one of the IP address in an organization. What are the number of subnets in the organization and the subnet mask? a) 16 and 255.255.255.128 b) 16 and 255.255.255.224 **c) 8 and 255.255.255.224** d) 8 and 255.255.255.128	1	1	3	2	2.6.3
3	A router receives a packet with destination address 132.168.16.4/20.Find the broadcast address for the network. a) 132.168.255.255 b) 132.168.16.255 **c) 132.168.31.255** d) 132.168.15.255	1	1	3	2	2.6.3
4	The supernet address for 192.168.10.0/24 and 192.168.11.0/24 is **a) 192.168.10.0/24** b) 192.168.21.0/24 c) 192.168.0.0/23 d) 192.168.10.0/23	1	2	3	2	2.6.3

5	In ____ encoding, we use three levels of voltage positive, zero and negative. a) Polar **b) Bipolar** c) Unipolar d) Linear	**1**	**1**	**2**	**1**	**1.6.1**
6	_____ rate is the number of bits per second; _____rate is the number of signal units per second a) **bit, baud** b) baud, bit c) baud, base d) base, baud	**1**	**1**	**2**	**1**	**1.6.1**
7	The length of the code-word obtained by encoding quantized sample is equal to **a) l=log(to the base 2)L** b) l=log(to the base 10)L c) l=2log(to the base 2)L d) l=log(to the base 2)L/2	**1**	**2**	**2**	**2**	**2.6.3**
8	. A carrier signal is of ___ wave shape? **a) Sine** b) Triangle c) Rectangle d) Pulse	**1**	**1**	**2**	**1**	**1.6.1**
9	In ------- the data rate of the link is n times faster, and the unit duration is n times shorter. a) **Synchronous time division multiplexing** b) Statistical time division multiplexing c) Course wavelength division multiplexing d) Dense wavelength division multiplexing	**1**	**2**	**2**	**1**	**1.6.1**
10	In Alternate Mark Inversion(AMI), alternate negative and positive voltages represent _____ a) **Binary 1s** b) Binary 0s c) Negative values d) Positive values	**1**	**1**	**2**	**1**	**1.6.1**

Part – B (5 x 2 Marks =10 Marks)						
11	A customer is using a Class C network of 192.168.10.0 subnetted with a 28-bit subnet mask. How many assignable addresses are available in each of the subnets? An IPv4 address contains a total of 32 bits. Since, in this question, we have 28 subnet bits, the number of host bits is 4 (i.e. 32 – 28 = 4). The number of assignable IP addresses in a subnet can be calculated as follows: Number of Assignable IP Addresses = 2 h – 2, where h is the number of host bits. Therefore, in this question, each subnet has 14 assignable IP addresses: Number of Assignable IP Addresses = $2^4 - 2 = 16 - 2 = 14$	**2**	**3**	**3**	**2**	**2.6.3**
12	Working organization has an allocated IP address is 201.20.31.65. Find the subnet mask of the given IP. Subnet mask= 255.255.255.0	**2**	**2**	**3**	**2**	**2.6.3**
13	What are the functions and limitations of the bridge? • Cannot read specific IP addresses. • Unable to provide communication network among networks of different protocols. • Cannot limit the capacity of broadcast messages as they transfer all the messages.	**2**	**2**	**3**	**1**	**1.6.1**
14	Illustrate polar NRZ-L and NRZ- I schemes for the data sequence 10110001  	**2**	**3**	**2**	**1**	**1.6.1**
15	We have an available bandwidth of 200 kHz which spans from 200 to 400 kHz. What are the carrier frequency and the bit rate if we modulated our data by using ASK with d = 1? *The middle of the bandwidth is located at 300 kHz. This means that our carrier frequency can be at fe =300 kHz. We can use the formula for bandwidth to find the bit rate (with d =1 and r =1).* B=(1+d)S=2 x N x1/r=2 x N=200 kHz N=100bps	**2**	**3**	**2**	**2**	**2.6.3**

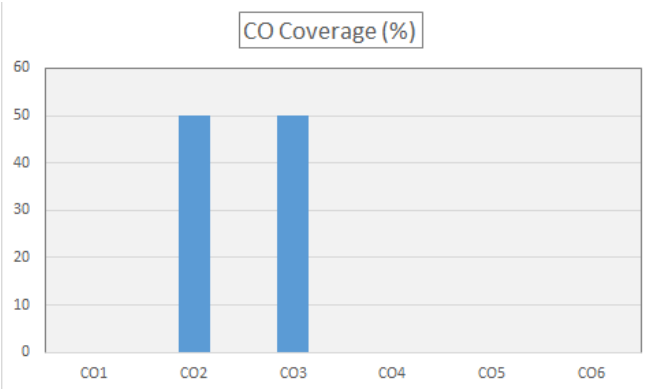
Part – C (2 x 15 Marks =30 Marks)						
16)a)	What subnet mask should be used to subnet the 192.168.10.0 network to support the number of subnets and IP addresses per subnet shown in the following topology?   16)a) IP address 192.168.10.0 Requirement = 50 Hosts, 30 Hosts, 25 Hosts and 10 hosts. (i) 50 Host req = 50 Hosts $2^h - 2 \geq 50$ $h=6 \Rightarrow 2^6 - 2 \geq 50$ $= 62 \geq 50$ Converted Bits = 8-6 = 2 = 255.255.255.192 (ii) 30 Host req = 30 Host $2^h - 2 \geq 30$ $2^5 - 2 \geq 30$ Converted Bits = 8-5 = 3 = 255.255.255.224 (iii) 25 Hosts req = 25 Host $2^h - 2 \geq 25$ $2^5 - 2 \geq 25$ Converted Bits = 8-5 = 3 = 255.255.255.224 (iv) 10 Hosts req = 10 Host $2^h - 2 \geq 10$ $2^4 - 2 \geq 10$ Converted Bits = 8-4 = 4 = 255.255.255.240	**15**	**3**	**3**	**3**	**3.2.1**
	(OR)					
16)b)	A company is granted with an IP address 201.168.10.0. The company wants to create 8 subnets. i.Find the subnet mask and number of hosts for each subnet. (3 marks)	**15**	**3**	**2**	**1**	**1.6.1**

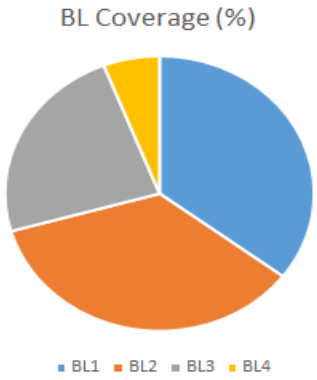
	i.What will be the first host ID and last host ID of the first and last subnet? (4 marks) i.Find the subnet address of each subnet. (4 marks) v.Find the broadcast address of each subnet. (4 marks) i) The ip address belongs to class c address. To form 8 subnets the subnet mask will be 255.255.255.224. Number of hosts for each subnet will be 30 ii) First host id of first subnet 201.168.10.1 Last host id for first subnet 201.168.10.30 First host id of last subnet 201.168.10.225 Last host id of last subnet 201.168.10.254 iii) 201.168.10.0,201.168.10.32,201.168.10.64,201.168.10.96,201.168.10.128,201.168.10.160,201.168.10.192,201.168.10.224 iv) 201.168.10.31,201.168.10.63,201.168.10.95,201.168.10.127,201.168.10.159,201.168.10.191,201.168.10.223,201.168.10.255					
17)a)	I. Synchronous TDM with one data stream for each input and one data stream for the output. Assume five inputs with a bit rate of 2 Mbps per input. Find (a) the input bit duration, (b) the output bit duration, (c) the output bit rate, and (d) the output frame rate. (8 Marks) A. The input bit duration is the inverse of the bit rate: 1 Mbps = 1/2µs. (2 marks) b. The output bit duration is one-fifth of the input bit duration = 1/10 µs. (2 marks) c. The output bit rate is the inverse of the output bit duration = 10 Mbps. This can also be deduced from the fact that the output rate is 5 times as fast as any input rate; so the output rate =5 x 2 Mbps =10 Mbps. (2 marks) d. The frame rate is always the same as any input rate. So the frame rate is 2,000,000 frames per second. (2 marks) II. Apply the concept of biphase polar encoding techniques to code the sequence 0101101011 (7 Marks) Manchester coding (3 marks) Differential Manchester (4 marks)	**15**	**4**	**2**	**2**	**2.6.3**
(OR)						

17)b)	I. Discuss the need for analog to digital conversion and explain in detail the techniques used for the conversion. (10 marks) Need for analog to digital (1 mark) A digital signal is superior to an analog signal because it is more robust to noise and can easily be recovered, corrected and amplified. PCM block diagram (2 marks) Sampling and Quantization (4 marks) Delta modulation (3 marks) II. Analyze the need for multiplexing and illustrate the purpose of multiplexers and demultiplexers (5 marks) Need for multiplexing – 2 marks multiplexer and demultiplexers along with block diagram (3 marks)	**15**	**4**	**2**	**2**	**2.6.3**

***Performance 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





Approved by the Audit Professor/Course Coordinator