USN										

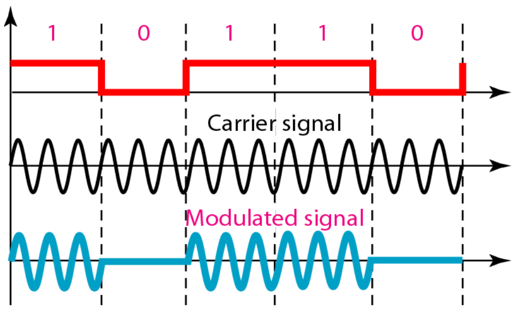
Internal Assessment Test 2 Aug. 2022

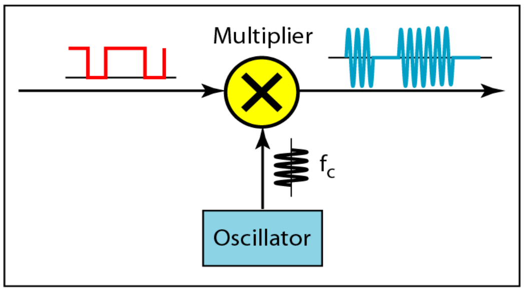
Sub:	Data Communication					Sub Code:	18CS46	Branch:	CSE
Date:	04/08/2022	Duration:	90 min's	Max Marks:	50	Sem / Sec:	IV A, B and C		

<u>Answer any FIVE FULL Questions</u>

		OBE	
	MARKS	CO	RBT
1a Explain with a block diagram the implementation of Binary ASK.	6	CO2	L2

ASK is implemented by changing the amplitude of a carrier signal to reflect amplitude levels in the digital signal. The line encoding will determine the values of the analog waveform to reflect the digital data being carried.





	MARKS	CO	RBT
1b An available bandwidth of of 200 kHz spans from 200 to 400 kHz. Wht is the bit rate if we modulated the data using ASK with d =1. Assume r = 1.	4	CO2	L3

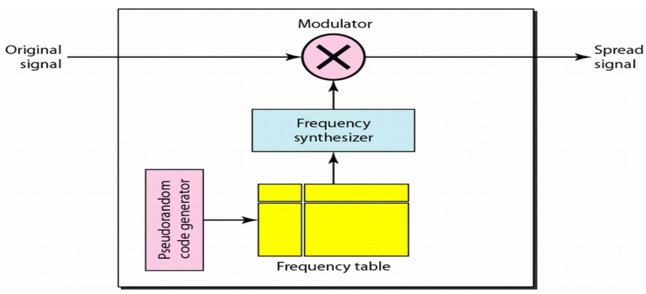
B=200 kHz, S=N/r, S=N, (r=1)

B=S(1+d) = N(2) (d=1)

Therefore N = B/2 = 200/2 = 100 bps.

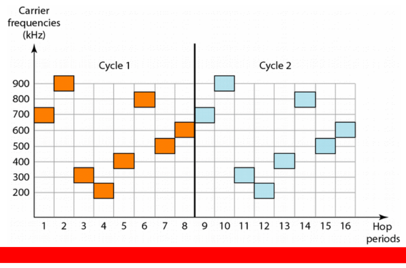
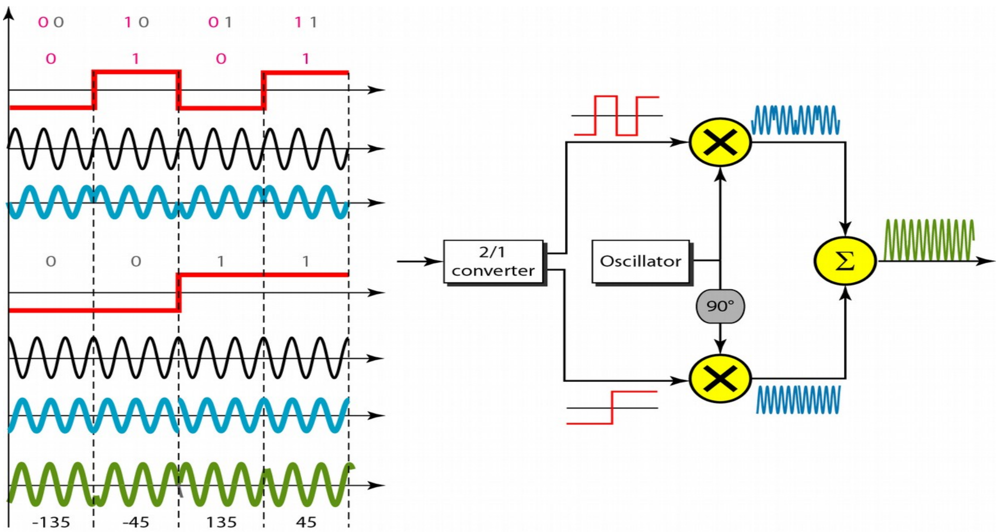
	MARKS	CO	RBT
2 Explain the implementation of Frequency Hopping Spread Spectrum.	10	CO2	L2

A pseudorandom code generator creates a k-bit pattern for every hopping period Th. The frequency table uses the pattern to finds the frequency to be used for this hopping period and passes it to the frequency synthesizer. The frequency synthesizer creates a carrier signal of that frequency and the source signal modulates the carrier signal.



How is bandwidth shared if the number of hopping frequencies is M.

If the number of hopping frequencies is M, we can ultiplex M channels into one using the same Bss bandwidth. This is because a station uses just one frequency in each hopping period;M-1 other frequncies can be used by M-1 other stations .

				
3a	Explain the implementation of QPSK. *To increase the bit rate, we can code 2 or more bits onto one signal element.* *In QPSK, we parallelize the bit stream so that every two incoming bits are split up and PSK a carrier frequency. One carrier frequency is phase shifted* 90^{o} *from the other - in quadrature.* *The two PSKed signals are then added to produce one of 4 signal elements. L = 4 here.* 	6	CO2	L2
3b	Find the bandwidth for a signal transmitting at 12Mbps for QPSK. The value of d = 0. *For QPSK, 2 bits is carried by one signal element. This means that r = 2. So the signal rate (baud rate) is S = N × (1/r) = 6 Mbaud. B=(1+d)S. With a value of d = 0, we have B = S = 6 MHz.*	4	CO2	L3
4a	*Explain data rate management in TDM.* *Not all input links maybe have the same data rate. Some links maybe slower. There maybe several different input link speeds. There are three strategies that can be used to overcome the data rate mismatch: multilevel, multislot and pulse stuffing.*	6	CO2	L2

<table>
<tr><td></td><td>Multilevel: used when the data rate of the input links are multiples of each other.

Multislot: used when there is a GCD between the data rates. The higher bit rate channels are allocated more slots per frame, and the output frame rate is a multiple of each input link.

Pulse Stuffing: used when there is no GCD between the links. The slowest speed link will be brought up to the speed of the other links by bit insertion, this is called pulse stuffing.</td><td></td><td></td><td></td></tr>
<tr><td>4b</td><td>Four channels are multiplexed using TDM. If each channel sends 100 bytes /s and we multiplex 1 byte per channel, show the frame traveling on the link, the size of the frame, the duration of a frame, the frame rate, and the bit rate for the link.

Each frame carries 1 byte from each channel; the size of each frame, therefore, is 4 bytes, or 32 bits. Because each channel is sending 100 bytes/s and a frame carries 1 byte from each channel, the frame rate must be 100 frames per second. The bit rate is 100 × 32, or 3200 bps.</td><td>4</td><td>CO2</td><td>L3</td></tr>
<tr><td>5</td><td>Compare and contrast datagram switching and virtual circuit switching.
<table>
<tr><td>Datagram</td><td>Virtual Circuit</td></tr>
<tr><td>Each packet treated independently</td><td>Preplanned route established before any packets sent</td></tr>
<tr><td>Packets can take any practical route</td><td>Call request and call accept packets establish connection</td></tr>
<tr><td>Packets may arrive out of order</td><td>Each packet contains a virtual circuit identifier instead of destination address</td></tr>
<tr><td>Packets may get lost or delayed</td><td>No routing decisions required for each packet</td></tr>
<tr><td>Up to receiver to re-order packets and recover from missing packets</td><td>Clear request to drop circuit</td></tr>
<tr><td>Each packet must carry source and destination address</td><td>Not a dedicated</td></tr>
</table></td><td>10</td><td>CO2</td><td>L2</td></tr>
<tr><td>6</td><td>Given the dataword 10100111 and the divisor 10111, show the generation of codeword at the sender site. How does the receiver determine that there are no errors?

10011011
10111)101001110000
10111

00111</td><td>10</td><td>CO2</td><td>L3</td></tr>
</table>

	00000 01111 00000 11111 10111 10000 10111 01110 00000 11100 10111 10110 10111 0001			