Part A

Department: CSE Program: BSc in CSE

Course no: CSE3211 Course Title: Data communications

Examination: final Semester (session): fall 2019

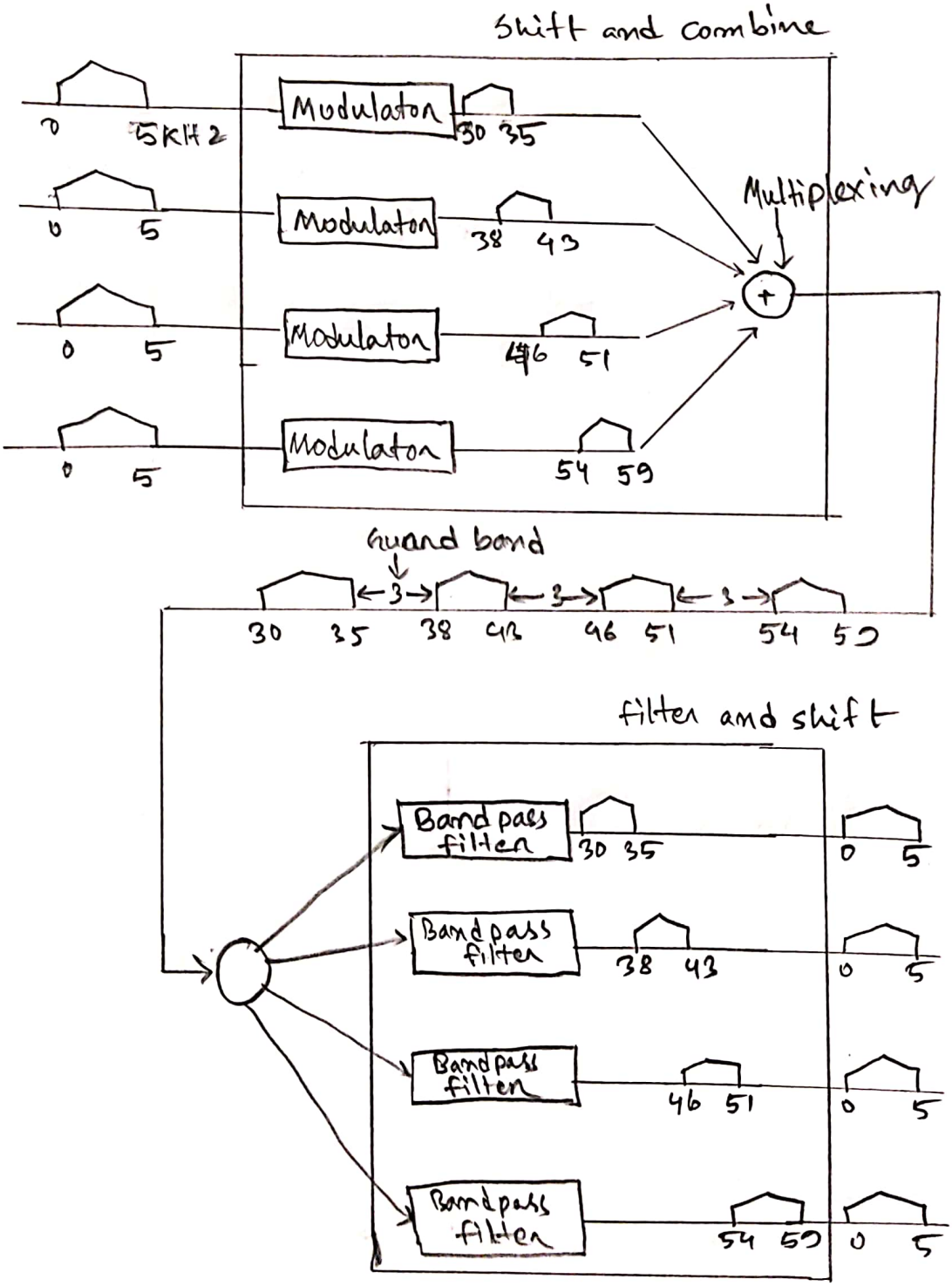
Student no: 170104077 Signature and Date: Raju
15/10/2020

ID: 170104077

Rajk

Course no: CSE3211

Ans: to the Qus no 1 (a)



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Ans: to the Ques no 1(b)

Given,

Power at the beginning of cable, $P_0 = 2W$

Attenuation of the cable is 2.5 dB/km

at 24km, power $= -2.5 dB/km \times 24 km$

$= -60 dB$

Now,

$$dB = 10 \log_{10} \frac{P_1}{P_0}$$

where P_1 = input for the amplifier at 24km

$$\therefore -60 = 10 \log_{10} \frac{P_1}{P_0}$$

$$\Rightarrow -6 = \log_{10} \frac{P_1}{2}$$

$$\Rightarrow P_1 = 2 \times 10^{-6}$$

$\therefore$ input of the amplifier is $2 \times 10^{-6} W$

let,
output of the ~~system~~ amplifier is P_2

Given,
Gain of the amplifier is 64 dB

Again,

$$dB = \cancel{bel}\ 10 \log_{10} \frac{P_2}{P_1}$$

$$\Rightarrow 64 = 10 \log_{10} \frac{P_2}{2 \times 10^{-6} W}$$

$$\Rightarrow \log_{10} \frac{P_2}{2 \times 10^{-6} W} = 6.4$$

$$\Rightarrow P_2 = 10^{6.4} \times 2 \times 10^{-6}\ W$$

$$= 5.02\ W$$

$\therefore$ Output of the ~~system~~ amplifier is 5.02 W

Now,
output of the system is at 40 km

let, P_3 is the output of the system.

$\therefore$ at 40 km $= (40 - 24)\ km \times 2.5\ dB/km$

$= -40\ dB$

$$\therefore -40 = 10 \log_{10} \frac{P_3}{5.02W}$$

$$\Rightarrow -4 = \log_{10} \frac{P_3}{5.02}$$

$$\Rightarrow P_4 = 10^{-4} \times 5.02$$

$$= 5.02 \times 10^{-4}$$

$\therefore$ Output of the system is $5.02 \times 10^{-4} W$

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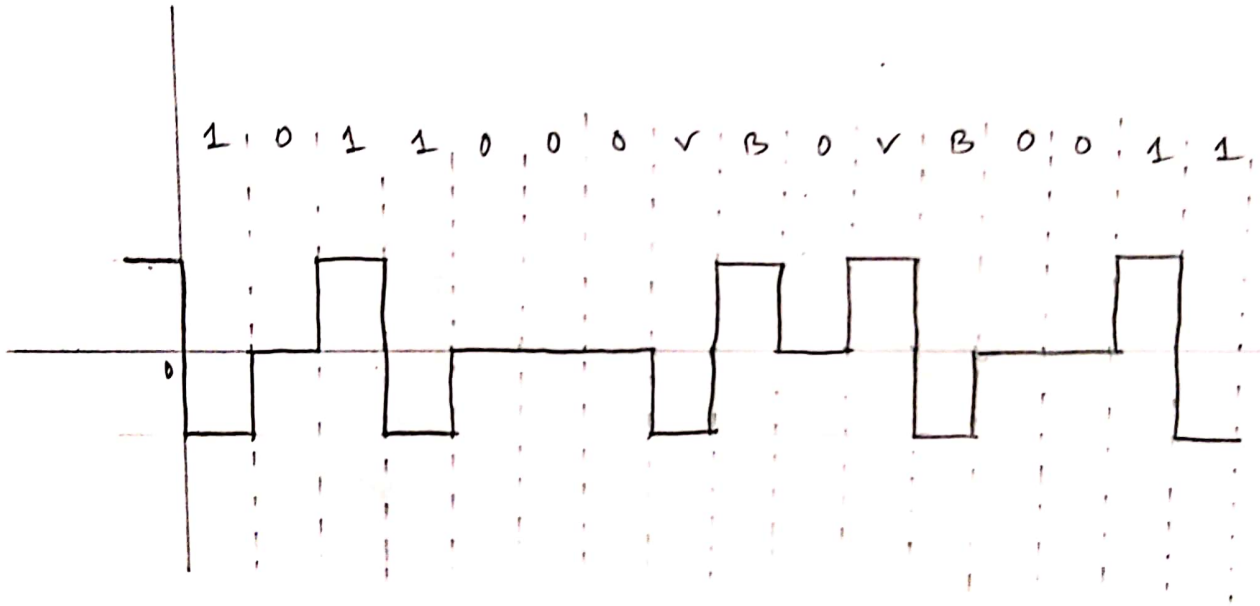
Ans: to the Ques no 1 (c)

Given sequence, 1011 0000 0000 0011 will become
1011 000V B0VB 0011



Raju

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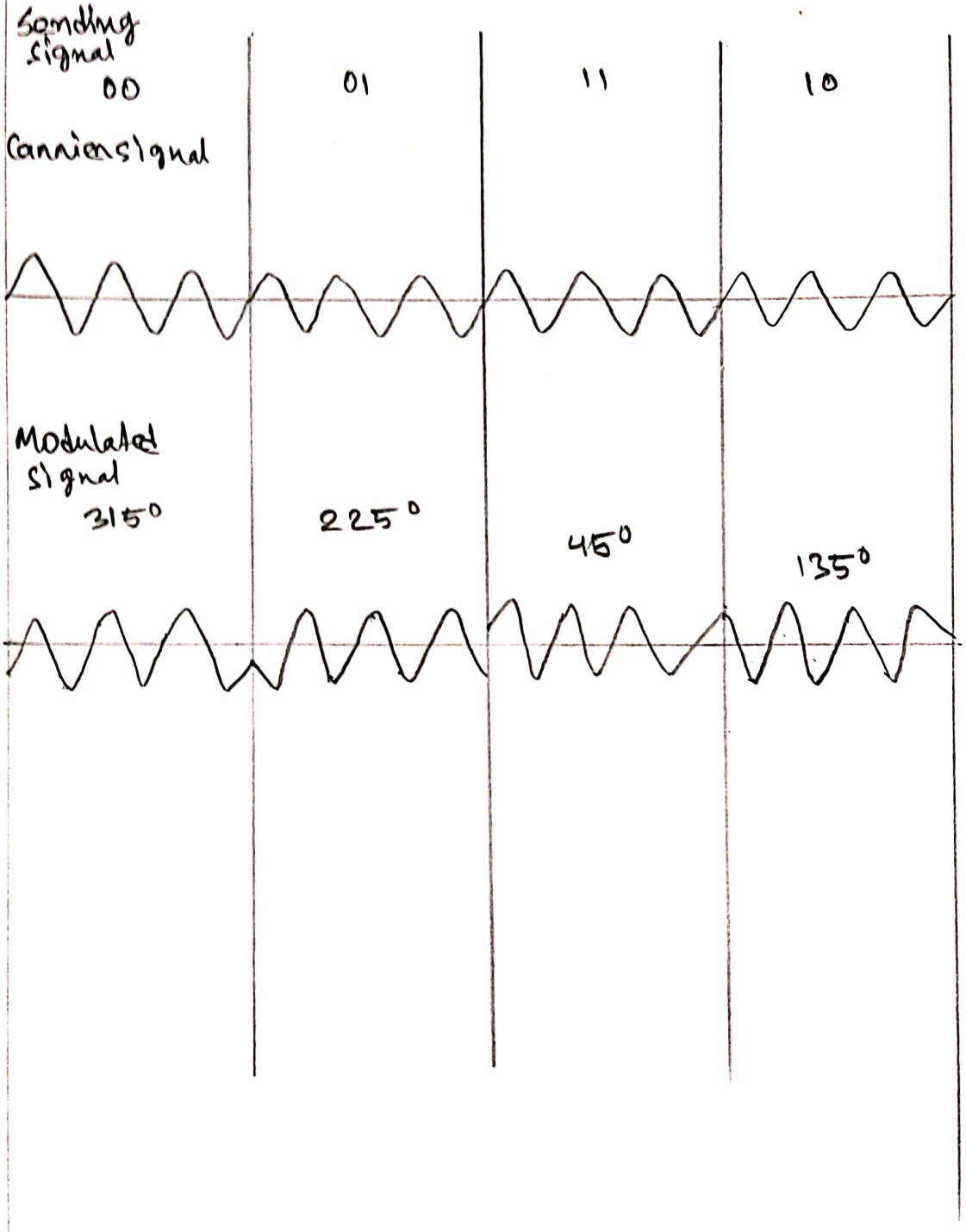
Raju

Ans: to the Ques no 2(a)



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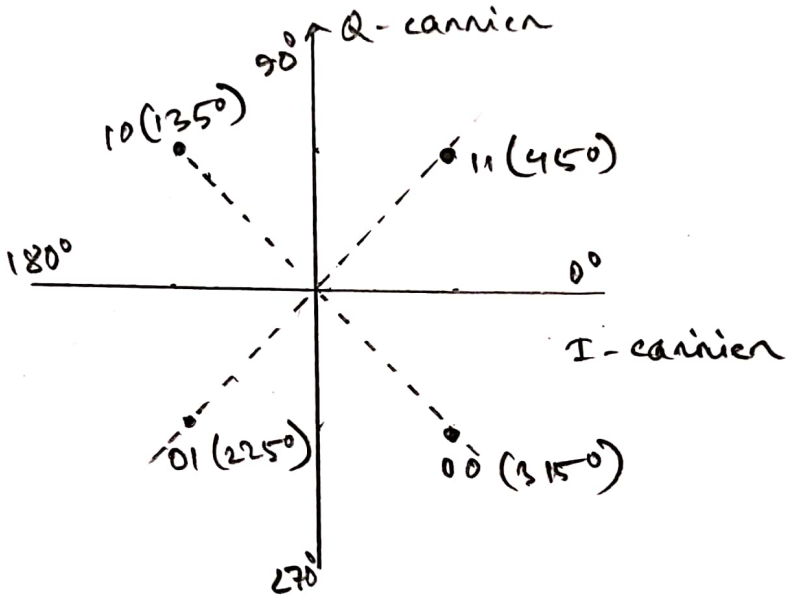
Ans: to the Ques no 2(b)

Since same amplitude for in-phase carrier and quadrature carrier, we get the following constellation diagram,



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Rajis

Ans: to the Ques no 2(c)

Given,

Levels = 4

∴ Per sample bit, $n_b = \log_2 L$

$= \log_2 4$

$= 2$ bits

∴ bit rate $= 8000 \times 2$ bps

$= 16000$ bps

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Rajiv

Ans: to the Ques no 3(a)

Given,

$f_{min} = 30\ KHz$

$f_{max} = 50\ KHz$

$\therefore$ Carrier frequency, $f_c = \frac{30+50}{2}\ KHz$

$= 40\ KHz$

Bandwidth of original signal $= (50-30)\ KHz$

$= 20\ KHz$

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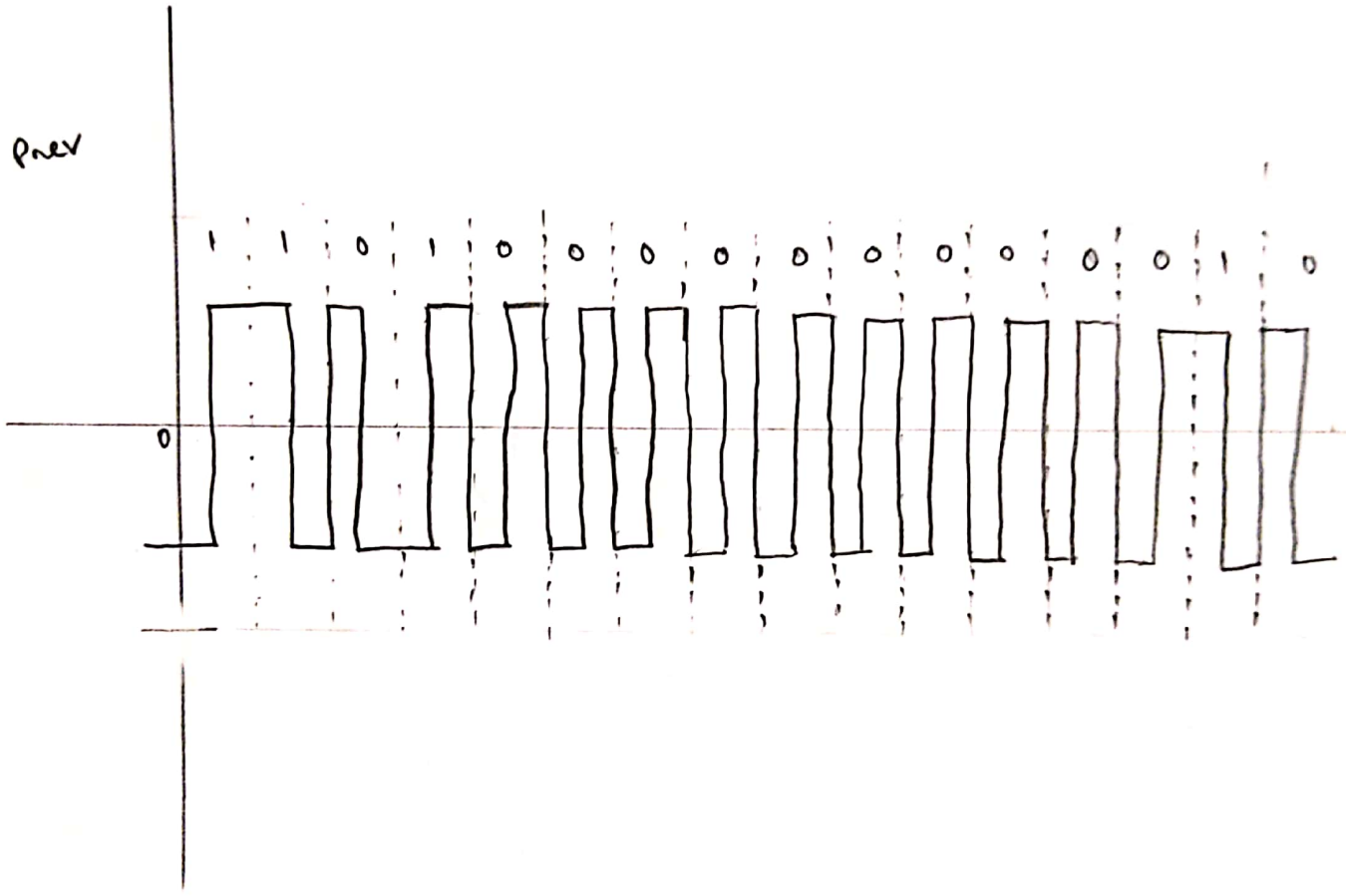
Ans: to the Ques no 3(b)

Given signal = 1101 0000 0000 0010



Rajk

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Rajiv

Ans: to the Ques no 3(c)

Asynchronous Transmission:

(1) Data is sent in a group of bit, usually 8 bits or 1 byte.

(2) 1 start bit (0) at beginning and 1 or more stop bits (1s) at the end of each byte is added and sent

(3) Transmission of each byte maybe followed by a gap of varying duration.

(4) It is called asynchronized because at the byte level, the sender and receiver do not have to be synchronized.

(5) The addition of start and stop bits and insertions of gaps into the bit stream makes the transmission slower.

(6) It is cheap and effective when ~~that~~ low speed communication is acceptable.

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Synchronous transmission

① bit stream is combined into ~~tog~~ longer frames, which may contain multiple bytes.

② bits are sent one after another without start or stop bits or gaps. It is the responsibility of the receiver to group the bits.

③ No gaps are present between bits.

④ Timing becomes very important in this transmission, because the ~~accu~~ accuracy of the received information is dependent on ability of the receiving device

⑤ As no extra bits or gaps ~~are~~ are not ~~introduced at~~ added ~~to~~ to ~~with~~ the data, synchronous transmission performs faster.

⑥ It is more useful for high-speed application but costly.

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Ans: to the Ques no 4(a)

If two wires were parallel, the effect of ~~these~~ unwanted signal is not same in both wire because they are at different locations relative to the noise. By twisting the pairs, a ~~bla~~ balance is maintained. For example, in one twist, one wire is closer to the noise source and other is farther; in the next twist, the reverse is true. Twisting makes it possible ~~to~~ that both wires are equally effected by external influences. This means that the reciever, which calculates the difference between the two, receives no unwanted signals. Unwanted signals are mostly cancelled out.

from the above, discussion, we can say that transmission of signal will be affected if two cables ~~were~~ are arranged parallel.

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Ans: to the Ques no 4 (b)

Given,

Data rate of input connection = 64 Kbps

and 1 byte = 8 bits are multiplexed at a time

i) Duration of each input slot = $\frac{8}{64 \times 10^3}$ sec

= 0.125 ms

ii) Duration of each output slot = $\frac{\text{duration of input slot}}{\text{total connection}}$

= $\frac{0.125 \text{ ms}}{7}$

= 0.01785 ms

iii) Duration of each frame = duration of each input slot

= 0.125 ms