



বাংলাদেশ আর্মি ইন্টারন্যাশনাল ইউনিভার্সিটি অব সায়েন্স এন্ড টেকনোলজি (বিএআইইউএসটি), কুমিল্লা
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Department of Electrical and Electronic Engineering
Level-3, Term-II
Mid Term Examination, Spring-2023
Course Code: EEE 313
Course Title: Communication Theory

Notes:

Time: 1 Hour

Full Marks: 60

- Each question carries 30 marks.
- Figure on the right of each question indicate marks for respective question.
- Answer any **TWO (2)** including Question **ONE (1)**

- Describe message signal with non-zero offset. [05]
 - In a signal generator room, you are given four diodes and two center-tap transformers. [10]
There is only a message signal, $m(t) = +ve$, and a carrier signal, $c(t) = -ve$, available in the stock room. Design a modulator and discuss the output behavior with a proper diagram.
 - For a baseband signal [15]

$$m(t) = \cos w_m t$$

Determine the DSB-SC signal and illustrate its spectrum. Identify the USB and LSB.
Verify that the DSB-SC modulated signal can be demodulated by the demodulator in “figure 1(iii)”.

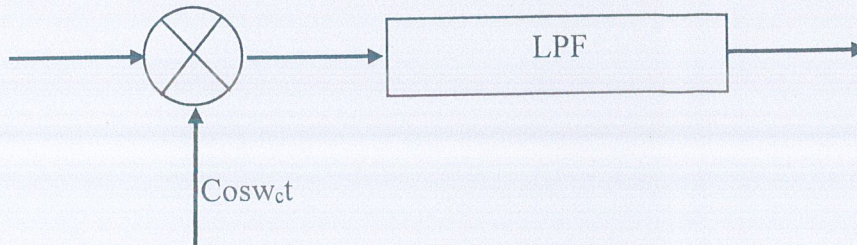


Figure 1(iii)

- State multipath effect and Doppler shift effect. [05]

- ii. If a bandwidth of a channel is 35 KHz and SNR is found to be 25 dB. Determine [10]
channel capacity.
- iii. In figure 2(iii) a DSB-SC modulation process is given. Determine the desired output [15]
modulated signal with a proper mathematical explanation.

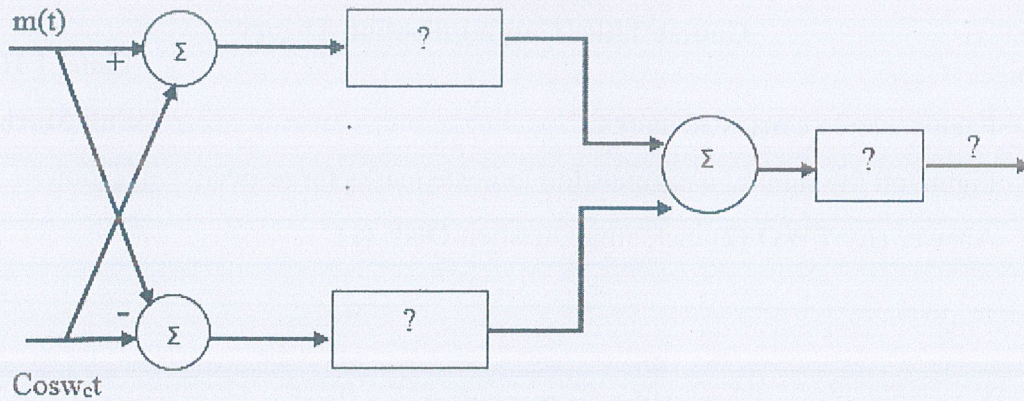


Figure 2(iii)

3. i. For a baseband signal [15]

$$m(t) = b \cos w_m t$$

Sketch $\phi_{AM}(t)$ for the modulation indices of $\mu = 0.5$ and $\mu = 1$, Consider the scenario as tone modulation.

- ii. For an AM signal [15]

$$\phi_{AM}(t) = [A + m(t)] \cos w_c t$$

Interpret the sideband and carrier power using proper mathematical equation.

Chah