Deptt. of Elec. Engg., IITD

EEL306, Comm. Engg. Major Exam. Max. Marks: 30

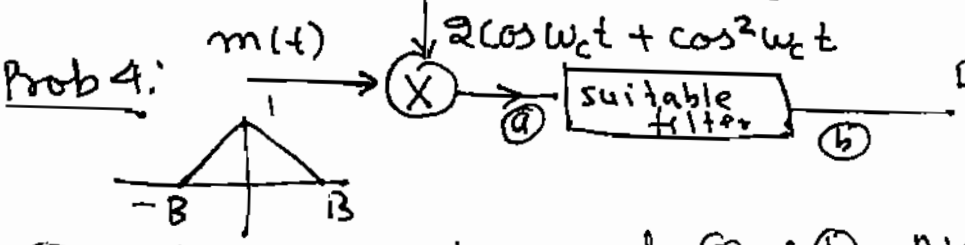
MAKE NECESSARY ASSUMPTIONS IF REQUIRED

Prob. 1: Five messages bandlimited to W, W, 2W, 4W and 4W Hz respectively, are to be Time-Division multiplexed. Device commutator diagram (one frame) such that each signal is periodically sampled at its own minimum rate. (6)

Prob. 2: Starting from first principles, making and also stating clearly, the necessary assumptions, derive the expression for figure of merit for FM. Also discuss the role of pre-emphasis and de-emphasis, if used. (6)

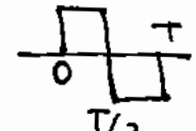
Prob. 3 For a modulating signal $m(t) = \frac{0.02}{t^2 + 10^{-4}}$ and carrier $\cos(10^4 t)$ (a) Determine and sketch the DSB-SC spectrum; (b) Determine $s_{USB-SSB}(t)$ and sketch its spectrum (6)

Prob 4:



(6)

(a) Plot the spectrum at (a) & (b). Also specify the filter.
(b) What is the minimum ω_c such that output is DSB-SC

Prob. 5: In a binary communication system '0' is transmitted as $s_0(t)$ given as: 

and '1' is transmitted as $s_1(t) = -s_0(t)$, both in bit period 'T'. Let a string of 5 bits "00110" be converted to corresponding signal. Plot the signal which would be transmitted. Also plot the output of matched filter, matched to $s_0(t)$, when the signal corresponding to about bit string is passed through it. (6)