

# G.A.T.E.

EE1205 : Signals and Systems  
Indian Institute of Technology Hyderabad

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## I. QUESTION E.C.(45)

**Question:** Let a frequency modulated (FM) signal :  $x(t) = A \cos(\omega_c t + k_f \int_{-\infty}^t m(\lambda) d\lambda)$  , where  $m(t)$  is a message signal of bandwidth  $W$ . It is passed through a non-linear system with output  $y(t) = 2x(t) + 5(x(t))^2$ . Let  $B_T$  denote the FM bandwidth. The minimum value of  $\omega_c$  required to recover  $x(t)$  from  $y(t)$  is: