King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE370: Communications Engineering I (071)
Quiz 2

Serial # 0

-2 points for not writing your serial #

Name: KEY Sec. 1

1. From the definition of Fourier Transform $G(\omega) = \int_{-\infty}^{\infty} g(t)e^{-j\omega t}dt$, find the Fourier Transform of the following signal: *Simplify* **(5 points)**

$$G(\omega) = \int_0^1 4\,e^{-j\omega t}dt + 2\int_1^2 e^{-j\omega t}dt \qquad 2$$

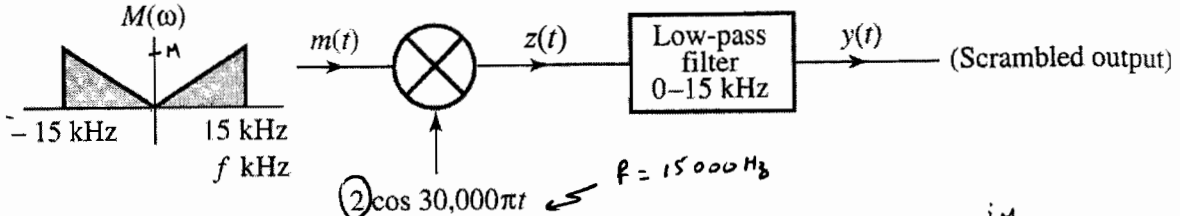
$$= \frac{4}{-j\omega}\left[e^{-j\omega} - 1\right] + \frac{2}{-j\omega}\left[e^{-j\omega 2} - e^{-j\omega}\right] \qquad 2$$

$$= \frac{4}{j\omega} - \frac{4}{j\omega}e^{-j\omega} + \frac{2}{j\omega}e^{-j\omega} - \frac{2}{j\omega}e^{-j\omega 2}$$

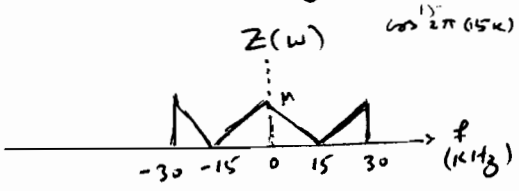
$$= \frac{2}{j\omega}\left[2 - e^{-j\omega} - e^{-j\omega 2}\right] \qquad 1$$

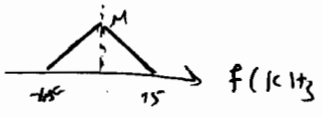
2. The system shown in the figure is used for modifying audio signals. The output $y(t)$ is the scrambled (modified) version of the input $m(t)$.

a) Sketch the spectrum of $z(t)$, at the output of the multiplier . **(3 points)**
b) Sketch the spectrum of the scrambled signal $y(t)$. **(2 points)**
Show all important points (numbers) on the sketches



a)





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