Page No.
Date :

ASSIGNMENT - 1

AMOGH GARG — 2020UCD1688

Q. Prove that: $\sum_{m=-\infty}^{\infty} \delta(t - mT_0) = \frac{1}{T_0} \sum_{n} \delta\left(f - \frac{n}{T_0}\right)$

$$\sum_{m=-\infty}^{\infty} g(t - mT_0) \rightleftharpoons \frac{1}{T_0} \sum_{n} G\left(\frac{n}{T_0}\right) \delta\left(f - \frac{n}{T_0}\right)$$

Here $g(t) = \delta(t)$

$\Rightarrow g(t - mT_0) = \delta(t - mT_0)$

Fourier Transform of $\delta(t - mT_0)$:

$\delta(t) \rightleftharpoons 1$

$\Rightarrow \delta(t - mT_0) \rightleftharpoons 1$

$\therefore G\left(\frac{n}{T_0}\right) = 1$

$$\therefore \boxed{\sum_{m=-\infty}^{\infty} \delta(t - mT_0) = \frac{1}{T_0} \sum_{n} 1 \cdot \delta\left(f - \frac{n}{T_0}\right)}$$