

PG SEMESTER-III (PHYSICAL CHEMISTRY SPECIALIZATION)
PROBLEMS ON FOURIER TRANSFORMATION
ASSIGNMENT 2 (28/09/2024)

1. Find the Fourier transform of $\exp(-ax^2)$, where $a > 0$.
2. Find the Fourier transform of the function

$$f(x) = \begin{cases} 0; & x < -nL \\ \sin \frac{2\pi x}{L}; & -nL < x < nL \\ 0; & x > nL \end{cases}$$

3. Find the Fourier transform of the one-sided exponential function

$$f(t) = \begin{cases} 0, & t < 0 \\ e^{-\alpha t}, & t > 0 \end{cases}$$

where α is a positive constant.

4. Find the Fourier transform of the two-sided exponential function

$$f(t) = \begin{cases} e^{\alpha t}, & t < 0 \\ e^{-\alpha t}, & t > 0 \end{cases}$$

where α is a positive constant.

5. Find the Fourier transform of $\exp(-ax^2)$, where a is a positive constant.
6. Find the Fourier transform of $\exp(-a|x|)$.