

Notice:

- a) Term grading policy: Final \times **35%**.
- b) Total 125 points in this exam.
- c) Exam Time: 1:00PM–2:50PM, 15 Jan., 2021.

1. (25 pts) Evaluate the integral $\int_0^{2\pi} \frac{1}{10 - 6 \cos \theta} d\theta$.

2. (25 pts) Evaluate the integral P.V. $\int_0^{\infty} \frac{x \sin x}{(x^2 - 1)(x^2 + 4)} dx$.

3. (25 pts) Evaluate the integral P.V. $\int_0^{\infty} \frac{\sqrt{x}}{x^2 + 1} dx$.

4. (25 pts) Find the piecewise smooth function $f(t)$ with Laplace transform of $F(s) = \mathcal{L}\{f(t)\} = \frac{1}{s^4 + 2s^2 + 1}$.

5. (25 pts) Find the function $f(t)$ with Fourier transform of $F(\omega) = \mathcal{F}\{f(t)\} = \frac{\omega^2}{\pi(\omega^4 - 1)}$.