Pune Institute of Computer Technology, Pune

Department of Information Technology

Subject : Engineering Mathematics – III

Assignment No. – 02

Unit - II : Transforms

Issue Date : 04/03/2021 Submission Date : 10/03/2021

Submission Platform – Microsoft Teams

Instructions : *1)Assignment should be submitted in* ***pdf format*** *with file size not exceeding 5mb and must be scanned properly(readable).*

2)Assignment to be written in question answer format only.

3)Five digit roll number should be mentioned on each page.

4)Deadline should be followed strictly.

1) Represent the following function in the Fourier integral form: $f(x) = e^{-|x|}, -\infty < x < \infty$

2) Obtain Fourier cosine integral of: $f(x) = \begin{cases} e^{-x}, 0 < x < 1 \\ 0, \quad x > 1 \end{cases}$

3) Using inverse Fourier sine transform, find $f(x)$ if, $F_s(\lambda) = \frac{1}{\lambda} e^{-a\lambda}$

4)Solve the integral equation : $\int_0^\infty f(x) cos\, \lambda x \; dx = \begin{cases} 1 - \lambda, 0 \le \lambda < 1 \\ 0 \quad , \quad \lambda \ge 1 \end{cases}$

4) Find Z – transform and ROC of $f(k) = \frac{5^k}{k}$, $k > 0$

5) Find Z – transform and ROC of $f(k) = (k+1)3^k$, $k \ge 0$

6) Find inverse z – transform of $F(z) = \frac{1}{\left(z - \frac{1}{4}\right)\left(z - \frac{1}{5}\right)}$, $|z| < \frac{1}{5}$

7) Find inverse z – transform of $F(z) = \frac{z+2}{(z-1)^2}$, using inversion integral method.

8) Solve the difference equation $y_{k+2} - 2y_{k+1} + y_k = 2^k$, $k \ge 0, y_0 = 2, y_1 = 1$