ECH PSG TEC Course Code: 15X No of Pages

Roll No:

(To be filled in by the candidate)

## PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, NOVEMBER 2017

MSc - SOFTWARE SYSTEMS Semester: 3

TRANSFORM TECHNIQUES

Maximum Marks: 100 Time: 3 Hours

## INSTRUCTIONS:

- Answer ALL questions. Each question carries 20 Marks.
- 2. Subdivision (a) carries 3 marks each, subdivision (b) carries 7 marks each and subdivision (c) carries 10 marks each.
- a) Laplace transform reduces the problem of solving a differential equation in to an algebraic equation. Comment on this statement.
  - b) (i) What do you mean by unit step function u(t) and unit impulse function? Give real time examples for each.
    - (ii) Sketch the graph of f(t)u(t), f(t)u(t-2) and f(t-2)u(t-2) if  $f(t)=\sin 2t$ .
  - c) (i) Solve the initial value problem  $y'' + y' 2y = 3\cos 3t 11\sin 3t$ , given that y(0) = 0, y'(0) = 6 using Laplace transform.

(OR)

- (ii) State and prove the convolution theorem for Laplace transform and use it to find the inverse transform of
- 2. a) Without using actual integration evaluate  $\int_0^\infty e^{-t}$ 
  - b) Find the Laplace transform of  $f(t) = \begin{cases} 1 \\ 1 \end{cases}$ 0 < t < 1 1 < t < 2 and  $f(t + 2) = f(t), \forall t...$
  - c) Solve the integral equation  $y'(t) = t + \int_0^t y(t-u)\cos u \, du$ , y(0) = 4.
- 3. a) State the existence conditions for Fourier Transform.
  - b) Why do we need Fourier integral representation? Obtain the Fourier integral  $\pi e^{-x}$  if x > 0 and hence evaluate  $\int_0^{\infty} \frac{dx}{1+x^2}$ representation of f(x) =
  - c) (i) Find the Fourier transform of  $f(x) = \begin{cases} 1-x \\ 0 \end{cases}$

(OR)

(ii) Find the Fourier Cosine transform of  $\frac{1}{3^2+1}$ Hence find the Fourier Sine transform

PSG TECH PSG TECH

No of Pages : Course Code: 15XW33

4. a) What do you mean by Fast Fourier Transform? Why it is called so?

- (i) What is a periodic sequence? Give an example.
  - (ii) Describe the two methods to find the convolution of two periodic sequences with their limitations. Compute the convolution of the following periodic sequences  $\{1, -1.1.2\}$  and  $\{2, 1, 1, 4\}$  $\{1, -1, 1, 2\}$  and  $\{2, 1, 1, 4\}$ . (4)
- Find the Discrete Fourier Transform of {1,2,3,4,4,3,2,1} using DIT-FFT. Cross validate your answer by finding the inverse transform.
- 5. a) State the admissibility condition for the existence of wavelet transform
  - b) (i) What do you mean by detail signal? What is the use of the detail signal? (3)
- (ii) For the discretely sampled signal  $f = \{8, 4, 6, 8, 9, 7, 2, 4\}$  how will you arrive at the e the page tech coarser signal and detail signal using filters H and G. Hence write the expression for the continuous time signal for f'(t) in terms of the Haar scaling function
- PSGTECH PSGTEC

PSG TECH PSG TECH PSG TECH PSG TECH PSG TECH