VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

DEPARTMENT OF MATHEMATICS

SCHOOL OF ADVANCED SCIENCES

Fall Semester – 2018-2019

Continuous Assessment Test – I

Course Name : Applications of Differential and Difference Equations
Course Code : MAT2002
Slot : B2+TB2
Max. Marks : 50

Date: 13-8-2018
Time: 2.00 to 3.30 PM
Duration: 90 Minutes

ANSWER ALL QUESTIONS

(5 x 10 marks = 50 marks)

1. Find the Fourier series expansion of $f(x) = x + x^2$ in $(-1,1)$ (10 M)

2. Obtain the first three coefficient in the Fourier cosine series for y, where y is given in the following table:

x	0	1	2	3	4	5
y	4	8	15	7	6	2

(10M)

3. Find the eigenvalues and eigenvectors of the matrix $A = \begin{pmatrix} 4 & -1 & 1 \\ 0 & 2 & 0 \\ 1 & 1 & 4 \end{pmatrix}$. (10M)

4. Reduce the quadratic form $3x_1^2 + 3x_2^2 + 3x_3^2 + 2x_1x_2 + 2x_1x_3 - 2x_2x_3$ into a canonical form by orthogonal transformation. (10M)

5. Find the general solution of the differential equation

$$\frac{d^2y}{dx^2} - \frac{dy}{dx} - 2y = x + e^{3x}.$$ (10M)