**29-01-2018**

**MECE233 Resit Exam**

**Name:**

**Surname:**

**Signature:**

**Q1)** For the circuit below R1 = R2 = R3 = 2 Ω, Vs = 10 Volt, Vd = 5K1 Volt and K1 is the voltage over resister R1. Find the Thevenin Equivalent Circuit between points A and B. **(20 points)**



**Q2)** A second order circuit’s differential equation governing the state variable ‘x’ is given by the formula $\ddot{x}+4x=sin⁡(t)$ where x(0)=5 and $\dot{x}\left(0\right)=2$. Find x(t). **(20 points)**

**Q3)** For the circuit below C= 2 Farad, L1 = L2 = 1 Henry, R1 = R2 = R3 = 1 Ohm. The circuit is fed by a voltage source VS.

1. Find the state-space representation where the state variables are VC (capacitor voltage), I1 (inductor current over L1) and I2 (inductor current over L2). **(30 points)**
2. Find the third order differential equation governing VC. **(30 points)**

