Mid Term Test   **Date: 03.11. 2022**

**Duration: 2:00 - 3:30 PM**   **Max. Marks: 30Min**

1. Consider a home heating system consisting of a natural gas-fired furnace and a thermostat. In this case the process consists of the interior space to be heated. The thermostat contains both the measuring element and the controller. The furnace is either on (heating) or off. Draw a schematic diagram for this control system. On your diagram, identify the controlled variables, manipulated variables, and disturbance variables. Besure to include several possible sources of disturbances that can affect room temperature.   (2 M)
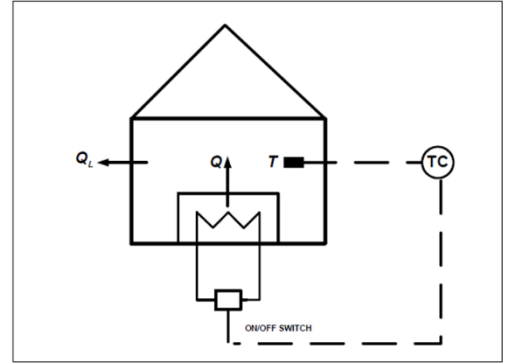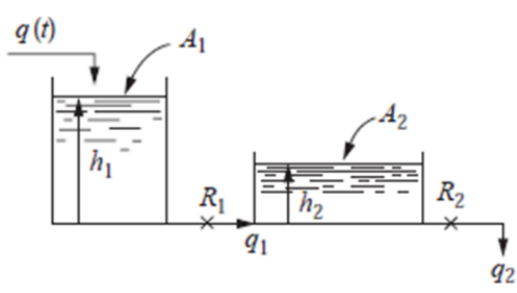

2. Find Y(t) if $Y(s) = \dfrac{s+1}{s(s^2+4)}$ [4 M]

3. Find Y(s) if   [4 M]
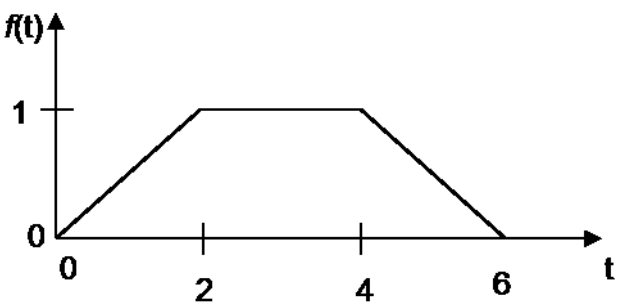
4. Find the inverse transform of $Y(s) = \dfrac{1+e^{-2s}}{(4s+1)(3s+1)}$ [4 M]

5. Develop the transfer function for a liquid-level system shown in Fig. Assume the resistances are linear.   [8 M]

6. Develop the transfer function for a U-tube manometer. State your assumptions clearly.   [8 M]

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