

Name:

Duration: 15 min

ID:

Grade:/30

Questions**Part I: Understand**

(5 pts) Suppose you are asked to design a motor drive for an elevator. Would you prefer DOL control or VFD? Why?

(5 pts) Is V/f control applicable at the whole operating range for the crane-hoist system? Why? Provide a counter example if your answer is negative. HINT: Use your observations during the experiment.

Part II: Solve

(10 pts) Consider the crane hoist system. Suppose that V/f control is used, the applied frequency is 50 Hz and the system operating in **upwards direction** at steady state. Suppose also that, phase sequence applied to the motor **changed suddenly**, keeping all other parameters the same.

Draw the old and new torque speed curves (along with the load torque). Show the old and new steady state operating points.

Sketch the transition during the transient period, on the same graph. Label the critical points.

Write the motor operating modes during the steady states and transient states.

Explain the behavior of the water tank physically.

Part III: Think

(10 pts) Why do we use *Volts/Hertz control* in induction motors?