EE462 – Laboratory

Exp. 1 Quiz **Group #2** **20.05.2017**

Name: **Duration:** 15 min

ID: **Grade:** …../30

Questions

Part I: Understand

(5 pts) What is the *load characteristics* (torque vs speed) of a fan load? Sketch. Draw a sample *motor characteristics* (torque vs speed) of an induction motor, on the same graph.

(5 pts) Explain how the speed control is achieved with fan load using frequency control. You may use your sketch as above.

Part II: Solve

(10 pts) Suppose you have an induction motor rated values of which are as follows.

P = 150 kW, $V_{l\text{-}l}$ = 540 V, f = 60 Hz, N = 1170 rpm, pole = 6

Calculate:

Synchronous speed of the motor.

Rated slip of the motor.

Rated torque of the motor.

The frequency of the rotor induced currents at rated conditions.

The minimum required DC link voltage of the drive inverter, in case **Sinusoidal PWM** technique is used.

Part III: Think

(10 pts) Why do we use *Volts/Hertz control* in induction motors? Explain both conceptually and analytically.