EE462 – Laboratory

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

Name: **Duration:** 15 min

ID: **Grade:** …../30

Questions

Part I: Understand

(10 pts) Compare the *damper control* methods with *VFD control* for a fan load application, in different aspects.

Part II: Solve

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

P = 4 kW, $V_{l\text{-}l}$ = 400 V, f = 50 Hz, N = 1440 rpm, pole = 4

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 *Space Vector PWM* technique is used.

Part III: Think

(5 pts) Suppose that you have a wind turbine to which an induction machine is coupled. The machine terminals are connected to a converter (which is also connected to the grid with another converter) and it is rotating at rated speed and generating rated power. **Draw a torque speed curve and show the operating point on it. Show also the important points (synchronous speed etc.).**

(5 pts) Suppose now that, the wind is suddenly blocked; i.e., the turbine does not generate any torque, but it is able to rotate. The voltage or frequency applied to the machine are not changed. **On the same figure, show the new operating point. What are the operating modes of these cases? Show also the transition between the operating points.**