

**End Semester Examinations - 2015-16 Even Semester - May 2016**

**14EE3005 Solid State AC Drives**

**Set B**

**Time : 3 hrs**  
**Total Marks: 100**

1. Present an equivalent circuit of an Induction motor with respect to stator and Derive an expression for
- a) Developed Torque  $T_e$
  - b) slip ( $S_m$ )
  - c) breakdown torque  $T_{em}$ .
  - d) Regenerative breakdown torque  $T_{eg}$ . (20)

**OR**

2. Differentiate with supporting graphs between the frequency control method and V/F control method. (20)
3. Prove that the Developed torque and speed of the Induction machine is controlled by varying the duty cycle of the chopper. Also find the total Rotor circuit Resistance/phase. (20)

**OR**

4. With a neat diagram and graphical representation explain and prove that the Torque expression of a static Kramer drive is:
- $$T_e = (P \times 1.35 V_1 \times I_d) / (2 \times \omega_s \times n_1) \quad (20)$$

5. Give a detail derivation of the torque expression of an induction motor as a function of stator and rotor fluxes so as to aid in DTC control. (20)

**OR**

6. With a neat block diagram and related equations discuss on the 'voltage model method' of flux vector estimation. (20)
7. Explain in detail the DTC control strategy shedding light on the trajectory of stator flux vector and the switching table of the inverter voltage vectors. (20)

**OR**

8. For a balanced Induction machine, derive the dynamic equations and represent the resulting expression in vector form. (20)
9. Explain in detail the control of LCI drive with constant turn off angle ( $\gamma$ ) with a suitable control block diagram. (20)

**Wishing you All the Best**