Code No. B5401

JAWAHARLAL NEHRU TECHNOLOGY UNIVERSITY, HYDERABAD

M .Tech. II Semester Supplementary Examinations, March – 2009

POWER ELECTRONIC CONTROL OF A.C. DRIVES

(Common to Power Electronics & Electric Drives and Power Electronic)

Time: 3 hours **Max. Marks. 60**

Answer any Five questions
All questions carry equal marks

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1. Explain the operation of three phase voltage source inverter fed three phase induction motor drive with 180^o conduction with the help of circuit diagram and waveforms. Also sketch speed-torque characteristics for sub-synchrouns speeds.

2. Discuss the working of three-phase auto sequentially commutated current source inverter fed three phase induction motor. Draw neat circuit diagram and necessary waveform and speed-torque characteristics.

3. A three phase, 4 pole, 18 Kw, 300V, star-connected induction motor is driven at 50 Hz by a six-step voltage source invested supplied from a d.c. supply of 200V. The motor equivalent circuit parameters for 50 Hz operation are $R_1 = 0.1\Omega,\ R_2 = 0.17\Omega,\ x_1 = 0.3\Omega$ $x_2 = 0.5\Omega,\ x_m = 200\Omega$. Calculate the rms current and the harmonic copper losses when this operates at 1450 rpm, 50Hz. Estimate the motor efficiency compassed with sinusoidal operation.

4. Explain the operation of three phase ship-ring induction motor drive when static scherbius scheme is employed, with the help of circuit diagram. Give speed-torque characteristics.

5.a) What is vector control with respect to induction motor.
b) Explain, in detail, the operation of induction motor when direct method of vector control is adopted.

6. A 8 Mw, 3-phase, 6.6kv, 50Hz, 6-pole, star-connected wound field synchronous motor has the following parameters: x_m = 8 ohms, $x_{sf} = 0.5\Omega$, rated power factor =1, R_s=0.01 ohms, rated field current = 180A Field winding resistance =1.2 ohms. Calculate the power factor, armature current, efficiency at half the rated torque and at rated field current core, friction and windage loss assumed constant at 9 kW.

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7. Explain the operation of variable reluctance motor drive with inverter circuit with the help of neat circuit diagram.

8. Discuss the working of a three phase Brushless D.C. motor drive when fed from sinusoidal excitation.

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