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FOURTH SEMESTER **B.TECH. EE/EL**

MID SEM EXAMINATION **March,2019**

EE208 ASYNCRONOUS AND SYNCHRONOUS MACHINES

Time: 1.5 Hours ***Max. Marks : 20***

Note : Answer ALL questions. Assume suitable missing data, if any.

1. What is the need of starters in 3-phase asynchronous motor? Explain any two starting methods in brief.
2. Derive the equivalent circuit of a single phase asynchronous motor with the help of double revolving field theory.
3. A 3 phase, 400 V, 50 Hz, 6 pole, star connected SCIM has the following per phase constants in ohms referred to stator: $r_1 = 0.2$, $r2 = 0.5$, $x_1 = 2$, $x_2 = 2$, $X_m = 48$. This motor drives a hoist. During lowering of the hoist, the load accelerates the motor to a speed of 1050rpm. At this speed, determine
   a) Line current
   b) Active power returned to 3-phase supply
   c) Reactive power requirement of the generator
4. A 400V, 3 phase, 50 Hz, star-connected, six pole induction motor has the following test results:
   No load test: 400V, 8.5A, 1100W
   Blocked rotor test: 180V, 45A, 5700W
   Calculate with circle diagram or equivalent circuit, the line current and power factor, when operating at 4% slip. The stator resistance per phase is 0.5 ohm.
5. Two cages of a 3 phase, 50 Hz, 4 pole, delta-connected induction motor have respective standstill leakage impedances of (2+j8) and (9+j2) ohms/phase. Estimate the gross torque developed.
   a) At standstill, the effective rotor voltage being 230V/phase.
   b) At 1450 rpm when the effective rotor voltage is 400 V/phase. The rotor quantities given are referred to the stator; the stator impedances are negligible. What is the gross starting torque if a star-delta starter is used?