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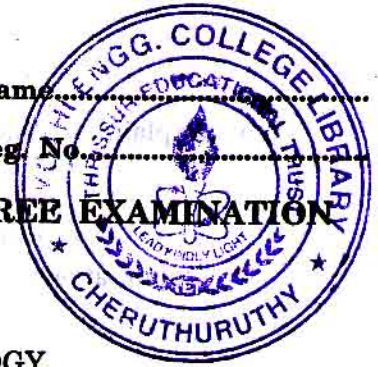
Reg. No.

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
DECEMBER 2012**

Mechanical Engineering

ME/AM 04 306—ELECTRICAL TECHNOLOGY

(2004 Admissions)



Time : Three Hours

Maximum : 100 Marks

1. (a) Explain the production of rotating magnetic field in the 3-phase induction motor.
(b) Draw the per phase equivalent circuit of a three phase induction motor.
(c) Explain the nature and classification of load torque.
(d) Explain the load equalization in connection with electric drive.
(e) Explain the input-output characteristic of AC to DC converters.
(f) Explain the principle of frequency control of induction motor.
(g) Draw the phasor diagram for a synchronous generator for a lagging load. Assume e.m.f. method.
(h) Explain the principle of operation of a synchronous motor.

(8 × 5 = 40 marks)

2. (a) A 3-phase induction motor at stand-still has a rotor voltage of 100 V between the slip-rings when they are open circuited. The rotor winding is star connected and has leakage reactance of 1Ω /ph at stand-still and a resistance of 0.2Ω /ph. Calculate (i) the rotor current when the slip is 4% and the rings are short circuited ; (ii) the slip and rotor current at maximum torque. Assume the flux to remain constant.

Or

- (b) Explain the no load and blocked rotor tests on the induction motor and hence the determination of its equivalent circuit parameters.

(15 marks)

3. (a) Explain the stability of a drive and derive the condition for the steady-state stability.

Or

- (b) Derive the expressions for the equivalent values of drive parameters for a motor driving linear and rotational loads.

(15 marks)

Turn over

4. (a) Explain the principle and the input-output characteristic of a AC to DC converter.

Or

- (b) Explain the principle of speed control of an induction motor by stator voltage control and state its limitations.

(15 marks)

5. (a) For a synchronous generator connected to an infinite bus bars explain the effect of change of excitation and fuel input.

Or

- (b) With neat diagram explain the working of stepper motor.

(15 marks)

(4 × 15 = 60 marks)