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Name.....

Reg. No.....

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, OCTOBER 2011**

EC 09 306/PTEC 09 305—ELECTRICAL ENGINEERING

(2009 admissions)

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. State all the necessary conditions for a DC shunt generator to build its EMF.
2. Draw the phasor diagram for transformer at no load.
3. Define voltage regulation of a transformer.
4. Synchronous motor is not self starting. Justify.
5. In which direction does shaded pole induction motor run ?

(5 × 2 = 10 marks)

Part B

Answer any four questions out of six.

1. Explain the construction and principle of operation of a dc generator with a neat sketch.
2. A 3-phase, 50 Hz induction motor has 8 poles. If the full-load slip is 2.5 %, determine (i) synchronous speed ; (ii) rotor speed ; and (iii) rotor frequency.
3. The equivalent circuit of a 200/400 V step up transformer has the following parameters referred to the low-voltage side. $R_{01} = 0.15 \Omega$; $X_{01} = 0.37 \Omega$, $R_c = 600 \Omega$, $X_m = 300 \Omega$ when the transformer is supplying a load at 10A at a power factor of 0.8 lag. Calculate the primary current.
4. Mention the advantage of salient pole in synchronous motor.
5. Draw the equivalent circuit diagram of three-phase induction motor.
6. Explain why a single-phase induction motor is not self starting.

(4 × 5 = 20 marks)

Part C

Answer any One question from each module.

1. Explain briefly with circuit diagrams the various methods of exciting a DC generator.

Or

2. Draw and explain speed-torque characteristics of DC series, shunt and compound motors.
3. Explain the working of a transformer on load. Draw the phasor diagram for the transformer at load conditions at lag power factor.

Or

4. Explain the working of a dynamometer wattmeter with a neat sketch.

Turn over

5. (a) Derive the EMF equation of a 3-phase alternator, including the expressions for the distribution factor and pitch factor.

(5 marks)

- (b) A 1200 kVA, 6600 V, 3-phase star connected alternator has its armature resistance as 0.25Ω per phase and its synchronous reactance as 5Ω per phase. Calculate its regulation if it delivers a full-load at (i) 0.8 lagging and (ii) 0.8 leading p.f.

(5 marks)

Or

6. Explain briefly the methods of starting a synchronous motor.
7. What is the necessity of starter in three-phase induction motor ? Explain the operation of rotor resistance starter.

Or

8. Explain the working of capacitor start and run single-phase induction motor with necessary diagram.

(4 × 10 = 40 marks)

