

B. Tech Degree III Semester Examination, November 2009**ME/EB/EI/IT/EC 302 ELECTRICAL TECHNOLOGY***(2006 Scheme)*

Time : 3 Hours

Maximum Marks : 100

(8 x 5 = 40)

- I. (a) Distinguish between power and distribution transformers.
 (b) Draw and explain the no load phasor diagram of a single phase transformer.
 (c) Explain the conditions for voltage build up of a self excited shunt generator.
 (d) Which motor has the highest starting torque? Why?
 (e) Explain the different methods of starting synchronous motors.
 (f) Compare synchronous and induction motors.
 (g) Distinguish between slip ring and squirrel cage induction motors.
 (h) List the various electrical equipments used in power stations.

PART B

(4 x 15 = 60)

- II. The following readings were obtained from O.C and S.C tests on 8 KVA 400/120 V 50Hz transformer.

O.C test (l.v.side) : 120V, 4A, 75W

S.C test (h.v side) : 9.5V, 20A, 110W

Calculate

- (i) The equivalent circuit constants with respect to H.V . side.
 (ii) Voltage regulation and efficiency for .8 lagging power factor load.
 (iii) The efficiency at half full load and 0.8 power factor load.

(15)

OR

- III. (a) Derive the emf equation of a transformer. (5)
 (b) A 10 KVA 400/200V single phase 50 Hz transformer has a maximum efficiency of 92% at 80% of full load at unity p.f. Determine the efficiency at full load at 0.8p.f lagging. (10)

- IV. (a) Derive the emf equation of a generator. (5)
 (b) A shunt generator supplies 500A at 500V. Calculate its generated emf if its armature and shunt field resistances are 0.02Ω and 125Ω respectively. (10)

OR

- V. (a) Draw the combined power flow diagram for motor and generator actions. (5)
 (b) What is armature reaction? Explain in detail the two effects of armature reaction. (10)

- VI. (a) A 6 pole 50Hz 3ϕ induction motor running on full load with 3% slip develops a torque of 160 N-m at its pulley rim. The friction and windage losses are 210 W and stator copper and iron losses equals to 1640 W. Calculate

- (i) Rotor o/p
 (ii) Efficiency at full load
 (iii) Rotor copper loss.

(15)

OR

- VII. A 600V, 60 KVA single phase alternator has an effective resistance of 0.2Ω . A field current of 10A produces an armature current of 210 A on short circuit and an emf of 480 V on open circuit.

Calculate –

- (i) Synchronous impedance and reactance
 (ii) Full load regulation with 0.8 pf lagging.

(15)

- VIII. (a) What is skin effect? (5)
 (b) Sketch and explain nuclear power station. (10)

OR

- IX. (a) What is corona? Explain the factors affecting corona. (6)
 (b) Explain hydro electric power generation with a neat sketch. (9)

