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Enroll No…….

EE-104

M.Tech. (PS)–I Sem. (Reg. / Ex.)

Examination, March.-2021

Advance Course in Electrical Machines

Time: Three Hours

Maximum Marks:70

Note: Attempt any five questions. (Each question carries equal marks)

Q.1 (a) What is generalized model of rotating electrical machines? Flow are the various windings of a machine represented by the primitive machine?

(b) Derive the voltage equations and expression for the electrical torque of the Kron's primitive machine.

Q.2 Explain the basic reason of using transformations in electrical macilines. Obtain identical transformations for currents and voltages from rotating balanced 3-phase (a, b, c) winding to a rotating balanced 2-phase (α,β) winding.

Q.3 Write the general voltage equations for a metadyne generator with zero compensation. If a load impeduice of(RL + Lip) is connected across the output terminals, then derive the transient and steady-state expression for the load voltage.

Q.4 (a) Draw the generalized Mathematical Model of a polyphase induction machine. Write down voltage equations for this model obtain there from the equivalent circuit for a pul y-phase induction motor.

(b) Enumerate the most common problems concerning the dynamics of induction motors.

Q.5 (a) A 2301, 4-pole, 50Hz single phase induction motor has the following constraints and losses: Stator resistance and leakage reactance: 2.3 a 3.2 n. Rotor resistance and ieakagc reactance: 4.2 fl, 32 CI (referred to stator). Magnetizing reactance : 74 CA Core is =98 Watts. Friction and windage loss = 30 Watts. Determine the stator current.. p.f. power output, torque and efficiency at a slip of 0.05, with the auxiliary winding open.

(b) Explain the constructional features and principle of working of schrage motor.

Q.6 (a) Explain how Park's transformations transform equations in a, b, c variables to d, q,o variables.

(b) From the phasor diagram of a salient pole alternator working at a leading pf, but with pf angle 0 less than load angle obtain the following relation: E1 = V, s4545+ I. ra cos(6— 0) + IdXd.

Q.7 (a) Explain_ the various reactance's and time constants from the 9-axis equivalent circuit of a 3-phase synchronous machine.

(b) During the balanced 3-phase short-elm:L.1i analysis, explain why a-axis parameters are mainly involved.

Q.8 Write short notes (Any two)

(a) Commutator machine

(b) Cross field theory of D.C. machine

(c) Single paring of 3- phase induction motors.

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