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B.E. DEGREE EXAMINATION, NOV/DEC – 2011

III SEMESTER

ELECTRONICS AND COMMUNICATIONS ENGINEERING

EE 295 ELECTRICAL MACHINES

Time: 3 Hours

Max. Marks: 100

Answer all questions

PART- A (10 X 2 = 20)

1. What are called iron losses?
2. The transformer should not be given very high DC voltage. Why?
3. Define: All day efficiency of a transformer.
4. Why should we start the series motor always with load?
5. What is slip speed?
6. How can the speed be controlled in DC motors?
7. Why can't a three phase induction rotate at synchronous speed?
8. Can an induction machine generate power? How?
9. How do we start a single phase induction motor?
10. What is possible effect of wrong synchronization

PART- B (5 X 16 = 80)

11(a) (i) Derive the emf equation of a DC generator and torque equation of a DC motor.

(ii) A 4-pole DC shunt generator, with a shunt field resistance of 100 ohms and an armature resistance of 1 ohm, has 378 wave connected conductors in its armature. The flux per pole is 0.02 Wb. If a load resistance of 10 ohms is connected across the armature terminals and the generator is driven at 1000 rpm, calculate the power absorbed by the load.

12 (a) (i) A six-pole lap-connected 230V shunt motor has 410 armature conductors. It takes 41A on full load. The flux per pole is 0.05 Weber. The armature and field resistances are 0.1 ohm and 230 ohms respectively. Determine the speed of the motor at full load.

(ii) A 250 V DC shunt motor takes 30 A current while running at full load. The resistance of motor armature and field windings are 0.1 ohms and 200 ohms respectively. Determine the back emf generated in the motor, when it runs on full load.

(OR)

(b) Explain the different methods of speed control of DC motors with neat circuit diagrams.

13.(a) (i) Draw and explain the no-load condition of a single phase transformer with phasor diagram.

(ii) Draw and explain the vector diagrams for a single phase transformer on load at upf, pf (lag) and pf (lead).

(OR)

13. (b) Explain the construction and working principle of a single phase transformer. Derive its emf equation.

14. (a) Explain the construction and the principle of operation a 3 phase and single phase AC machines with neat sketches.

(OR)

14. (b) Explain a method of testing to predetermine the efficiency of a DC machine as motor and generator with a neat circuit diagram.

15. (a) Explain the different types of DC motors characterized by the connection of the field windings in relation to the armature. Draw the diagrams also.

(OR)

15. (b) Write short notes on

- (i) Three phase circuits
- (ii) Motor starters
