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Question Paper Code : 33421

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Third Semester

Electronics and Communication Engineering

EE 1211/EE 1261 — ELECTRICAL MACHINES

(Common to Instrumentation and Control Engineering and Electronics and
Instrumentation Engineering)

(Regulation 2004/2007)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A 8 pole lap wound d.c. generator armature has 960 conductors cutting a flux of 40m Wb and rotates at a speed of 400 r.p.m. Calculate the induced e.m.f.
2. List any two specific advantages of Swinburne's test.
3. Define voltage regulation.
4. What are the main losses in a transformer?
5. Compare squirrel cage induction motor with slip-ring induction motor.
6. Why is single phase induction motor not self starting?
7. List two characteristics of synchronous motor.
8. Name four applications of hysteresis motor.
9. What are the main advantages of EHVDC system over EHVAC system?
10. Classify insulators.

PART B — (5 × 16 = 80 marks)

11. (a) Sketch and explain the load characteristics of the following type of DC generator.
- (i) Shunt
 - (ii) Series
 - (iii) Cumulative compound
 - (iv) Differential compound. (4 × 4 = 16)

Or

- (b) (i) Derive the torque equation of a d.c. motor. (6)
- (ii) A motor operating on 200 V mains takes 6A on load. The armature and field resistances are 0.5 ohms and 100 ohms respectively. Calculate efficiency when the machine is running as
- (1) a generator (5)
 - (2) a motor when output is 5 kW. (5)

12. (a) Explain the construction (with necessary diagrams) and working of single phase transformer.

Or

- (b) Draw the equivalent circuit of single phase transformer. Explain the tests that are to be performed to determine the equivalent circuit parameters.

13. (a) Explain the different methods of speed control that can be employed for three phase induction motor.

Or

- (b) (i) State Double field revolving theory. (6)
- (ii) Explain the construction and working of shaded pole induction motor. (10)

14. (a) A 64 pole, 50 Hz, three phase star connected alternator has 3 slots per pole per phase. There are 4 conductors per slot. A flux of 0.05 Weber/pole is distributed sinusoidally across the air gap. Find conductors per phase, distribution factor, speed and induced e.m.f.

Or

- (b) Explain with necessary diagram, the construction and working of stepper motor.

15. (a) Draw and explain the structure of electric power system.

Or

(b) Explain in detail EHVAC and EHVDC transmission system.
