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**Question Paper Code : 21524**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Third Semester

Electronics and Instrumentation Engineering

EI 2201/EI 33/EE 1202/080300001 /10133 EI 303 — ELECTRICAL MACHINES

(Common to Instrumentation and Control Engineering)

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by armature reaction?
2. What is the function of commutator in a DC generator?
3. Enumerate the losses in a transformer.
4. What are the different types of transformers?
5. List the various methods to start the synchronous motor.
6. Draw the vector diagram of loaded alternator at leading power factor.
7. What is the condition for the maximum starting torque in three phase transformer?
8. Sketch the torque-slip characteristics of three phase induction motor.
9. State double revolving field theory.
10. Why single phase induction motor is not self starting?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the different types of DC motors? Sketch their mechanical characteristics. (6)
- (ii) Explain the principle and theory of operation of DC generator. (10)

Or

- (b) (i) Describe any two methods of speed control of DC motors. (10)
- (ii) Derive the torque equation of a DC motor? (6)

12. (a) (i) From the first principles, derive emf equation of a transformer? (8)  
(ii) Explain how the primary current adjusts itself to the load on the secondary. (8)

Or

- (b) Explain how the equivalent circuit parameters of a transformer are determined from OC and SC test readings? (16)

13. (a) (i) Explain V and inverted V curves of a synchronous motor. (8)  
(ii) Derive the emf equation of an alternator. Discuss the effect of winding factor on the induced emf? (8)

Or

- (b) (i) Write short notes on hunting in synchronous motor. (6)  
(ii) Explain the construction and principle of operation of an alternator. (10)

14. (a) (i) Explain the concept of rotating magnetic field production. (8)  
(ii) Derive the torque-slip equation for a 3 phase induction motor and also the equation for slip at which maximum torque occurs. (8)

Or

- (b) Explain any one method of starting employed in 3-phase cage induction motor. (16)

15. (a) Describe in detail the construction and working principle of Switched Reluctance Motor. (16)

Or

- (b) Write in detail notes on :  
(i) Repulsion motor. (8)  
(ii) Universal motor. (8)