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Question Paper Code: 34326

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Electronics and Instrumentation Engineering

01UEE426 - PRINCIPLES OF ELECTRICAL MACHINES

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Write an expression for voltage equation of DC motor.
2. List the different types of DC generator. Also write their applications.
3. Why transformers are rated in kVA?
4. What is ideal transformer?
5. Differentiate squirrel cage and split ring induction motor.
6. State the condition for maximum starting torque produced in an induction motor.
7. Why the synchronous motor is not self starting type?
8. List out the different torques of a synchronous motor.
9. List out the applications of permanent magnet synchronous motor.
10. What are the types of single phase induction motor?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain the construction and operating principle of DC generator with neat sketch. (10)
- (ii) Derive the e.m.f. equation of DC generator. (6)

Or

(b) With neat sketch explain the electrical and mechanical characteristics of DC shunt motors. (16)

12. (a) (i) Explain in detail the working principle of a transformer. (8)

(ii) A 1ϕ transformer has 500 turns in the primary and 1200 turns in the secondary winding. The net cross-sectional area of the core is 80 cm^2 . If the primary winding is connected to a 50 Hz supply at 500 V . Calculate (i) peak-flux density in the core and (ii) voltage induced in the secondary winding. (8)

Or

(b) Draw and explain the working of a transformer on load with phasor diagram. How it affects the power factor of the loaded transformer. (16)

13. (a) Derive an expression for the torque equation of a 3-phase induction motor. (16)

Or

(b) (i) Draw the equivalent circuit of a 3 phase induction motor. (8)

(ii) Explain the starting of 3 phase induction motor using star-delta starter. (8)

14. (a) Explain the principle of operation of a synchronous motor. (16)

Or

(b) (i) Explain V- curves and inverted V- curves for synchronous motor. (8)

(ii) Explain the different torques associated with a synchronous motor. (8)

15. (a) (i) Discuss in detail working principle of Capacitor start- and- run motor. (8)

(ii) Explain in detail working principle of Repulsion type motor. (8)

Or

(b) (i) Discuss in detail the principle operation of Hysteresis motor. (8)

(ii) With neat diagram explain the construction and operation of reluctance motor (8)