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Question Paper Code: 34326

B.E. / B.Tech. DEGREE EXAMINATION, NOV 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. The armature of a DC machine is laminated. Why?
2. Write the emf equation for (i) DC motor (ii) DC generator.
3. What is meant by turns ratio of a transformer
4. Define all day efficiency of a transformer.
5. State the condition for maximum starting torque produced in an induction motor.
6. What is meant by slip of an induction motor?
7. What is hunting in synchronous machines and how it is suppressed?
8. List the starting methods 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) Explain the construction and operating principle of DC generator with neat sketch.

(16)

Or

- (b) With neat sketch explain the electrical and mechanical characteristics of DC shunt motors. (16)
12. (a) (i) Explain the construction, operating principle of transformer with neat sketch. (8)
(ii) Derive the e.m.f. equation of transformer. (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) (i) Derive an expression for the torque equation of a 3-phase induction motor. (8)
(ii) Explain the speed torque characteristic of a 3-phase induction motor, clearly indicating the starting torque, operating region and maximum torque. (8)
- 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) Draw the phasor diagram of a loaded alternator for the following conditions. (i) unity power factor (ii) power factor lag and (iii) power factor lead and then explain the diagram. (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) Explain the principle of operation of a capacitor start and run single phase induction motor and mention its advantages. (8)
(ii) Discuss the construction and principle of operation of a Hysteresis motor. What are the common applications of hysteresis 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)