Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50488

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Fifth Semester
Electrical and Electronics Engineering
EE 6504 – ELECTRICAL MACHINES – II
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What is the necessity of chording in the armature winding of a synchronous machine ?

2. Distinguish between transient and sub-transient reactances.

3. A 3-phase synchronous motor driving a constant load torque draws power from infinite bus at leading power factor. How power angle and power factor will change if the excitation is increased ?

4. What is the role of damper winding in synchronous motor ?

5. What measure can be taken for minimizing the effect of crawling in a 3-phase induction motor ?

6. Draw the torque-slip characteristic of double-cage induction motor.

7. Why is rotor rheostat starter unsuited for a squirrel cage motor ?

8. What are the conditions for regenerative braking of an induction motor to be possible ?

9. How is the direction of rotation of a single phase induction motor reversed ?

10. What is the principle of operation of a linear induction motor ?

PART – B (5×13=65 Marks)

11. a) i) Derive the EMF equation of a 3-phase synchronous machine. (6)

ii) Describe how the direct and quadrature-axis reactances of a salient-pole synchronous machine can be estimated by means of slip test. (7)

(OR)

b) i) What is meant by Synchronizing ? State the conditions for paralleling alternator with infinite busbars. (5)

ii) Explain the Ampere-Turn method of finding voltage regulation of an alternator. (8)

12. a) i) Describe the principle of operation of synchronous motor. (5)

ii) What are the methods of starting a synchronous motor ? Explain any one of them with a circuit diagram. (8)

(OR)

b) i) What are 'constant excitation circles and constant power circle' for a synchronous motor ? How are they derived ? (8)

ii) Explain briefly how a synchronous motor can be operated as a synchronous condenser. (5)

13. a) i) Describe the working principle of a 3-phase induction motor. (7)

ii) An induction motor has an efficiency of 0.9 when the shaft load is 45 kW. At this load, stator ohmic loss and rotor ohmic loss each is equal to the iron loss. The mechanical loss is one-third of the no-load losses. Neglect ohmic losses at no-load. Calculate the slip. (6)

(OR)

b) i) Derive the expression for torque under running condition of a 3-phase induction motor and obtain the condition for maximum torque. (8)

ii) Write short notes on 'Induction generators'. (5)

14. a) i) With a neat diagram, explain the working of a star-delta starter for a 3-phase induction motor. (8)

ii) Describe the method of speed control of a 3-phase squirrel cage induction motor by changing the number of stator poles and state the applications of this method. (5)

(OR)

b) i) Draw and explain the schematic diagram of a static Kramer variable-speed drive system for a slip ring induction motor. (7)

ii) Explain the dc dynamic braking of a 3-phase induction motor. (6)

15. a) i) Explain the two field revolving theory for single phase induction motors. (8)

ii) Describe the principle of operation of Hysteresis motor. (5)

(OR)

b) i) Explain the no-load and blocked rotor tests on a single phase induction motor. (7)

ii) Describe the working principle of any one type of stepper motor. (6)

PART – C (1×15=15 Marks)

16. a) Explain the V/F control technique in 3ϕ IM. (15)

(OR)

b) With neat diagram, explain the construction and operation of shaded pole induction motor. (15)

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