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

Question Paper Code : 62207

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Electrical and Electronics Engineering

080280039 — ELECTRICAL MACHINES — II

(Regulations 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the different types of rotors in alternator.

2. Write the conditions for parallel operation of alternators.

3. Does the speed of the synchronous motor change when loaded? Give reason.

4. What is meant by hunting in a synchronous motor?

5. Distinguish between Crawling and Cogging in Three Phase Induction Motor.

6. How can an Induction motor be operated as an Induction generator?

7. What is meant by plugging?

8. What happens if a stationary 3-phase induction motor is switched on with one phase disconnected?

9. Why single phase induction motors are not-self starting?

10. Mention the different applications of reluctance motor.

PART B — (5 × 16 = 80 marks)

11. (a) The stator of a 3-phase, 16-pole alternator has 144 slots and there are 4 conductors per slot connected in two layers and the conductors of each phase are connected in series. If the speed of the alternator is 375 rpm, calculate the e.m.f induced per phase. Resultant flux in the air-gap is 5×10^{-2} webers per pole with sinusoidal distribution. Assume the coil span as 150° electrical.

Or

(b) Explain about determination of voltage regulation of alternator experimentally by E.M.F method.

12. (a) (i) Describe the experimental procedure to obtain 'V' and inverted 'V' curves in synchronous motor. (10)

(ii) What is hunting and how hunting can be reduced? (6)

Or

(b) (i) Derive the power input and developed equations in three phase synchronous motor. (10)

(ii) Explain the starting methods of three phase synchronous motor. (6)

13. (a) Explain the torque-slip characteristics of 3-phase induction motor and also explain how the rotor resistance alters its shape. (16)

Or

(b) Explain the no-load and block rotor test and derive the expressions for finding the losses and efficiency of a 3-phase induction motor. (16)

14. (a) (i) Explain with neat diagrams the working auto transformer starter of a three phase induction motor. (8)

(ii) Determine a suitable auto transformation ratio for starting a three phase induction motor with line current not exceeding three times the full load current. The short circuit current is 5 times the full load current and full load slip is 5%. (8)

Or

(b) (i) Explain with neat diagrams the working star-delta starter of a three phase induction motor. (8)

(ii) Describe the variable frequency speed control of a three phase induction motor. (8)

15. (a) (i) Explain double revolving field theory of single phase motors.

(ii) The following data relates to tests as a 110 V, 150 W, 50 Hz, 6-pole single phase induction motor.

No-load test : 110 V, 63 W, 2.7 A

Blocked-rotor test : 55 V, 212 W, 5.8 A

The stator winding resistance is 2.5 Ω during the blocked rotor test, the starting winding is open. Determine the equivalent circuit parameter. Also find, the core, friction and windage losses.

Or

(b) (i) With the aid of neat diagrams explain the constructions, working principle and applications of a shaded pole motor.

(ii) A 200 W, 230 V, 50 Hz capacitor start motor has the following winding constants :

Main winding : $R = 4.5\ \Omega$; $X_L = 5.7\ \Omega$

Auxiliary winding : $R = 9.5\ \Omega$; $X_L = 3.5\ \Omega$

Find the value of starting capacitance that will result max. starting torque.
