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Question Paper Code : 80501

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fifth Semester

Electrical and Electronics Engineering

EE 2302/EE 52/EE 1301/10133 EE 505 – ELECTRICAL MACHINES – II

(Regulations 2008/2010)

(Common to PTEE2302 for B.E (Part-Time) Fourth semester- EEE-
Regulations- 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the causes of voltage drop in an alternator when loaded.
2. What is meant by armature reaction?
3. What is meant by hunting of a synchronous motor?
4. What are the uses of damper winding in synchronous motor?
5. What is meant by Slip in Induction motor?
6. What is the purpose of conducting blocked rotor test?
7. State an important distinguishing factor of induction generator and alternator.
8. Draw the torque speed characteristics of an induction motor whose rotor resistance is very large compared to rotor inductance.
9. Draw the torque slip characteristics of single phase induction motor.
10. What will be the direction of rotation of a shaded pole single phase induction motor?

PART B — (5 × 16 = 80 marks)

11. (a) (i) With neat sketch describe the construction and principle of operation of salient pole alternator. (6)
- (ii) Derive the EMF equation of an alternator. (6)
- (iii) A 4-pole alternator has an armature with 25 slots and 8 conductors per slot and rotates at 1500 rpm and the flux per pole is 0.05Wb, Calculate the e.m.f generated, If winding factor is 0.96 and all the conductors are in series (4)

Or

- (b) (i) Explain the EMF method of determining the regulation of an alternator (8)
- (ii) State and explain the conditions for parallel operation of alternators. (8)
12. (a) Illustrate through neat phasor diagram, the functioning of synchronous machine with varying excitation under constant real power load

Or

- (b) Illustrate the phenomenon of hunting and the use of damper winding with the help of dynamic equations.
13. (a) (i) Derive the torque-slip characteristics of 3 phase induction motor and explain. (8)
- (ii) The real power input to a 415 V, 50 Hz, 6 pole, 3-phase induction motor running at 970 rpm is 41 kW. The input power factor is 0.9. The stator losses amount to 1.1kW and the mechanical losses total 1.2 kW. Calculate the line current, slip, rotor copper loss, mechanical power output and efficiency. (8)

Or

- (b) (i) Show how a 3 phase induction motor can be represented by an approximate equivalent circuit. (8)
- (ii) Explain with necessary diagrams the principle of operation and characteristics of the double cage induction motor. (8)
14. (a) Discuss the following starters for three phase induction motor:
- (i) Autotransformer starter (8)
- (ii) Star-Delta starter (8)

Or

- (b) Explain in detail with a neat diagram, the slip power recovery scheme.

15. (a) Explain with suitable diagram the working principle of split-phase and capacitor start induction motor. (8+8)

Or

- (b) Discuss briefly the operation and characteristics of
- (i) Repulsion motor (8)
 - (ii) AC series motor. (8)
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