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Question Paper Code : 41006

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Fifth Semester

Electrical and Electronics Engineering

EE6504 – ELECTRICAL MACHINES – II

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. Two reaction theory is applied only to salient pole machines. State the reason.

2. What are the advantages of salient pole type construction used for Synchronous machines ?

3. How the synchronous motor can be used as synchronous condenser ?

4. How does a change of excitation affect its power factor ?

5. Why an induction motor will never run at its synchronous speed ?

6. Explain why an induction motor, at no-load, operates at very low power factor.

7. What is the need of starter for induction motor ?

8. What are the advantages of slip power scheme ?

9. What are the various methods available for making a single-phase motor self-starting ?

10. What is the principle of reluctance motor ?

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PART – B   (5×13=65 Marks)

11. a) Explain the procedure for POTIER method to calculate voltage regulation of alternator.   (13)

(OR)

   b) Describe the principle and construction of slow speed operation generator with neat diagram.   (13)

12. a) A 5 kW, three-phase Y-connected 50 Hz, 440 V, cylindrical rotor synchronous motor operates at rated condition with 0.8 pf leading . The motor efficiency excluding field and stator losses is 95% and $X_s = 2.5\ \Omega$. Calculate :

   i) Mechanical power developed

   ii) Armature current

   iii) Back emf

   iv) Power angle

   v) Maximum or pull out torque of the motor.   (13)

(OR)

   b) Explain the working of synchronous motor with different excitations.   (13)

13. a) Explain the construction and working of three phase induction motor.   (13)

(OR)

   b) Develop an equivalent circuit for three phase induction motor. State the difference between exact and approximate equivalent circuit.   (13)

14. a) Explain with neat diagram, the working of any two types of starters used for squirrel cage type three phase induction motor.   (13)

(OR)

   b) Explain briefly the various speed control schemes of induction motor.   (13)

15. a) Give the classification of single phase motors. Explain any two types of single phase induction motor.   (13)

(OR)

   b) What is the principle and working of hysteresis motor and AC series motor ? Explain briefly.   (13)

PART – C   (1×15=15 Marks)

16. a) A 415 V, 11kW, 50 Hz, delta connected, three-phase energy efficient induction motor gave the following test results :

No load test : 415 V; 5.8 A; 488 W

Blocked rotor test : 40 V; 18.4 A; 510 W

Stator resistance per phase = 0.7 Ω.

For full-load condition, find
   i) line current
   ii) power factor
   iii) input power
   iv) slip and
   v) efficiency.

(OR)

b) A 1.1 MVA, 2.2 kV, 3-phase, star -connected alternator gave the following test result during OC and SC tests :

Field current (A)	:	10	20	30	40	50
Open circuit voltage(kV)	:	0.88	1.65	2.20	2.585	2.86
Short circuit current (A)	:	200	400	–	–	–

The effective resistance of the 3-phase winding is 0.22 Ω/ph. Estimate the full-load voltage regulation at 0.8 p.f. lagging
   i) By synchronous impedance method and
   ii) Ampere-turn method.

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