

G 1095

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL MACHINES—III (E)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Describe the principle operation of a 3-phase induction motor.
2. Explain the differences between the characteristics of slip ring and squirrel cage induction motor.
3. What are the different types of starting arrangements for cage induction motor ?
4. Explain the starting of slip-ring induction motor.
5. What is an induction generator ?
6. Explain the working principle of single-phase induction motor.
7. Write short notes on universal motor.
8. Distinguish between Reluctance motor and Hysteresis motor.
9. Explain the principle of operation of commutator motors.
10. Write short note on frequency converters.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each full question carries 12 marks.

11. A 3-phase, star connected, 400 volts, 50 Hz, 4-pole induction motor has the following per phase constants in ohms referred to stator :

$$r_1 = 0.15, x_1 = 0.45, r_2 = 0.12, x_2 = 0.45, X_m = 28.5, \text{ Fixed losses} = 400 \text{ watts.}$$

Compute the stator current, rotor speed, output torque and efficiency when the motor is operated at rated voltage and frequency at a slip of 4 %.

Or

Turn over

12. Develop the equivalent circuit of an induction motor and explain the simulation between the transformer and induction motor equivalent circuits.
13. Explain the method of speed control in a three-phase induction motor by changing the no. of poles.

Or

14. A 3.7 kW, 3 ϕ induction motor has a blocked rotor current of 5 times the full load current and the full load slip is 5 %. Find the starting torque as a percentage of full-load torque if the motor is started by :
 - (a) Autotransformer starter.
 - (b) Star Delta Starter.
 - (c) Stator resistance starter.

15. Explain the operation of separately excited induction generator. Also mention the advantages and disadvantages.

Or

16. Write short note on split phase capacitor start, capacitor run and shaded pole motors.
17. Describe the theory of operation of a single-phase series motor. Obtain the circle diagram and predict the performance.

Or

18. Distinguish between Repulsion start and Repulsion run induction motor.
19. Write short note on Scharage motor, polyphase commutator motors.

Or

20. Explain the operation of linear induction motors also write the application of linear inductance motors.

(5 × 12 = 60 marks)