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Question Paper Code: 44302

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Electrical and Electronics Engineering

14UEE402 - AC MACHINES

(Regulation 2014)

Duration: Three hours　　　　　　　　　　　　　　　　Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The slip speed of an induction motor depends upon

    (a) Armature current　　　　　　　　　　(b) Supply voltage
    (c) Mechanical load　　　　　　　　　　　(d) Eddy currents

2. The starting torque of a simple squirrel-cage motor is

    (a) Low　　　　　　　　　　　　　　　　(b) Increases as rotor current rises
    (c) Decreases as rotor current rises　　　　(d) High

3. When rotor is at standstill

    (a) Slip is zero　　　　　　　　　　　　　(b) Slip is one
    (c) Any slip　　　　　　　　　　　　　　(d) Slip is infinity

4. A 3-phase, 4-pole, $50Hz$ induction motor runs at a speed of 1440 *rpm*. The rotating field produced by the rotor rotates at a speed of

    (a) 1500　　　　　　(b) 1440　　　　　　(c) 60　　　　　　(d) 0

5. A 10 pole AC generator rotates at 1200 *rpm*. The frequency of AC voltage in cycles per second will be

    (a) 120　　　　　　(b) 110　　　　　　(c) 100　　　　　　(d) 50

6. In a synchronous generator, delivering lagging power factor load
    (a) The excitation emf leads terminal voltage by the power angle
    (b) The excitation emf lags terminal voltage by the power angle
    (c) The excitation emf leads terminal voltage by the power factor angle
    (d) None of these

7. Synchronous motor can operate at

    (a) Lagging power factor only
    (b) Leading power factor only
    (c) Unity power factor only
    (d) Lagging, leading and unity power factor only

8. The maximum power developed in the synchronous motor will depend on

    (a) rotor excitation only
    (b) maximum value of coupling angle
    (c) supply voltage only
    (d) rotor excitation supply voltage and maximum value of coupling angle

9. A capacitor start single phase induction motor will usually have a power factor of

    (a) unity   (b) 0.8 leading
    (c) 0.6 leading   (d) 0.6 lagging

10. The torque developed by a split phase motor is proportional to

    (a) Sine of angle between I_m and I_s
    (b) Cosine of angle between I_m and I_s
    (c) Main winding current, I_m
    (d) Auxiliary winding current, I_s

PART - B (5 x 2 = 10 Marks)

11. Why are the rotor slots of a 3 phase Induction motor skewed?

12. Why are most of the 3-phase induction motors constructed with delta connected stator winding?

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

14. What is meant by hunting?

15. What are the starting methods of single phase induction motor?

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PART - C (5 x 16 = 80 Marks)

16. (a) Write the step by step procedure for determination of equivalent circuit of three phase induction motor. (16)

Or

(b) How the losses and efficiency of three phase induction motor can be calculated. Illustrate with necessary diagram and equations. (16)

17. (a) Explain the starting of induction motors using star- delta starter with necessary diagram and also mention the precaution with star- delta starter. (16)

Or

(b) Explain the main methods of electrical braking of induction motors. (16)

18. (a) Derive the emf equation of Synchronous Generator. (16)

Or

(b) Explain the determination of direct and quadrature axis synchronous reactance using slip test. (16)

19. (a) Derive the torque equation of synchronous motor. (16)

Or

(b) Write short notes on:

(i) V–curves of synchronous motor. (8)

(ii) Synchronous condenser. (8)

20. (a) Explain double field revolving theory and cross field theory. (16)

Or

(b) With neat diagram explain the working of any four types of single phase induction motor. (16)

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