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PSG POLYTECHNIC COLLEGE, COIMBATORE - 641 004

DIPLOMA EVEN SEMESTER EXAMINATIONS APRIL 2014

E12402 AC MACHINES

MODEL QUESTION PAPER

Time : 3 Hours **Max.Marks: 100**

Instructions:

1. **Group A** and **Group B** questions should be answered in the Main Answer book.
2. Answer any **TEN** questions in **Group A**. Each question carries two marks.
3. Answer **ALL** questions either **(a)** subdivision or **(b)** subdivision in **Group B**. Each question carries 14 marks.

Group – A **Marks: 10 x 3 = 30**

1. Why is the stator core of an alternator laminated?
2. Write down the equation for frequency of generated emf for an alternator.
3. What are the conditions of parallel operation?
4. Draw the V-curve and inverted V- curve.
5. What are the applications of a synchronous motor?
6. Draw the mechanical characteristics of synchronous motor.
7. What are the advantages of the three phase induction motor?
8. Why are the slots of induction motor slightly skewed?
9. List the different methods of speed control for a three phase induction motor.
10. List out different types of single phase induction motor.
11. Write the function of a centrifugal switch.
12. Define % slip.
13. What you understand by an induction generator?
14. What is the need for the servo motor?
15. What are the applications of AC stepper motor?

Group– B **Marks: 5 x 14 = 70**

16. a) i)Derive an expression for the generated emf of an alternator. (5)
ii) Explain the parallel operation of an alternator using dark lamp method. (9)

(OR)

b) i) What are the advantages of parallel operation? (5)
ii) A 1000KVA, 3300V, 3-phase star connected alternator has an armature resistance of 0.2Ω per phase and a synchronous reactance of 3Ω per phase. Determine the voltage regulation at full load at 0.8pf lagging. (9)

17.a) i) With a neat sketch, explain the starting method of a synchronous motor using an induction motor. (5)
ii) Explain any one cooling method for a synchronous machine. (9)

(OR)

b) i) What are the applications of a synchronous motor? Describe in brief. (5)
ii) The total factory load on 3-∅, 3300V supply is 1500KW at a pf of 0.6 lag. Find the rating of a synchronous condenser to improve the pf to unity. There is no mechanical load on synchronous motor. (9)

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18. a) i) Calculate the percentage slip of an induction motor having 6- poles fed with 50Hz supply rotating with an actual speed of 960rpm. (5)
ii) Compare squirrel cage induction motor and slip-ring induction motor. (9)

(OR)

b) i) Define: the synchronous speed and % slip. (5)
ii) Briefly explain the principle of operation of a three phase induction motor. (9)

19. a) i) Explain the operation of a single phase split phase type induction motor. (5)
ii) A 6 pole single phase induction motor supply is taken from a 8 pole, 3 phase, 750 rpm alternation. If the slip of the induction motor is 4%, calculate the full load speed of the induction motor. (9)

(OR)

b) i) List out different types of 1-∅ induction motor and their applications. (5)
ii) Explain the operation of a shaded pole motor. (9)

20. a) i) Briefly explain the operation of an AC servo motor. (5)
ii) Write short notes on linear induction motor. (9)

(OR)

b) i) What are the applications of on AC stepper motor? (5)
ii) Briefly explain the operation of an AC stepper motor. (9)