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Question Paper Code : 23421

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Third Semester

Electronics and Communication Engineering

EE 1211/EE 1261 — ELECTRICAL MACHINES

(Common to Instrumentation and Control Engineering and Electronics and Instrumentation Engineering)

(Regulation 2004/2007)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the effects of armature reaction?
2. Draw the Speed -torque characteristics of a DC shunt motor.
3. Under what value of power factor dose the transformer gives a zero voltage regulation.
4. At what frequency the core loss and iron loss of a transformer is equal?
5. How will you change the direction of the rotation of a three phase induction motor?
6. What is the function of the capacitor in the single phase induction motor?
7. Write down the conditions to be satisfied for the synchronization of alternators.
8. List the applications of the stepper motors.
9. What is smart grid? State its significances.
10. Mention the different types of cables.

PART B — (5 × 16 = 80 marks)

11. (a) (i) With neat diagram explain the Swinburne's test procedure, also list its Merits. (8)
- (ii) Explain the different speed control schemes of a DC shunt motors. (8)

Or

- (b) (i) A four pole, wave connected DC machine has 460 armature conductors. If the flux per pole is 0.03 Wb and runs at 1500 rpm. determine the EMF generated and load current. If the machine is driven as a shunt generator with the same field flux and speed, calculate the terminal voltage when it supplies a load resistance of 40 ohm. The armature and field resistance are 2 ohms and 450 ohms respectively. (10)
- (ii) Draw and explain the performance characteristics of DC series and compound generators. (6)
12. (a) (i) Draw and discuss the equivalent circuit diagram of a transformer with referred to its primary side. (8)
- (ii) Obtain the EMF equation of a transformer. (8)

Or

- (b) A 100 KVA 6.6 KV/330 V, 50 Hz single phase transformer takes 10A and 436 Watts at 100 V in a short circuit test on the HV side. Calculate the voltage to be applied to the HV side on full load at power factor 0.8 lagging, when the secondary terminal voltage is 330V.
13. (a) Name the different types of three phase induction motor and briefly explain the construction details and working principles of each type with suitable diagrams.

Or

- (b) (i) Explain the starting mechanism of a single phase induction motor using the double revolving field theory. (8)
- (ii) A three phase, four pole, 50 Hz induction motor runs at 1440 rpm, determine its slip speed and speed. (8)
14. (a) What are the different types of reluctance motors? Describe the principles and construction of Switched reluctance motor with neat diagram.

Or

- (b) (i) Define the term synchronous reactance and voltage regulation of an alternator. (4)
- (ii) Explain the different methods of determining the regulation of the alternator. (12)

15. (a) Draw the structure of the electrical power systems and also explain in detail the different components of power systems and their role, significances in ensuring reliable electric power to the different consumers.

Or

- (b) (i) Compare between EHVAC and EHVDC transmission systems. (8)
(ii) Describe the functioning of electric substation with its layout. (8)
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