SHRI ANGALAMMAN COLLEGE OF
ENGINEERING AND TECHNOLOGY
(An ISO 9001:2008 Certified Institution)
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK

UNIT – I D.C. MACHINES

PART – A (2 MARKS)

1. What is the significance of back emf?
2. What is meant by armature reaction?
3. What is meant by excitation of a dc machine?
4. What are the methods of excitation?
5. Give the expression for speed of a dc motors.
6. Why a dc series motor cannot be started on no load.
7. List the different methods of speed control of dc shunt motors.
8. Why a dc series motor cannot be started on no load?
9. What are the various types of dc motors?
10. What is the necessity of a starter for a dc motor?
11. What is torque?
12. What is speed regulation?
13. What is called armature torque?
14. What is called shaft torque?
15. Draw the characteristics curve of a dc shunt motor?
16. What is the difference between three point and four point starters?
17. What is the method available for testing dc series motor?
18. Name the protective devices used in a 3point starter?

19. Mention the methods of speed control for a dc motor?
20. What are the losses that occur in a dc motor?
21. What are the various types of dc generators?
22. Draw the internal and external characteristic curves of dc shunt generator?
23. Draw the internal and external characteristic curves of dc series generator?
24. Draw the characteristics curves of dc compound generator?
25. DC series generators are suitable for _____
26. What is the function of commutator in DC generator?
27. What is the function of carbon brushes in DC generator?
28. What is called voltage regulation?
29. Write short notes on efficiency of a DC motor?
30. How the voltage builds up in Dc generator?
31. Why the armature core is made by laminated sheets?

PART – B (16 MARKS)

1. Explain the construction and working principle of D.C. generator with neat diagram.
2. Explain the different types of D.C. generators.
3. Draw and explain the characteristics of different types of d.c.generators.
4. a). Derive the emf equation of D.C. Generator.
   b). What is armature reaction?
5. Sketch and explain the speed-current, speed-torque and torque-current characteristics of a shunt motor, series motor and compound motor.
6. Why is a starter necessary for a motor? Give the diagram and explain the working of a three-point starter for a shunt motor?

7. Draw the characteristic curves of D.C. shunt, series and compound motors. Use these curves to explain the applications for which these motors are used.
8. a). What is the difference between 3-point and 4-point starters? What are the additional features incorporated in a 4-point starter.
   b). Explain in detail the methods of speed control of a D.C. Motor.
9. a).Draw and explain the Ward Leonard speed control scheme.
   b).Explain Swinburne's test for finding the efficiency of a D.C. machine. Can this method is applicable to D.C. Series motor?
10. a) Derive the expression for the electromagnetic torque developed in a D.C. motor.
    b) List all the important parts of a D.C. Motor and explain the importance of each.

UNIT – II

TRANSFORMERS

PART – A (2 MARKS)

1. Define a transformer.
2. What are turns ratio and transformation ratio of transformer?
3. What determines the thickness of the lamination or stamping?
4. Classify the different types of transformer.
5. What are the two components in transformers no load current?
6. Why is the core of transformer laminated?
7. Draw the exact equivalent circuit of a transformer.
8. Why transformer rating is expressed interms of kVA?
9. What are the properties of an ideal transformer?
10. What are the applications of transformer?
11. Draw the no load vector diagram of a transformer.

12. Define regulation up and regulation down for a transformer.
13. What is an ideal transformer?
14. Draw the typical equivalent circuit of a single phase transformer.
15. State the condition for maximum efficiency of a transformer. Then what is the corresponding output current?
16. Define “all day efficiency” of a transformer.
17. Define regulation and efficiency of a transformer.
18. Name the factors on which hysteresis loss depends.
19. Why the open circuit test on a transformer is conducted at rated voltage?
20. What are the necessary tests to determine the equivalent circuit of a transformer?
21. Why is the range of efficiency in transformer higher than those of other electrical machines?
22. Mention the two different components of core loss in a transformer?
23. What are the different types of testing of transformer?
24. What is the use of open circuit and short circuit test in a transformer?
25. How can the iron loss be minimized in a transformer?
26. What are the different losses occurring in a transformer?
27. Draw the phasor diagram for a transformer with inductive load.
28. What is a step up transformer?
29. Draw the no load phasor diagram of single phase transformer.
30. Why the transformer is called the constant flux apparatus?
31. What are the types of three phase transformer connection?

PART – B (16 MARKS)

1. Discuss in detail with neat diagram constructional features of a transformer.
2. Discuss about the working principle of operation of a transformer.
3. Draw the phasor diagram and explain the operation of practical transformer under no load and load.
4. Draw the phasor diagram and explain the operation of ideal transformer.
5. Explain in detail about types of three phase transformer connections.
6. Draw and explain the equivalent circuit of the transformer from transformer test.
7. Determine the regulation of the transformer for resistive, inductive and and short circuit tests.
8. Derive the equivalent circuit of a transformer.
9. Derive the emf equation of a transformer.
10. Draw the vector diagram for an ideal transformer on resistive, inductive and capacitive loads.
11. Explain with neat diagram the operation of sumpners test.
12. Define voltage regulation. Draw the phasor diagram for lagging power factor and determine voltage regulation.
13. What is the condition for maximum efficiency in transformer and what are the losses in transformer how to minimize it.
14. Explain the load tests on transformer. Develop the equivalent circuit from this test.
15. Derive the equivalent circuit of a single phase two winding.

UNIT – III INDUCTION MACHINES

PART – A (2 MARKS)

1. What are the advantages and disadvantages of three phase induction motor?
2. What are the main parts of an induction motor?
3. What are the two types of rotors of an induction motor?
4. What is an end ring?
5. The squirrel cage rotor is also known as short circuited rotor. Why?
6. Compare squirrel cage rotor and slip ring rotor.
7. Define slip speed in an induction motor.
8. Define slip of an induction motor.
9. What are the rotor quantities affected by slip?
10. What is the frequency of rotor emf?
11. What is the speed of rotor field in space?
12. What is the condition for maximum starting torque?
13. Give the equation for maximum starting torque.
14. How do you reverse the direction of rotation of a three phase induction motor?
15. What are the different types of induction motor starters?
16. What are the advantages and disadvantages of slip ring induction motor and squirrel cage motor?
17. State the two types of three phase induction motors.
18. Define synchronous speed in a three phase induction motor.
19. In which type of motor can resistance be introduced in the rotor circuit? What is the effect of it?
20. Draw the power flow diagram of a three phase induction motor.

21. Draw the equivalent circuit of an induction motor.
22. What is the necessity of starter in three phase induction motor?
23. List the various methods of speed control of three phase induction motor.
24. What is meant by stator voltage control?
25. What are the different methods of stator voltage control?
26. What are the applications of squirrel cage induction motor?
27. What are the applications of wound rotor induction motor?
28. Why the slots on the induction motor are usually skewed?
29. Name the types of polyphase induction motors.
30. How are frequencies of rotor induced emf and supply frequency related in a poly phase induction motor?
31. Give the applications of the squirrel cage & slip ring induction motors?
32. Name the two starters used in cage motors?
33. Name the starters, which is suitable for slip ring induction motors.
34. Mention the few methods of starting of an induction motor?
35. Discuss any one method of controlling the speed of an induction motor?
36. What are the applications of slip rings?
37. What is rotating magnetic field?
38. What are the various methods of speed control of three phase induction motor from stator side?
39. What are the various methods of speed control of three phase induction motor from rotor side?
40. What is called synchronous speed?
41. What are the applications of capacitor start motor?
42. What are the main advantages of capacitor run motor and capacitor start capacitor run motor?

43. What are the applications and characteristics of capacitor run motor and capacitor start capacitor run motor?
44. What are the different types of single phase motor?
45. What are the different types of single phase induction motor?
46. What are the applications, characteristics of split phase motors?
47. Name any two applications of shaded pole induction motors.
48. What are the drawbacks of the presence of the backward rotating field in a single phase induction motor?
49. Is single phase induction motor self-starting? Why?
50. What are the classifications of single phase induction motor based on the method of starting?
51. Which type of single phase induction motor is to be selected for driving fans and blowers and why?

PART – B (16 MARKS)

1. Compare between squirrel cage and slip ring induction motor.
2. Discuss in detail about the principle of three phase induction motor? Explain any one of it in detail.
3. Explain the emf injection method of speed control with a neat diagram.
4. What are the types of starters in three phase induction motor? Explain any one of it in detail.
5. Explain the principle of operation and construction of three phase induction motor.
6. Explain any one method of speed control technique adopted for speed control of a three phase induction motor.
7. Explain the principle of operation of three phase induction motor.
8. What are the torque speed characteristics?

9. Discuss the stator side speed control schemes of three phase induction motor.
10. Discuss the rotor side speed control schemes of three phase induction motor.
11. What are the methods of starting single phase induction motor? Discuss briefly the two main types of those machines.
12. Explain the various schemes adopted in starting of three phase induction motors.
13. Draw the power flow diagram of a three phase induction motor and derive the torque developed in this machine.
14. Write notes on (i) speed control of three phase induction motor (ii) equivalent circuit of three phase induction motor.
15. Explain the double field revolving theory for operation of single phase induction motor.
16. What are the types of single phase induction motor? Explain any two in detail.
17. Write short notes on (i) shaded pole motor (ii) capacitor start capacitor run motor.
18. Explain the working principle of capacitor start capacitor run motor.
19. Explain in detail about shaded pole motor and split phase induction motor.
20. Explain in detail about capacitor start capacitor run motor.

UNIT – IV SYNCHRONOUS AND SPECIAL MACHINES

PART – A (2 MARKS)

1. Compare Salient pole and Non-salient pole synchronous machines.
2. Discuss the advantages of rotating field type alternator?
3. What is synchronous speed of an alternator?
4. A 2pole synchronous machine is driven at 3600rpm. What will be the frequency of generated emf?
5. Define pitch factor & form factor
6. Derive the emf equation of a 3φ alternator?
7. What are the types of stepper motor?
8. What is voltage regulation of an alternator?
9. Name the applications of synchronous motors?
10. What are the various types of alternators?
11. What is meant by synchronous impedance in alternators?
12. State the principle of operation of reluctance motor.
13. Why synchronous motor is not self-starting?
14. Which methods are used to make Synchronous motor self starting?
15. Name the applications of synchronous motors?
16. State the characteristics of synchronous motors?
17. State the principle of operation of stepper motor.

PART – B(16 MARKS)

1. i. Describe with sketches the various parts of an alternator, stating the function of each part.

   ii. State the emf equation of an alternator.

2. Write a short note on constructional details, principle of operation and application of the following special machines.
    i. Reluctance motor.
    ii. Hysteresis motor.
3. i. Explain the construction and working principle of a variable reluctance stepper motor.

   ii. Give the expression to find the step angle and resolution of a stepper motor.
4. Explain the construction and working of synchronous generator.
5. Explain the construction and working principle of a permanent magnet reluctance stepper motor and hybrid stepper motor.
6. Describe the method of determining the regulation of an alternator by synchronous impedance method.
7. Describe the method of determining the regulation of an alternator by using optimistic and pessimistic method.
8. Write a short note on constructional details, principle of operation and application of the following special machines.
    i. Brushless alternators.
    ii. Synchronous motor.
9. Explain the construction and working principle of different types of synchronous machines.
10. a) Compare salient and non-salient pole synchronous machines.

    b) State the emf equation of an alternator.

    c) Define pitch factor.

    d) What are the advantages of rotating field structure over rotating armature in an alternator?

UNIT – V TRANSMISSION AND DISTRIBUTION

PART – A (2 MARKS)

1. Name the different types of generating systems.
2. State the advantages of AC transmission.
3. What are the different electric power systems?
4. Write a note on typical transmission and distribution scheme?
5. Draw a single line diagram of a typical transmission and distribution scheme?
6. What is primary transmission?
7. What is secondary transmission?
8. What is primary distribution?
9. What is secondary distribution?
10. Explain substation in power system?
11. Explain the following.

    (a) Feeder (b) Distribution.
12. Explain the following.

    (a) Distribution substation (b) Service main.
13. State the advantages and disadvantages of A.C. systems.
14. State the advantages and disadvantages of D.C. Systems.
15. Compare A.C and D.C. Systems.
16. Explain Kelvin's law.
17. State the necessity for E.H.V. transmission.
18. State the standard rated voltage of EHVAC lines.
19. Explain the basic principle of EHVDC transmission.
20. List down the necessary requirements of a good distribution system.

21. List down the various types of insulators used for transmission and distribution system.
22. What is called ring distribution system?
23. What is called radial distribution system?
24. List down the various types of cables used for UG system.
25. List down the various insulating materials for cables.
26. Mention the methods of testing of cables.
27. List down the various tests conducted over an insulator?
28. Compare UG cable with OH system.

PART – B (16 MARKS)

1. (i)Explain the structure of electric power system with a neat sketch.
(ii) Write short notes on cables.

2. Explain the following components of distribution
a)Substation b)Distribution Substation c)Feeder d)Distributor e)Service mains

3.With the neat diagrams ,describe various d.c systems used in transmission and distribution.

4.With the neat diagrams ,describe various a.c systems used in transmission and distribution.

5.a)Compare overhead and underground system of transmission.
b)Explain the basic principle of EHVDC transmission.
c)State the necessity for EHV transmission.

6.State the effect of high voltage used in transmission.

7.a)Compare the advantages and disadvantages of EHVAC and EHVDC system.
b)Explain the various types of underground cables.

8.a)Which are the important insulating materials used for the cables?

b)State the properties of good insulating materials used for the cables.

c)Write a note on testing of the cables.

9. With neat diagram explain in detail about different types of insulators.

10.a)Draw and explain the general construction of an UG cables.

b)Which are the two types of suspension insulators ? Which is more commonly used and why?

11.a)Explain the general d.c distribution system.

b)State the standard rated voltages of EHVAC lines.

c)List down the necessary requirements of a good distribution system.

d)State the advantages and disadvantages of d.c systems.

12.a)Explain the basic principle of EHVDC transmission.

b)State the necessity for EHV transmission.