CHAPTER 1
SAFETY AND PREVENTION OF ACCIDENTS

1. Define the following terms in connection with safety:
a. Safety
b. Hazard
c. Accident
d. Major accident hazard
e. Responsibility
f. Authority
g. Accountability
h. Monitoring
2. Which are the primary instructions to be followed to provide safe working conditions by all persons and at all times?
3. When working on live conductors, what personal apparel should be kept in mind?
4. State as per IS, what Do's and Don'ts be observed for sub-station operations?
5. What do you mean by electrical accident? What are different causes of electrical accident?
6. State procedure to be followed for shut down of sub-station and power lines.
7. Explain in brief the procedure for rescuing the person who has received an electric shock.
8. Explain in brief any one method of providing artificial respiration.
9. What are causes of fire due to electrical reasons?
10. What are different types of fire extinguishers used to extinguish fire due to electrical reasons? Explain their mode of operation in brief.
11. State different factors on which severity of electric shock depends.
12. What precautions you will take to avoid fire due to electrical reasons?
13. What steps are to be taken if you come across electric shock victim.
14. What are the types of fire extinguishers? State their applications.
15. When and how long the artificial respiration is given?
16. Describe the procedure of charging the transmission line after maintenance is completed.
17. State the procedure in substation to take shut down.
18. Give reason : Body of electrical machine gives shock.
19. What are the precautions will you take if the person gets an electrical shock?
20. Explain Silvester's method of providing artificial respiration?
21. What are the causes of electrical accidents?

CHAPTER 3
TESTING & MAINTENANCE OF ROTATING MACHINES

1. What are the objectives of testing?
2. What is significance of ISS?
3. Explain the concept of Tolerance?
4. What are the different types of testing?
5. What do you mean by direct and indirect testing?
6. What is the preliminary test which are to be done before commissioning equipment?
7. Explain merits and demerits of direct, indirect and regenerative method of testing?
8. Enlist the routine test and explain any one in detail.
9. Enlist the type test and explain any one in detail.
10. Enlist the special test and explain any one in detail.
11. Explain how will you find the efficiency of motor generator set when one machine is calibrated?
12. Explain the Swinburn test on D.C machine with its limitation.
13. What is failure of electrical machine? What are the probable reasons causing the failure of electrical machine?
14. Why maintenance of electrical machine is necessary? Explain its categories.
15. What do you mean by preventive maintenance? State advantage of it.
16. Explain the procedure for developing preventive maintenance schedule.
17. What is the frequency of inspection? Explain it in detail.
18. What do you mean by breakdown maintenance? State the steps for this type of maintenance and checks to be carried out.
19. Explain in brief “Total Productive Maintenance”
20. Distinguish between routine and breakdown maintenance of electrical equipment.
21. Distinguish between routine and type test.
22. State objective of testing of machine? Explain the brief Routine test, Type test and Supplementary test.
23. Explain High voltage test, commutation test for d.c machine.
24. Classify the test to be conducted on 3 ph I.M as per ISS.
25. What is the purpose of conducting reduced voltage running up test? Explain how it is carried out?
26. Explain no load test on 3 ph I.M and plot its characteristics.
27. Explain voltage ratio test on 3 ph slip ring I.M with circuit diagram.
28. What are the permissible limits for safe working of electrical machine?
29. Explain the necessity of conducting temp rise test and give limits of temp rise for different parts of 3 ph I.M. as per ISS.
30. What do you mean by normal working of electrical machine?
31. Plan the preventive maintenance schedule for storage batteries used in the relay room of the receiving station.
32. How will you carry out maintenance of silica gel breather?
33. State and explain the conditions to be needed before connecting the alternators in parallel.
34. What are the synchronizing methods of alternators ?Explain them in detail.
35. What is the need of connecting the alternators in parallel.
36. Describe the routine test and type test on 1 ph as well as on 3ph I.M
37. Describe the points to be considered for annual maintenance of 3ph I.M
38. What are the special tests on 1 ph as well as on 3ph I.M
39. Explain brake test on d.c series series motor.

CHAPTER 4
TESTING & MAINTENANCE OF TRANSFORMERS

1. State the importance of planning of preventive maintenance schedule for transformers.
2. State conditions for parallel operations of transformers.
3. Distinguish between routine and break-down maintenance of electrical equipment.
4. Give maintenance schedule for distribution transformers as per ISS 1886-1967.
5. Explain open delta method of testing of transformers.
6. Explain back-to-back test for efficiency of transformer.
7. State the factors affecting preventive maintenance schedule along with its advantages.
8. Draw a neat diagram of Sumpner's test and explain how this can be used for finding the efficiency of transformers under test?
9. What is the purpose of carrying out impulse test on transformers?
10. What are type tests of 3ph transformers as per ISS? Explain any one in detail.
11. Classify the different test carried out on transformers as routine, type and special test.
12. Explain the procedure for conducting HV test on transformers?
13. Draw the equivalent circuit of two transformers connected in parallel along with mathematical expressions.

CHAPTER 5
TESTING & MAINTENANCE OF INSULATION

1. State factors on which life of insulation depends.
2. List the properties of transformer oil.
3. Explain in brief, how the cleaning of insulation covered with loose dry dust sticky dirt, oily viscous film is carried out.
4. State the properties of transformer oil. List out the various tests to be performed on transformer oil.
5. State the various methods of revarnishing. Explain the neat sketch vaccum impregnation method of varnishing.
6. How will you interpret about the condition of insulation?
7. Classify insulating materials as per IS.
8. What is insulation resistance? How it is measured?
9. What is the necessity of revarnishing?
10. Give the applications of insulating material.
11. Describe with neat sketch
    a. Acidity Test
    b. Sludge Test
    c. Crackle Test
    d. Flash point
    e. Flash point Test
12. Why there is the necessity of filtration of transformer oil? How it is carried out?
13. What care should be taken to protect electrical equipment during the period of inactivity?
14. How insulating oil is contaminated? Explain about their action.
15. What is the necessity to dry out the insulation? Describe the methods.
16. Differentiate between internal heating and external heating applied to electrical machines.

CHAPTER 6
Electrical Installation

1. State the permissible limits of variation of
   a. Voltage
   b. Speed
   c. Current
   d. Frequency
2. Explain the significance of trouble shooting of various electrical machines.
3. Write trouble shooting chart of 3 ph I.M
4. State maintenance schedule of storage batteries.
5. State the external causes of failure of electrical equipment.
6. Enlist the common troubles in electrical installation and cables.
7. Explain the use of:
   a. Growler
   b. Filler gauges
   c. Dial Indicator
   d. Earth tester
   e. Megger
8. Prepare trouble shooting chart for DC Generator and DC Motor
9. Prepare trouble shooting chart for transformer.
10. Prepare trouble shooting chart for single phase induction motor.
11. What is single phasing? How it will affect on the performance of 3 ph IM.
12. Give trouble shooting chart for lead acid battery.
13. Explain Murray loop test and fault distance in case of underground cable.
14. State the probable faults in switchgears.
15. Write maintenance schedule for overhead lines, relays and C.B
16. What is MCCB? How it operates?
17. Compare MCB with fuse.
18. What is ELCB? How it operates? State its application.
19. Give constructional details of Megger along its working.
20. What are the protections provided by RCCB?
21. State and explain working of RCCB.
22. Enlist the different tools used in inspection, checking, maintenance and repair works in electrical field.
23. State the uses of sprit level.
24. What are the effects of mis-alignment?
25. List the common trouble in electrical installation.
26. Explain the factors involved in designing the machine foundation.
27. What are the requirements of foundations for installing rotating electrical machines as per IS 900-1992?
28. Explain the procedure to be followed is aligned two shafts to be
    a. Directly coupled
    b. In directly coupled.
29. Enlist various devices and tools in loading and unloading of heavy electrical equipment.
30. What are the factors involved in designing the machine foundation?
31. Explain the procedure for leveling and alignment of electrical machines.
32. What are the factors which are to be considered while designing the foundation for static and rotating machines?
33. What are the requirements of installing rotating electrical machines?

CHAPTER 2
Electrical Estimation and Design
CHAPTER 6
Electrical Installation

1. The main circuit wire in a house is required to carry a current of 45 amperes when connected to single phase a.c. supply. Determine the size of the wire if the length of the circuit is 40 metres.
2. A 33 KV substation is to be Connected to a 11 KV stepdown substation which is at a distance of 1.5 km by a underground cable. If the size of the transformer in the stepdown substation is 500 KVA, determine the size of the cable.
3. An underground cable is to be connected to a multi-storey building with the feeding substation at a distance of 2 km. The connected load is 500KW at 400 volts at a diversity factor of 0.7 and p.f as 0.8. Suggest if the building can be directly connected by a L.T. feeder from the substation
4. A 6.6. KV feeder of length 1 km is to be erected to feed on Industrial substation of 500 KVA. capacity. Find out the suitable size of A. C. S. R?, conductor to be used for the purpose.
5. An 11 KV overhead line is to be erected for feeding a substation at a distance of 5 km which has to feed the following connected L. T. load. Determine the size of conductor and transformer
   Load: (i) Lighting: 210 KW (Single phase)
   (ii) Fans, a- conditioner :66 KW (Single phase)
   (iii) Industrial :200 KW ('three phase)
6. The main circuit wire in a house is required to carry a current of 45 amperes when connected to single phase a.c. supply. Determine the size of the wire if the length of the circuit is 40 metres.
7. A room is to be wired for single phase ac. Supply directly taken from mains which has declared voltage of 200 volts. The length of the wire from the main switch to sight and plug points is 30 metres. lithe wire is to carry 5 amps determine the size of conductor.
8. Determine the size of underground cable to be laid for transmitting electrical energy at 11 "from the substation to the distribution substation at a distance of 500 metres of capacity 300 KVA.