Instructions –

(1) All Questions are Compulsory.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any THREE of the following: 12

   (i) State any four factors on which severity of shock depends.

   (ii) State any four objectives of preventive maintenance of electrical equipments.

   (iii) State the factors on which life of Insulation depends.

   (iv) State the permissible limits for variation of:

       1) Voltage

       2) Current

       3) Speed

       4) Frequency
b) Attempt any ONE of the following:  
(i) With the help of neat circuit diagram explain back to back test on transformer to determine efficiency and regulation.
(ii) With the help of neat diagram explain phasing out test to be carried out on transformer.

2. Attempt any TWO of the following:  

a) (i) State any six activities that are to be carried out for the person who received electrical shock.
(ii) State different methods of artificial respiration and explain any one of them.

b) Give the maintenance schedule of distribution transformer as per IS 10028 (Part III) - 1981.

c) State four possible causes for each of the following troubles of a 3 phase Induction motor.
   (i) Motor switch ‘ON’ but does not start.
   (ii) Motor overheat
   (iii) Motor runs slow
   (iv) Motor stalls

3. Attempt any FOUR of the following:  

a) List any four internal and external causes for the abnormal operation of electrical equipments.

b) State the roles of Bureau of Indian standards in testing of Electrical equipment.

c) Compare direct, indirect and regenerative type of testing (any four points).

d) State the classification of insulating materials as per IS 1271-1985.

e) State different methods for measurement of insulation resistance and explain any one of them.
4. a) Attempt any THREE of the following:  
   (i) What precautions should be taken to avoid fire due to electrical reasons? 
   (ii) List out the tests to be carried out on transformer as per IS 2026 and state the objective of heat run on test on transformer. 
   (iii) What are the factors to be considered in designing the machine foundation? 
   (iv) State the various requirements of installation of rotating machines. 

   b) Attempt any ONE of the following:  
   (i) Why filtering of transformer oil is required? Explain with neat sketch any one method of filtering transformer oil. 
   (ii) Draw the circuit diagram to perform the reduced voltage run up test on 3 phase induction motor and describe the objective of test. 

5. Attempt any TWO of the following:  
   a) What do you mean by revarnishing of insulation? When it is required? Explain with neat sketch, vacuum impregnation method of varnishing. 
   b) A 415 V, 40 h.p. (29.84 kW), 50 Hz delta connected motor gave the following test data. 
      No load test : 415 V, 21 A, 1250 W 
      Locked rotor test : 100 V, 45 A, 2730 W 
      Construct the circle diagram and determine 
      (i) the line cement and power factor for rated output. 
      (ii) maximum torque 
      Assume stator and rotor Cu losses equal at standstill. 
   c) What is the effect of misalignment on the performance of machine? Explain the procedure to be followed in aligned two shaft-in direct coupled drive.
6. **Attempt any FOUR of the following:**

a) What are the different routine tests and type test of single phase induction motor.

b) Describe the procedure of synchronous impedance method to find regulation of alternator.

c) List internal and external causes for failure of equipments.

d) List out the tools required for loading and unloading the heavy equipments. Also state the use.

e) State the meaning of earth resistance. State the permissible values of earth resistance in case of

   (i) Power station

   (ii) Substation

   (iii) Domestic Installation

   (iv) O.H. installation