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.

1. Attempt any TEN of the following: 20
   a) State I.E Rule No. 90.
   b) Draw the symbols for following:
      (i) Bracket fan
      (ii) Intermediate switch
      (iii) Neutral link
      (iv) Bell
   c) Draw wiring diagram for one lamp and two fan.
   d) List the name of various components of service connection for underground connection.
   e) State the purpose of following in conduit wiring:
      (i) Nipple
      (ii) Bushing

P.T.O.
f) List the types of internal wiring in residential installations.
g) State any two factors on which the size of bus bar chamber depends.
h) Give any four examples of commercial electrical installations.
i) State the function of following in motor wiring circuit:
   (i) Motor switch
   (ii) Main switch
j) List the types of engineering contracts.
k) Define the following:
   (i) Earnest money deposit
   (ii) Security deposit
l) Name the starters used for following motors:
   (i) 7 H.P. 3-Ph squirrel cage I.M
   (ii) D.C. shunt motor

2. Attempt any **FOUR** of the following:  
   a) List any eight rules related to electrification of residential installation.
   b) Draw a neat labelled diagram for overhead service connection to a double storey building.
   c) Compare overhead service connection and underground service connection on the basis of initial cost, identification of fault, appearance and safety.
   d) One light point, one ceiling fan, two 6 Amp socket outlet are to be wired switches are to be provided on a single switch board. Draw the wiring diagram and single line diagram.
   e) With reference to execution of work explain the meaning of:
      (i) Administrative approval
      (ii) Technical sanctions
   f) State the sequence to be followed to prepare estimate of factory unit.
3. **Attempt any TWO of the following:**

   a) A college canteen hall has $6 \times 4$ m size. It provided with the following electric load:
      
      (i) 12 nos. of tube lights 40 watt each.
      (ii) 6 nos. of fan points of 60 watt each.
      (iii) 4 nos. of plug points of 240 watt each.
      
      Estimate quantity of material and their cost required for casing capping wiring system.

   b) (i) State the procedure for the selection of rating of main switch and distribution board in residential building installation.
      
      (ii) State the principles of circuit design in lighting and power circuits.

   c) Prepare a complete estimate to install a 3-phase, 400 volt, 50 Hz, 3 H.P. induction motor have to be used for grinding purpose in a small workshop having room size of $3 \times 3$ m. Assume necessary data required for the estimation. Draw installation plan and wiring diagram.

4. **Attempt any FOUR of the following:**

   a) Draw the following wiring diagrams:
      
      (i) One lamp controlled by one switch.
      (ii) One lamp controlled by two switches.

   b) Write necessity of earthing. Draw a neat labelled diagram of pipe type earthing.

   c) Write procedure of submission and opening of a tender.

   d) State the rating of lamps, fan and socket outlet points used in residential installation.

   e) Write the procedure to prepare a design for commercial electrical installation.

   f) A motor is to operated with star delta starter. Draw wiring diagram showing connection of motor, starter and motor switch.
5. **Attempt any FOUR of the following:**

a) A bungalow has a lighting load of 2 kW and power load of 4 kW. It is located 10 m away from electric supply pole. Calculate the rating and quantity of service wire required. List the material required to provide O.H. connection.

b) The main circuit wire in a house is required to carry a current 45 Amp when connected to single phase a.c. supply. Determine the size of the wire if the length of the circuit is 40 meters.

c) State sequence to be followed for preparing estimate of residential building electrification.

d) Define busbar. Draw and label the diagram showing its arrangement.

e) State commercial rate of any ISI mark company each of following for per unit:
   - (i) Flexible wire bundle (90 mtr)
   - (ii) Three pin power plug (5 A)
   - (iii) Single phase, 15 Amp ICDP
   - (iv) Single phase, 15 Amp MCB

f) State any four rules and regulations for industrial wiring.

6. **Attempt any FOUR of the following:**

a) In a factory of area 30 m × 12 m one lathe machine of 1 H.P., 3-phase, 420 volt is to be erected. Estimate the cost for the power wiring.

b) State any four rules for motor wiring.

c) State the criteria for selection of contractor / supplier (any four).

d) Write any four difference between electrification of residential and industrial installation.

e) State the factors governing number of lighting sub-circuits and power sub-circuits in commercial installation.

f) Give the procedure to calculate motor current in any industrial installation.