

**Scheme G**  
**Sample Test Paper-I**

**Course Name : Diploma in Electrical Engineering**

**Course Code : EE/EP**

**Semester : Fourth**

**17416**

**Subject Title : Industrial Electrical System-I**

**Marks : 25**

**Time:1 hour**

**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. Preferably, write the answers in sequential order

**Q1. Attempt any THREE**

**9 Marks**

a) Identify the following symbols used in electrical installations.

i)  ii)  iii) 

b) Classify following installations into residential, commercial or industrial installation.

- i) Cinema Hall
  - ii) Computer Institute
  - iii) Two Room Kitchen Flat
  - iv) Fabrication Workshop
  - v) Rice Mill
  - vi) Farm House
- c) What is service connection? State its types.
- d) State, why earthing is necessary in residential installation. Also state the standard value of earth resistance for the same.

**Q2. Attempt any TWO**

**8 Marks**

- a) Two light points each with one way switch are to be wired. Switches are to be provided in different places. Draw the following.
- i) Schematic Diagram

- ii) Wiring diagram in looping in system.
- b) State any four general rules for residential installation.
- c) Differentiate between underground and overhead service connections on the basis of aesthetic, installation cost, service life and labour cost.

**Q3. Attempt any ONE**

**8 Marks**

- a) i) Study the given single line diagram shown in Figure 1 and answer the following questions.
  - i. Identify the type of wiring. (1)
  - ii. Identify any two symbols. (1)
  - iii. Estimate the length of wire required for the given installation. (2)

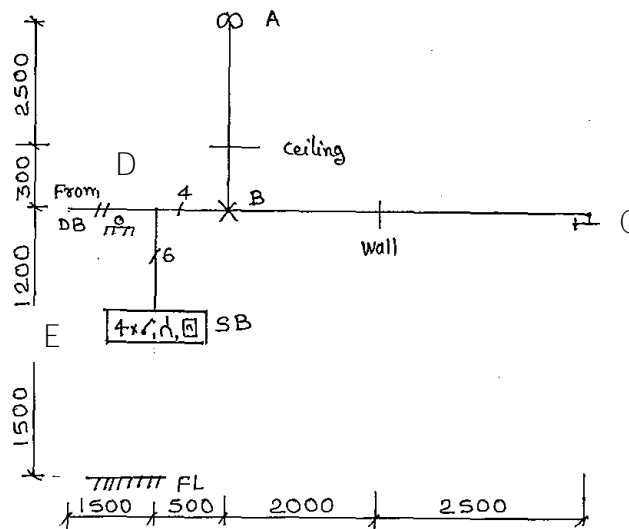


Figure 1.

- ii) Answer the followings.
  - 1) State the size of copper and aluminum conductor for lighting and power sub-circuits. (2)
  - 2) State the rules related to distribution of lighting and power sub-circuit in residential installation. (2)
- b) The installation plan of a room is shown in Figure 2 is to be provided with PVC surface conduit wiring. Assume wattage of ceiling fan 65 watt, tube light 40m watt, lamp 100 watt and 6 A socket outlet 100 watt. Also assume height of room- 3 m, height of switch

board from the floor level- 1.5 m and horizontal run from ceiling- 0.5 m. Answer the followings.

- 1) Calculate the total load and decide the size of main switch and distribution board. (2)
- 2) Draw the layout diagram (Single line diagram for the given installation plan. (2)
- 3) Estimate the total cost of material required for the given installation. (4)

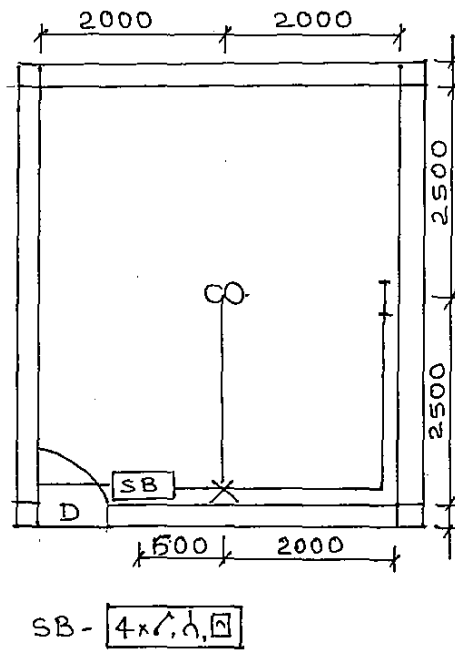


Figure 2.

**Scheme G**  
**Sample Test Paper-II**

**Course Name : Diploma in Electrical Engineering**

**Course Code : EE/EP**

**Semester : Fourth**

**Subject Title : Industrial Electrical System-I**

**Marks : 25**

**17416**

**Time:1 hour**

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**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. Preferably, write the answers in sequential order

**Q1. Attempt any THREE**

**9 Marks**

- a) Compare residential and commercial installations on the basis of type of connected load, method of power distribution and type of service connection.
- b) State, how wire is different than cable.
- c) State the expansion of following abbreviations.
  - i) MCB
  - ii) ELCB
  - iii) ICTP
- d) Select proper starter for the following motors.
  - i) 1 hp single phase squirrel cage induction motor.
  - ii) 5 hp delta connected squirrel cage induction motor.
  - iii) 10 hp slip ring induction motor.

**Q2. Attempt any TWO**

**8 Marks**

- a) State the design considerations of commercial electrical installations for followings.
  - i) Deciding the size of cable.
  - ii) Deciding rating of switch board and distribution board.

- b) A 240 volts, 3.67 kw, single phase motor is working at full load with an efficiency of 80% and power factor of 0.6 lagging. Calculate the current supplied to the motor and suggest the size of cable required.
- c) Draw the wiring diagram showing main switch and starter for 15 hp squirrel cage induction motor.

**Q3. Attempt any ONE**

**8 Marks**

- a) Study the given installation plan as shown in Figure 1 of a celebration hall and answer the following questions.
- Calculate total load assuming standard wattage of fan and light. (2)
  - Decide number of light and fan circuit. (2)
  - Decide the rating of main switch and distribution board. (2)
  - Draw the single line diagram from energy meter to switch board assuming three phase supply. (2)

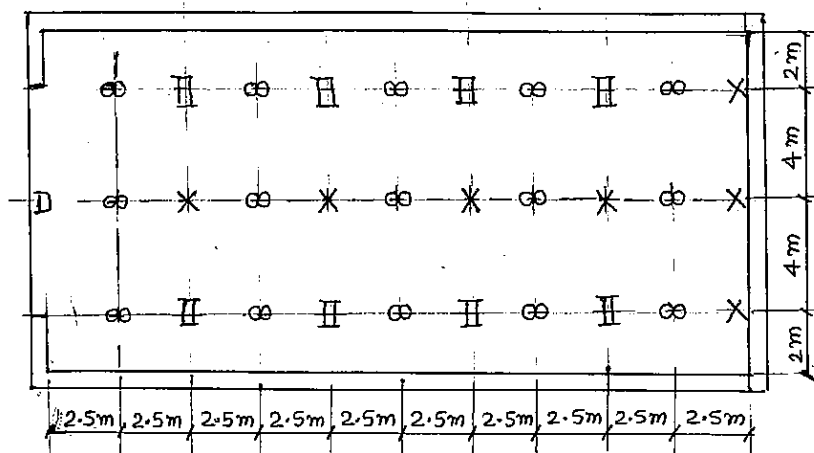
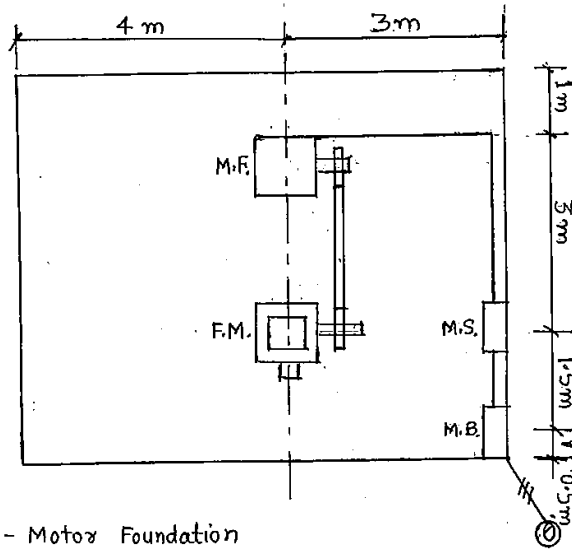


Figure 1.

- b) In a flour mill, one 10 hp, 415 V, three phase, 50 Hz, motor is to be installed. The installation plan of the same is shown in the Figure 2. Answer the following questions.
- Draw the single line diagram for the installation. Also suggest the motor starter. (2)
  - Calculate the size of cable and rating of main switch. (2)
  - Calculate the length of conduit and wire required. (4)



M.F. - Motor Foundation  
 F.M. - Flour Mill  
 M.S. - Main Switch  
 M.B. - Main Board

Figure 2.

**Scheme G**  
**Sample Question Paper**

**Course Name : Diploma in Electrical Engineering**

**Course Code : EE/EP**

**Semester : Fourth**

**17416**

**Subject Title : Industrial Electrical System-I**

**Marks : 100**

**Time: 3 hour**

**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. Preferably, write the answers in sequential order

**Q1 Attempt any TEN of the following.**

**20 Marks**

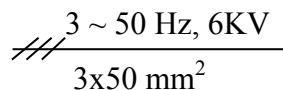
**a)** Draw the IS symbols for the following used in layout diagram.

(i) Intermediate switch (ii) Plug and socket.

**b)** State the meaning of following IS symbols:



**c)** State the meaning of following single line representation:



**d)** What is service connection?

**e)** State the purpose of ELCB in residential installation.

**f)** State the expansion of following abbreviations:

(i) DPIC (ii) DB

**g)** State any two examples of commercial installations.

**h)** State any two factors on which the size of bus bar chamber depends.

**i)** State the difference between conduit and pipe.

**j)** Name the starters used for following motors:

- (i) 15 hp, 3-phase Squirrel cage Induction motor (ii) D.C. Shunt motor.
- k) State any two materials used for earthing wire.
- l) State the meaning of following terms: (i) Security deposit (ii) Earnest money.

**Q2. Attempt any FOUR of the following.**

**16 Marks**

- a) List any eight wiring accessories.
- b) What is tender? State its types.
- c) One light point, one ceiling fan, one 6Amp socket outlet are to be wired. Switches are to be provided on a single switch board. Draw the following:
  - (i) Wiring diagram in looping-in system. (ii) Single line diagram for (i).
- d) Compare overhead service connection and underground service connection on the basis of Location, Economy, Safety and Labour cost.
- e) List the materials required for underground service connection.
- f) A newly constructed residential unit is having following load:
  - (i) 6 lamps of 100Watts
  - (ii) 6 ceiling fans of 65 Watts
  - (iii) 4 sockets of 6Amp having 100Watts
  - (iv) 3 sockets of 16 Amp having 2000 Watts.Calculate rating of overhead service connection conductor.

**Q3. Attempt any FOUR of the following.**

**16 Marks**

- a) Define the following terms as per IS:
  - (i) Wiring diagram
  - (ii) Schematic diagram.
- b) A one lamp is to be controlled from two different switch boards independently. Draw the following:
  - (i) Wiring diagram in looping-in system.
  - (ii) Single line representation for above.
- c) Study the following single line representation shown in Figure 1. and answer the following:
  - (i) Identify the method of wiring system



- (ii) Identify any two symbols and give its meaning
- (iii) State how many wires are required in between points B and D
- (iv) Calculate the total length of the wire.

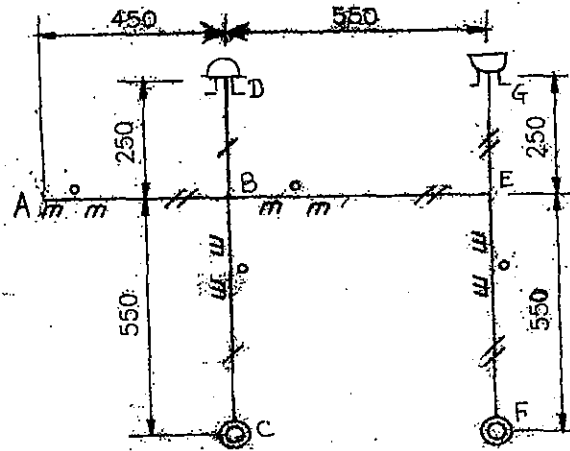


Figure 1.

- d) Draw the details of distribution board having separate energy meter for lighting load and power load.
- e) State the sequence to be followed for preparation of estimate of commercial electrical installation.
- f) A 3 hp, three-phase, 415 V motor and 5 hp, three-phase, 415 V motor and 1 hp, single-phase, 240 V motor are proposed to be installed in a fabrication workshop. Suggest the rating of individual cables for each motor and the main cable.

**Q4. Attempt any FOUR of the following.**

**16 Marks**

- a) State any four general rules for installation of residential electrification.
- b) State the meaning of terms given in the following specification of wire.  
 "10 Sq.mm PVC copper wire of size 140/0.3"  
 (1) 10 Sq. mm.  
 (2) PVC  
 (3) 140  
 (4) 0.3
- c) Draw single line diagram for 15 hp, three-phase, 415 V Induction motor to be operated on suitable starter.

- d) State any four the important factors, which should be considered for economical execution of electrical installation work?
- e) Write the detailed procedure for submission and opening of a tender document.
- f) What are the different types of contracts? State any two advantages and two disadvantages of item rate contract.

**Q5. Attempt any TWO of the following.**

**16 Marks**

- a) A cloth shop of size 4m x 8m is to be provided with 14 twin tube light fittings of 80 Watts each and 7 ceiling fans of 60 Watts each having sweep of 800 mm. Switch-boards consist of 14 nos. 6 Amp sockets of 100 Watts. Design and draw installation plan using standard IS symbols for twin tube light fittings, ceiling fans. Calculate the number of sub-circuit required. Show the position of switch boards on installation plan.
- b) A ground floor plan of a three storey hostel building is shown in Figure 2. The number of lights and fans are also indicated on it. First and second floor plan is similar to ground floor. In each room 6A socket outlet has to be provided. Calculate the total wattage and decide the number of sub-circuits. Draw the single line diagram showing arrangement of switch boards and distribution boards from energy meter for the complete hostel building. Assume Wattage of lamp, ceiling fan and 6 A socket outlet to be 20 watt, 65 watt and 100 watt respectively.

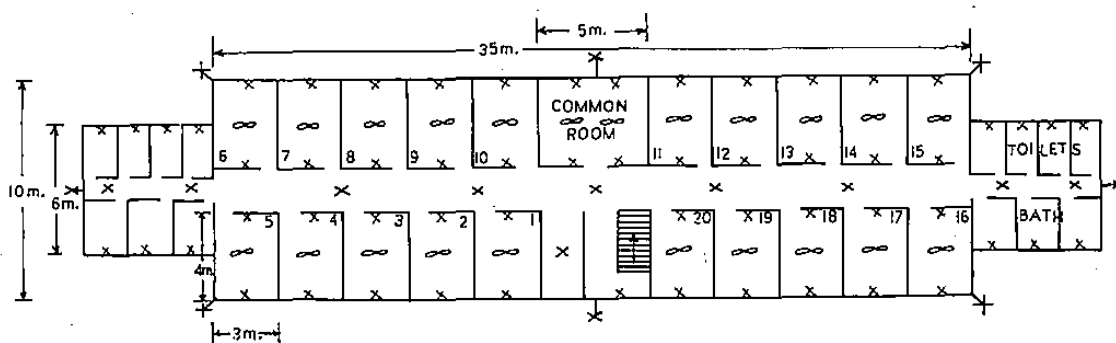


Figure 2.

- c) A three -phase, 415V, 10 hp(metric), motor having 85% efficiency and 0.8 power factor is to be installed in a workshop. Calculate full load current of motor. Decide

the cable size and select the fuse rating and motor starter with main switch. Draw single line representation for motor circuit wiring.

**Q6. Attempt the following.**

a) Describe how rating of cables and fuses are to be decided for three-phase squirrel cage induction motor by taking suitable rating. **4 Marks**

b) **Attempt any ONE from the following.** **12 Marks**

i) In a workshop 10 hp (metric), 415 V, three-phase, 50 Hz. Motor is to be installed. Prepare the estimate required for the motor installation assuming PVC surface conduit type of wiring. The detailed plan is as shown in Figure 3.

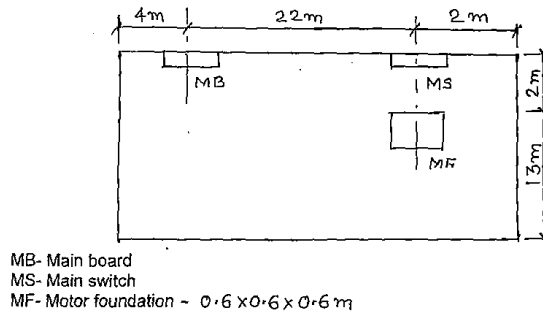


Figure 3.

ii) The installation plan of a room is shown in Figure 4 is to be provided with PVC surface conduit wiring assume wattage of lamp, ceiling fan and socket outlet to be 60 watt, 65 watt and 100 watt respectively. Assume height of room- 3 m, height of switch board from floor level – 1.5 m and horizontal run from ceiling -0.5 m  
Answer the following.

1. Calculate the total load and decide the size of main switch and distribution board.
2. Draw the details of distribution boards.
3. Draw the layout diagram (Single line representation) for given installation.
4. Calculate the length of wire and PVC conduit.
5. Prepare the estimate assuming labour and contingencies as 40% of material cost.

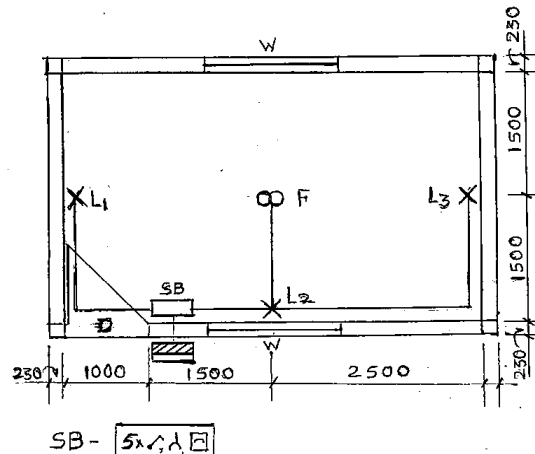


Figure 4.

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