

## Estimating, Costing and Design of Electrical Installation

Question - ① Prepare the diagram of plate earthing and also prepare the list of material as per Indian standard.

Answer - Earthing means connections of the neutral point of a supply system or the non-current carrying parts of electrical apparatus.

Plate Earthing :- This is the common system of earthing. In plate earthing an earthing plate either of copper of dimensions  $60\text{ cm} \times 60\text{ cm} \times 3\text{ mm}$  or of galvanised iron of dimensions  $60\text{ cm} \times 60\text{ cm} \times 6\text{ mm}$  is buried into the ground with its face vertical at a depth of not less than 3 meter from ground level.

The earth plate is embedded in alternate layers of coke and salt for a minimum thickness of 15cm.

The earth wire is securely bolted to an earth plate with the help of a bolt, nut and washer made of that of earth plate.

A small masonry brick wall encloses with a cast iron on top or an RCC pipe round the earth plate is provided to facilitate its identification and carrying out periodical inspection and tests.

Material Required for G.I. plate Earthing -

The list of material with complete specification for G.I. plate earthing is given as

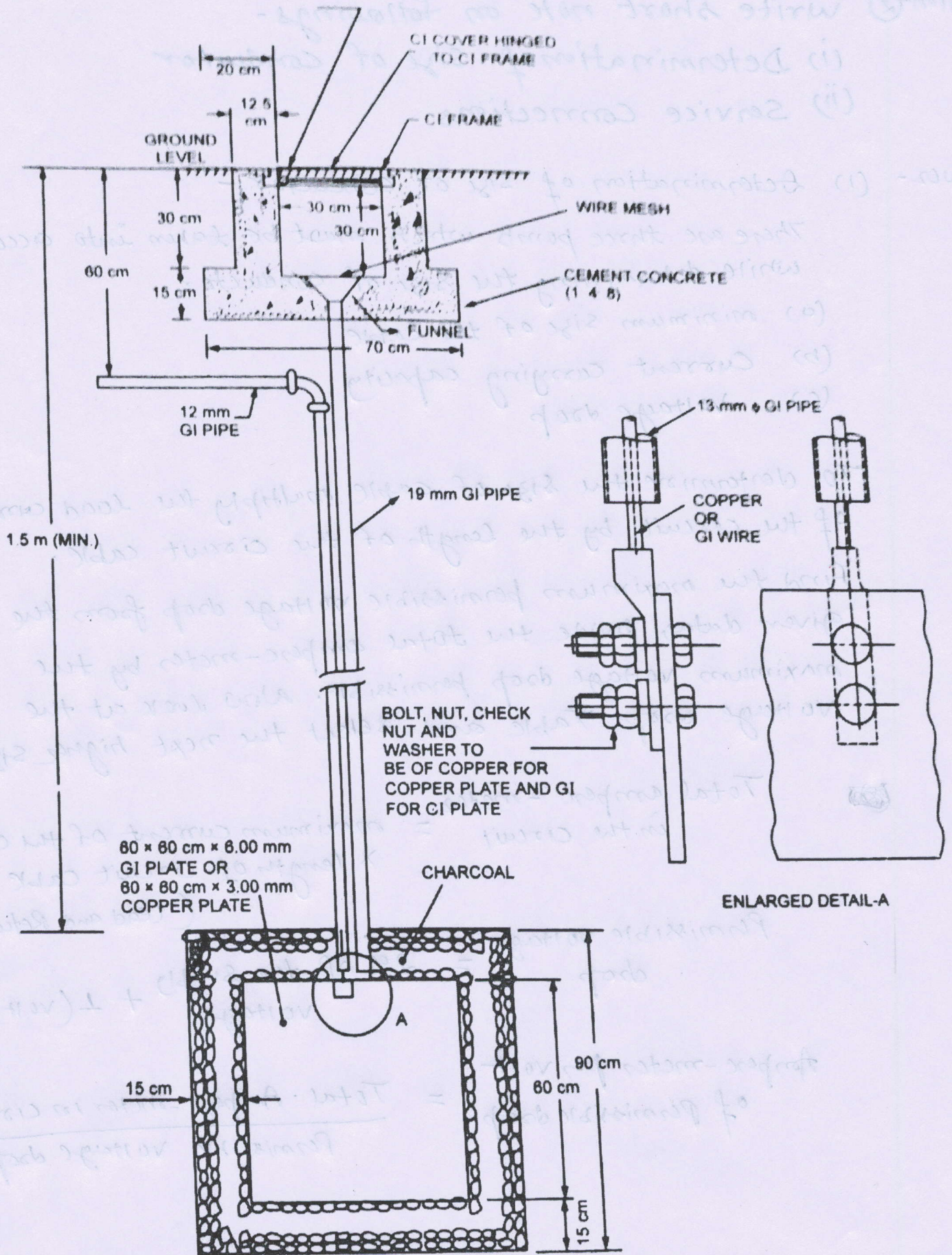


S.No.	Description of material with specification	Quantity Required	
		Quantity	Unit
1.	G.I earth plate of 60cm x 60cm x 6mm	3	meter
2.	G.I pipe for watering of 19 mm diameter	2.5	meter
3.	G.I pipe of 12mm	1.5	meter
4.	G.I wire 6 SWG	12	Kg.
5.	G.I lugs	2	nos
6.	G.I Bolts and nuts	2	nos
7.	G.I Bolts and washers	2	nos
8.	G.I Bends of 12mm	1	nos
9.	30 cm square cast iron frame	1	nos
10.	30 cm square cast iron cover	1	nos
11.	funnel with wire mesh	1	nos
12.	charcoal	10	Kg.
13.	common salt	10	Kg.
14.	Cement concrete (1:4:8)	0.20	m <sup>3</sup>
15.	Bricks	500	nos

(List of Required material for plate Earthing)

Diagram of plate Earthing —





(Diagram of plate Earthing)



Question-2 write short note on followings-

- (i) Determination of size of conductor
- (ii) Service connections

Answer-

(1) Determination of size of conductor -

There are three points which must be taken into account while determining the size of conductor -

- (a) minimum size of the cable
- (b) Current carrying capacity
- (c) voltage drop

To determine the size of cable multiply the load current of the circuit by the length of the circuit cable.

Find the maximum permissible voltage drop from the given data, divide the total ampere-meters by the maximum voltage drop permissible. Now look at the voltage drop Table and select the next higher size.

$$\text{Total ampere-meter in the circuit} = \text{maximum current of the circuit} \times \text{length of circuit cable (Lead and Return)}$$

$$\text{Permissible voltage drop} = 2\% \text{ of the supply voltage} + 1 \text{ (volt)}$$

$$\text{Ampere-meter per volt of permissible drop} = \frac{\text{Total ampere-meter in circuit}}{\text{Permissible voltage drop}}$$



(2) Service Connection — The overhead line or underground line or cable connecting the supplier's distribution line to the consumer's premises is called service main or service line or service connection.

The connection of service pole, pole fuse, energy meter, service fuse, main switch and fuses and distribution board for giving a service connection.

There are two types of service connections

- (a) Overhead Service Connection
- (b) Underground Service Connection

Methods of Installation of Service Lines

- (a) For high Roof Building
- (b) For low Roof Building
- (c) weatherproof cable method
- (d) Use of Junction or Joint Box
- (5) Underground Service connection method.