BUILDING SERVICES

ELECTRICAL SERVICES

Surabhi (Assistant Professor)
Course Instructor
Building Planning and Construction (CE-404)
Dept. of Civil Engineering
JNGEC Sundernagar

ELECTRICAL INSTALLATIONS IN BUILDINGS

Illumination

(Fluorescent, Incandescent lamps, LED)

Circulation of Air

(Ceiling fans, Exhaust fans)

Cooling of Air

(Air conditioners)

Supply of Hot Water

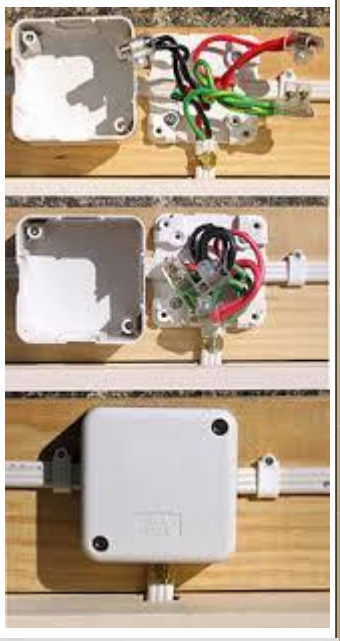
(Geysors)

Lifting of Water

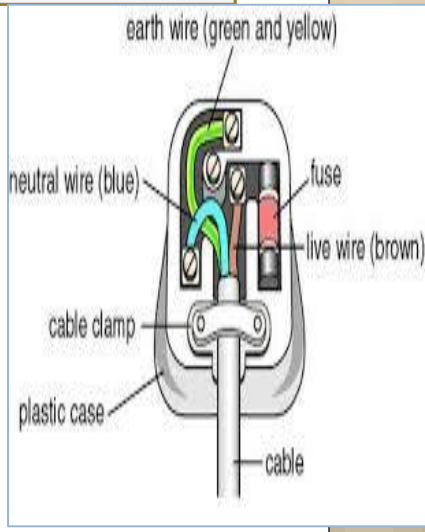
(Pumps)

Points to be considered while planning electrical installations:

- Electrical installations must be planned with regard to anticipated increase in the use of electricity in future.
- Wiring should be done by qualified electricians with care
- Wiring may be concealed or opened. In case of concealed wirings, junction boxes must be provided at all corners and bends.
- Each socket outlet should be controlled by a switch located adjacent to socket. Ordinary sockets may be placed at a convenient height of 20 cm above floor level. Socket outlets must be installed with mechanism such that they automatically get screened when plug is withdrawn from socket.



- *In case of earthed system of supply, three pin socket outlets must be provided , The third terminal should be connected to the earth point.*
- *All switchboards must be located at spaces where there is no possibility of danger due to injury by sudden hitting. Switchboards should also not be provided near wash basins, showers, sinks etc.*
- *No flammable reflectors/shades should be provided with lighting fittings. Reflectors made with enameled iron sheet or China clay are used.*



- *Number of outlets required as per national building code:*

Location	No. of Socket outlets required	
	5 Amperes	15 Amperes
Bed	2 to 3	1
Living room	2 to 3	2
Kitchen	1	2
Dining room	2	1
Garage	1	1
For refrigirator	—	1
For air conditioner	—	1 (one for each)
Verandah	1 per 10 sqm	1
Bath room	1	1

- *External lamps must be weather proof and resistant to ingress of moisture and dust.*

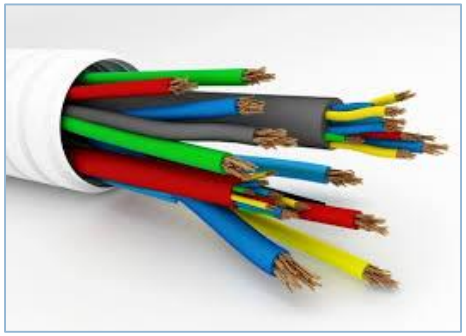
- *For better illumination, fluorescent lamps are used as they are economical.*
- *Incandescent lamps should be preferred at places where switching off lights is required for a short duration, in dressing tables, bathroom mirrors. (fluorescent lamps give grayish tinge to complexion)*
- *Entire wiring should be free from short circuits. They should be checked for defects.*
- *Ceiling fan should have control from regulator and switch. Suspension rods must be strong enough.*
- *In case of RCC slabs, fan clamps must be buried within the casting. They should extend to atleast 20 cm on either side and should be provided with end hooks for proper grip. For wooden beams, firm iron flat clamp should be fixed to hang the ceiling fan.*

- *Ceiling fan is fixed such that its bottom most part is at a height of 2.40 m from floor level,*
- *Blades of fan should be 30 cm clear off the ceiling, for better circulation.*
- *Electrical appliances and other control panels must not be locate din wet areas. Naked wires should be inserted inside the sockets.*
- *Water should not be able to extinguish electrical fire. Fire extinguishers must be used.*
- *Main switchboard must not be overcrowded and must be accessible easily.*
- *Entire electrical system must be earthed properly.*

COMPONENTS OF ELECTRICAL SERVICES

Wiring Materials:

- Main switches
- PVC wires
- Earthing wire
- Wooden switchboards
- Plugs, 5A
- Switches 5 A
- Bracket holder
- Ceiling Rose
- Clips
- Junction boxes



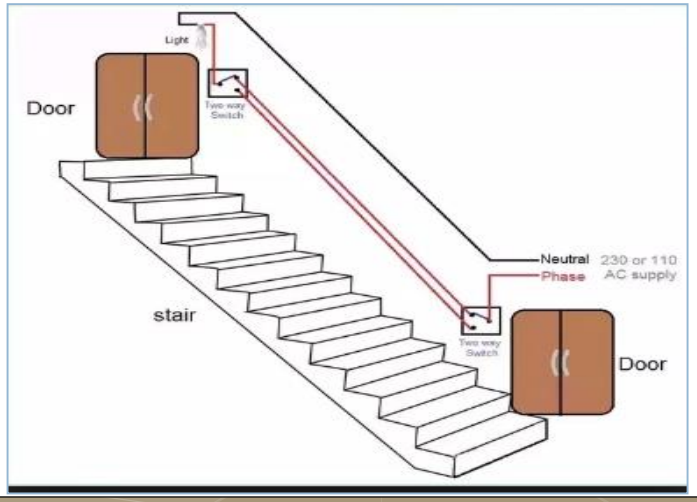
- Fuse Kit Kat 5 A

- Conduit pipes

- Screws

Electrical Fittings:

- Bulbs 5 A of various watts
- Ceiling fans
- Wall brackets
- Tube light 40 W, 250 V
- Decorative wall and ceiling electric light fittings
- Night lamps
- Call bell
- Two way switch for stair light
- Water tight fittings for external lights
- Ceiling light



ELECTRICAL SYMBOLS

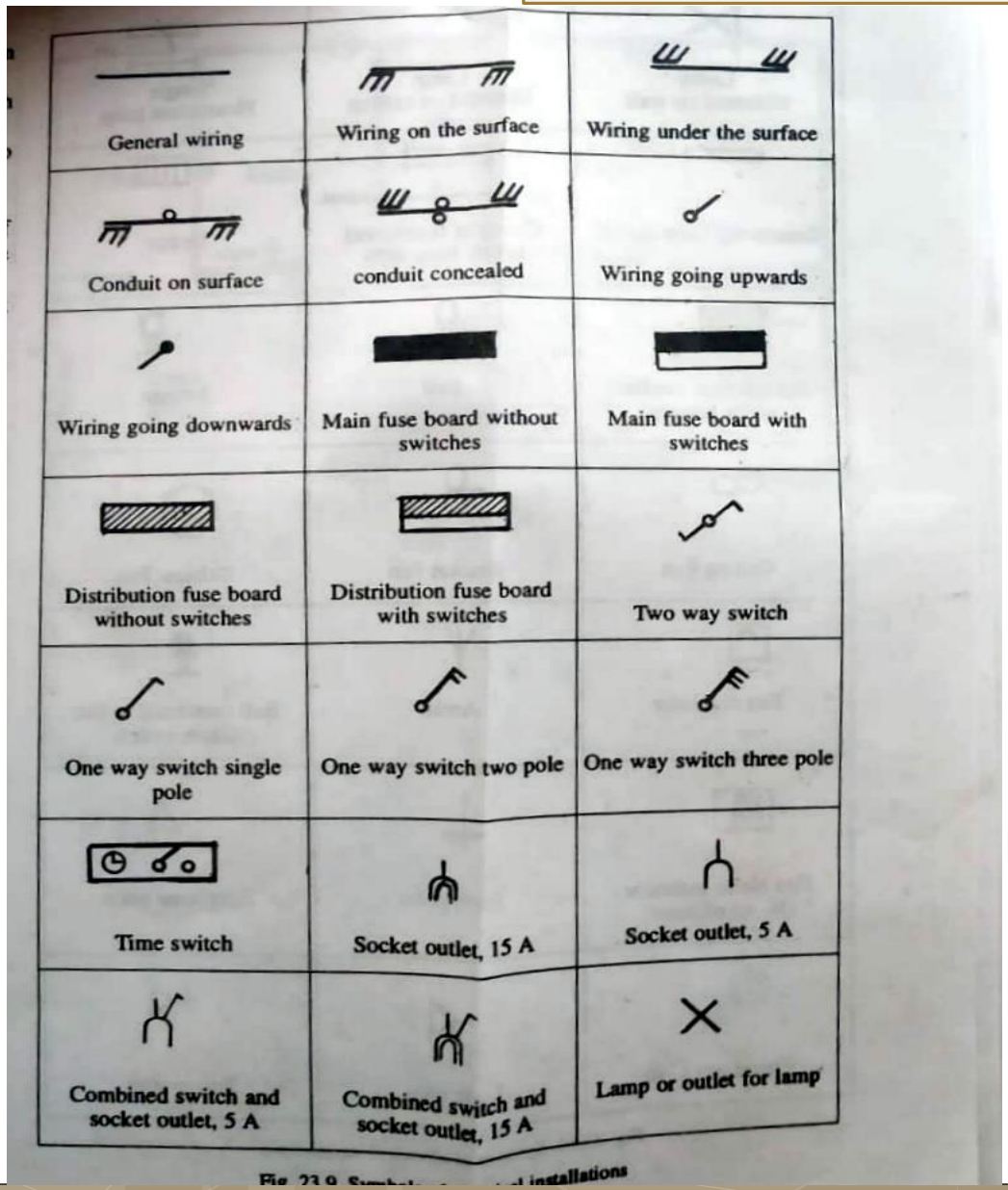


Fig. 23.9 Symbols ... installations

5 Ampere socket outlet

15 Ampere socket outlet

Combined switch and socket outlet

Socket outlet 2 pin

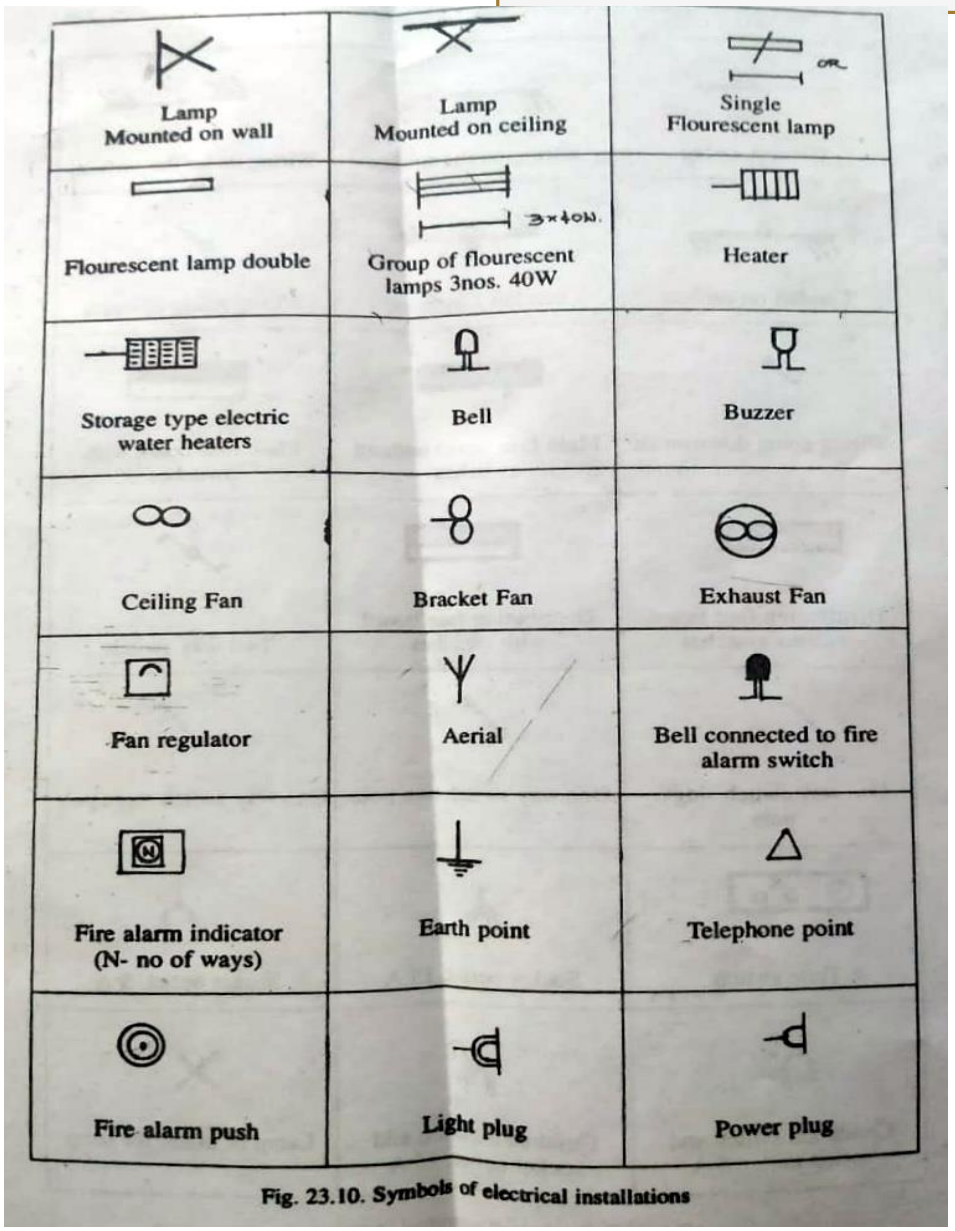
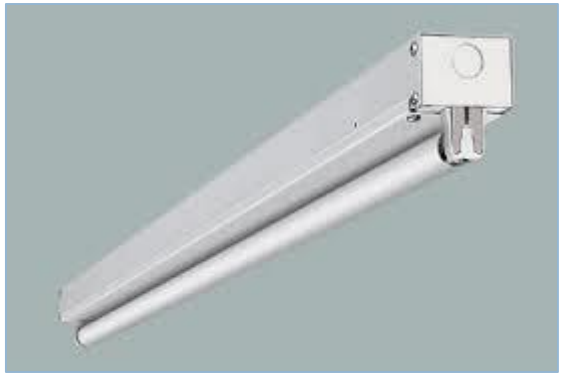


Fig. 23.10. Symbols of electrical installations

Lamp mounted on wall

Lamp mounted on ceiling



Single fluorescent light

Double fluorescent light

Storage type electric water heater

Bracket fan

Telephone point

Fire alarm push

Power plug

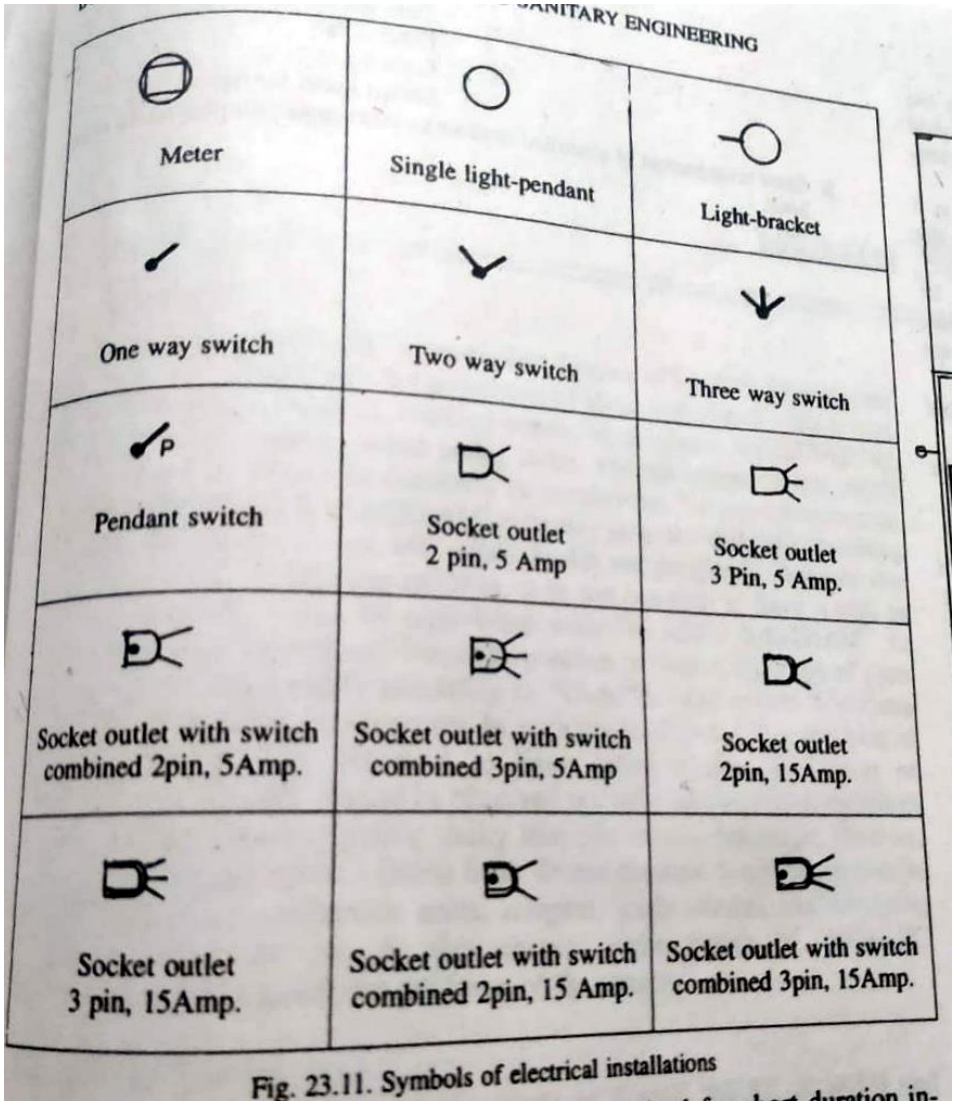


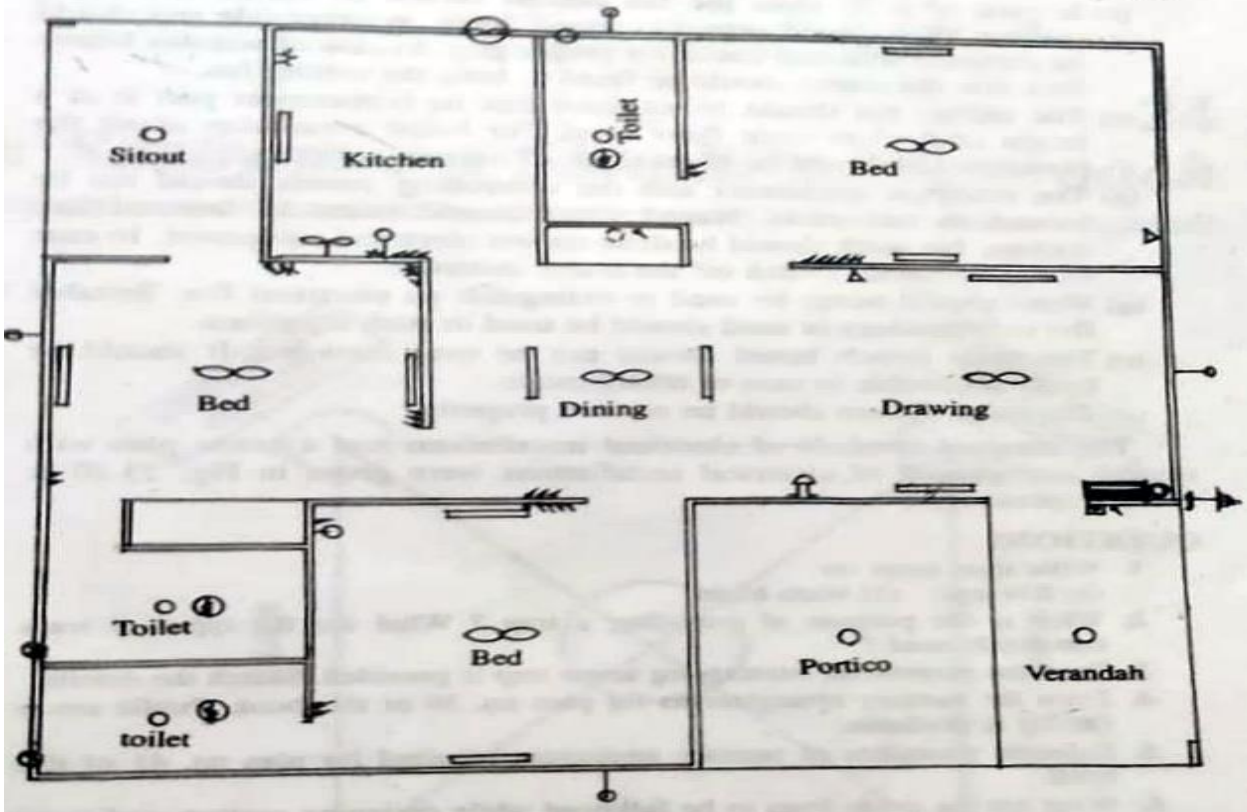
Fig. 23.11. Symbols of electrical installations

Meter

Single Pendant Light

Light Bracket

PLAN SHOWING ELECTRICAL INSTALLATIONS



Details:

1.	Fan points, ceiling (122 cm)	— 5 nos
2.	Flourescent light points (40W)	— 11 nos
3.	Incandescent lamps (60W)	— 13 nos
4.	Buzzer with switch	— 1 no
5.	Geysors	— 3 nos
6.	Exhaust fan	— 1 no
7.	Mini exhaust fans	— 3 nos
8.	Socket outlet (5 A)	— 9 nos
9.	– do – (15 A)	— 2 nos
10.	Bracket fan	— 1 no
11.	Telephone points	— 2 nos
12.	One way switches	— 48 nos
13.	Main fuse board	— 1 no
14.	Meter	— 1 no
15.	Earth point	— 1 no.

Fig. 23.12. Sketch Showing Electrical Installations for a Building

PLAN SHOWING ELECTRICAL INSTALLATIONS

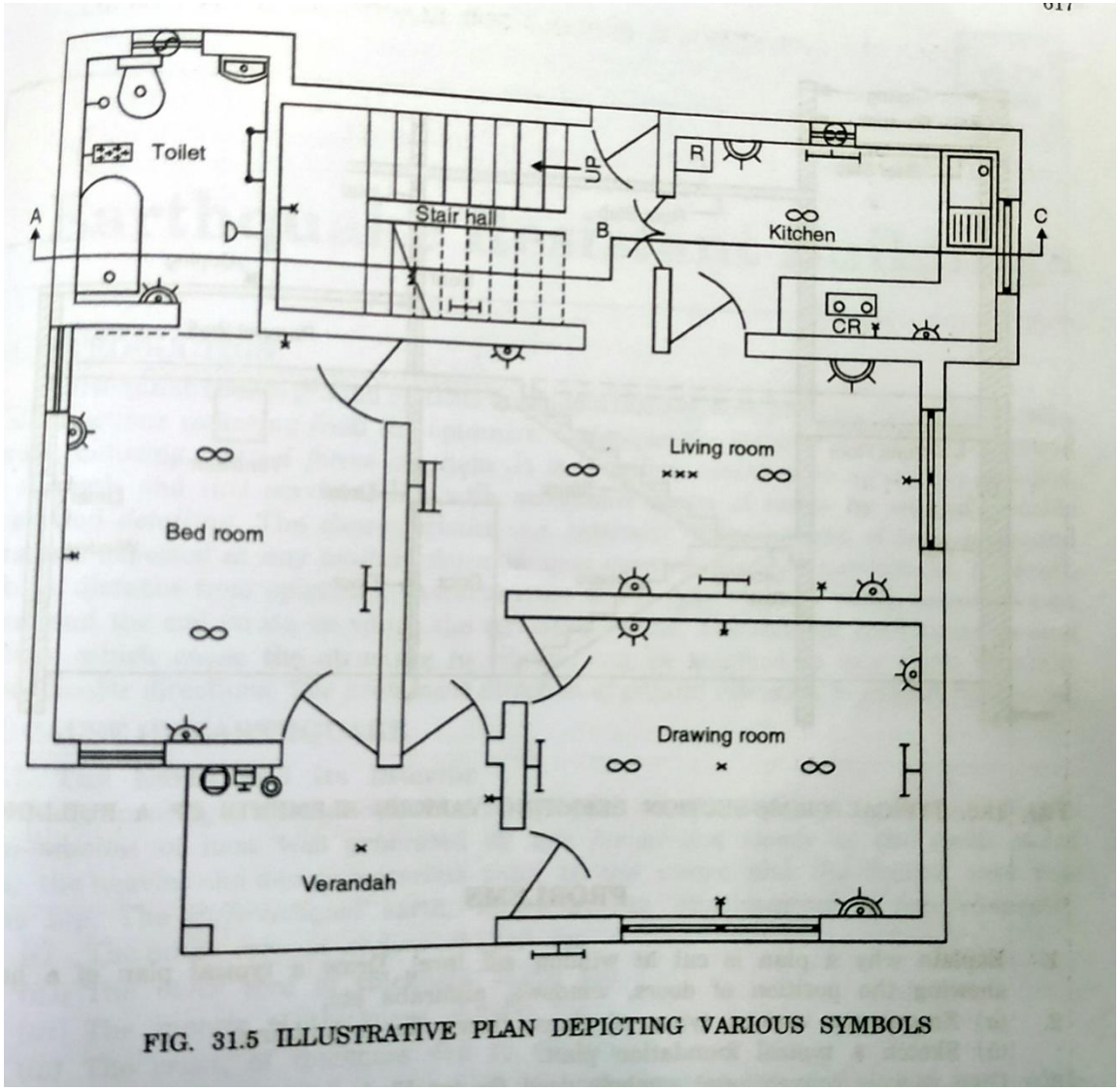


FIG. 31.5 ILLUSTRATIVE PLAN DEPICTING VARIOUS SYMBOLS

CIRCUIT DIAGRAM OF HOUSE WIRING

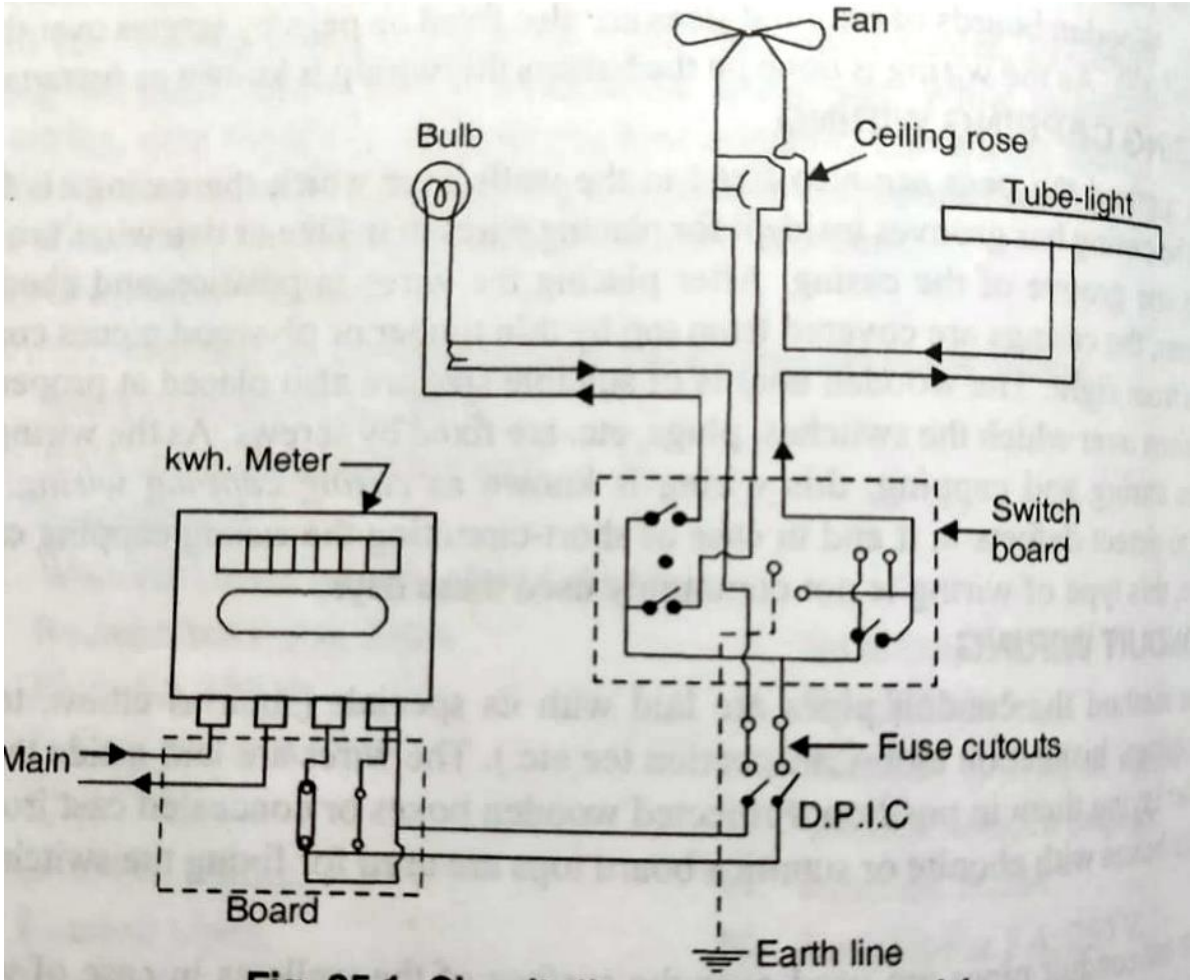


Fig. 25.1. Circuit diagram of house wiring.

SAFETY AND PRECAUTIONS

Points to be taken care of while working and jointing electric wires and doing house wiring:

- No live naked wire should be touched.
- If anyone comes in contact of live wire, wore should not be removed by hand nor the person should be touched before switching off main supply.
- If it is not possible to cut off supply, wire should be detached by dry timber or any other bad conductor of electricity.
- Safety belts should be used in the poles.
- No live electric gadget must be touched.
- Overhead line should not be touched.
- Line should be energied only when it is clear that no one is working over it.

- *All electric equipments should be earthed properly.*
- *Live wires should always be connected with switches.*
- *Plugs should be removed carefully.*
- *Earthing should be embedded in moist earth below ground.*
- *No water should be thrown on wires in case of fire.*
- *Proper tolls and equipments must be used.*