Total Load = 1100 W

Usage in hours = 8 hr

∴ Total energy requirements = 1100 × 8

= 8800 W

① Panel Wattage :-

- Maximum daily load :

$$= \frac{(\text{Total load in Watt-hours})}{(\text{load efficiency} \times \text{System Voltage})} \text{ Ah}$$

$$= \frac{8800}{0.8 \times 48} = 229.16 \text{ Ah}$$

- Total current required :

$$= \frac{(\text{Max. daily load})}{(\text{eq. sunshine hours} \times \text{system voltage} \times \text{charging efficiency} \times \text{dust factor})} \text{ A}$$

$$= \frac{229.16}{(5 \times 0.9 \times 0.95)} = \frac{229.16}{4.275}$$

$$= 53.60 \text{ A}$$

- Total Panel Wattage required
  = (Total current required) × (System voltage) × (Real Panel Voltage / I/P Panel Voltage)

  = 53.60 × 48 × 36/24

  = 3859 W

- Series Modules
  = System voltage / I/P Panel Voltage

  = 48/24 = 2

- IIel Modules = (Panel Wattage required) / (series modules × Panel Watta

  = 3859 / (2 × 300)

  = 6.43

  ≈ 6

∴ It will require 2 series strings & 6 IIel strings.

* Battery capacity :→

- Battery capacity required = $\frac{(\text{Days of Autonomy} \times \text{maximum daily load})}{(\text{D.O.D.} \times \text{discharging efficency})}$

$$= \frac{(3 \times 229.16)}{(0.8 \times 0.85)}$$

$$= \frac{687.48}{0.68}$$

$$= 1011 \text{ Ah}$$

- Series Batteries = $\frac{\text{System Voltage}}{\text{Input battery voltage}}$

$$= \frac{48}{12} = \underline{4}$$

- Ilel Batteries = $\frac{\text{Battery Capacity}}{\text{Solar battery Ah}}$

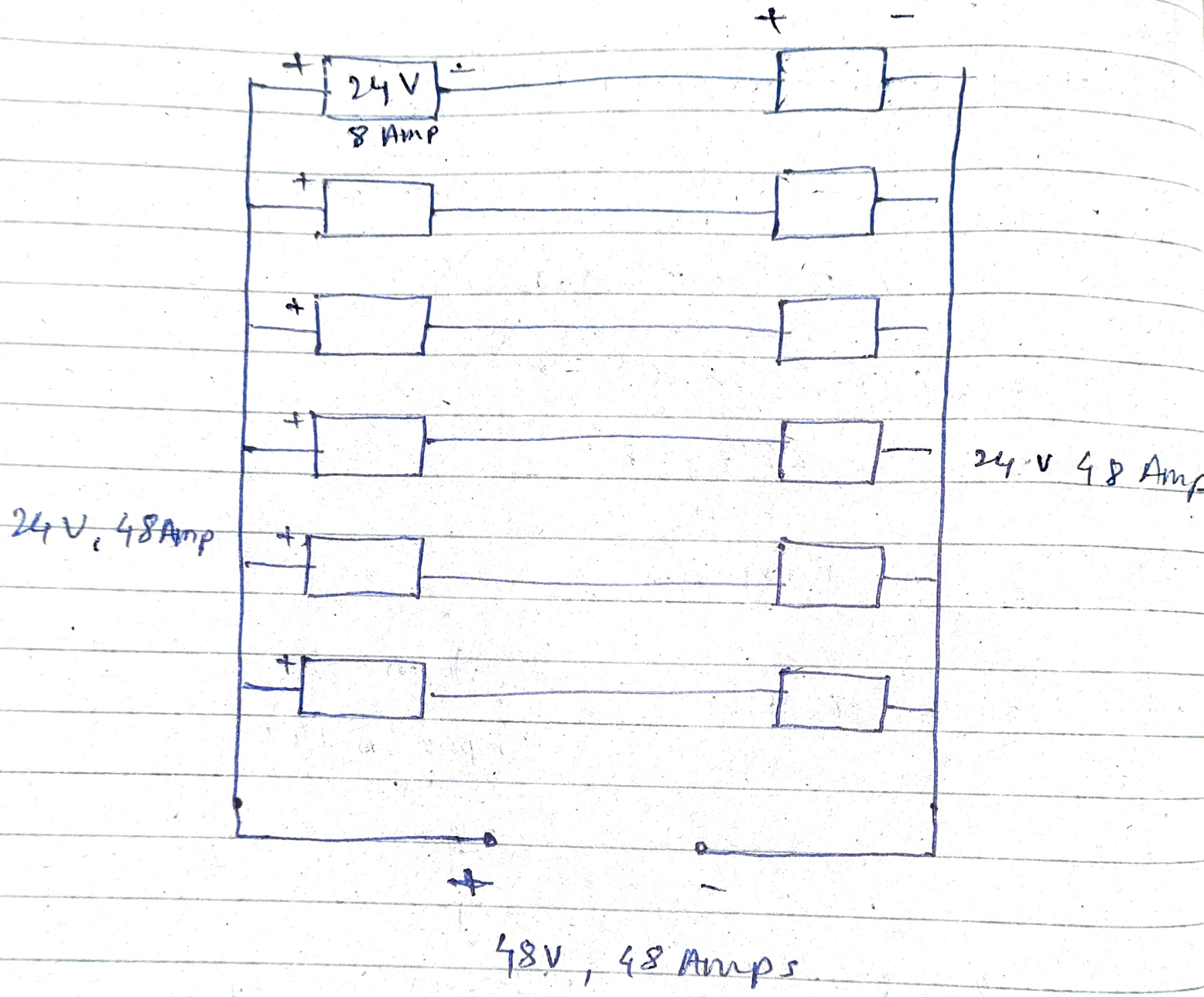
$$= \frac{1011}{250}$$

$$= 4.04$$

$$\simeq \underline{4}$$

∴ With 3 days of Autonomy 4 series strings and 4 Ilel string will be required.

PV Array :-



∴ We need 48 V, 50 Amps charge controller.