

P = IV

S/No	Description	No	Current	Voltage	Power (kW)	No of household	Total power (kW)
1	Grinder	5			2		10
2	Light bulbs	12			0.06	20	14.4
3	Socket	5	13	240	3.12	20	312
4	Socket	2	15	240	3.6	20	144
5	Socket	2	5	240	1.2	20	48
6	Fan	3			0.02		0.06
7	Saw mill	2			5		10
8	Feed mill	1			20		20
9	Livestock farm	1			20		20
10	Palm oil mill	1			50		50
11	Cassava Processing Centre	2			15		30
12	Village Centre	1			100		100
						TOTAL	758.46

- i. Power consumption is calculated in kW-Hr = Total Power x time of use
 Daily Power consumption = 758.46 x 8 = 6064kW-Hr
 Monthly PC = 6064 x 30 =181,920
 At ₦ 4.00 per kW-Hr, total monthly earning = 181,920 x 4 = ₦727,680.00
- ii. With a power consumption of 758.46 kW, the 300kVA 300kW is grossly inadequate at peak load
- iii. A transformer of 1000KVA is recommended for immediate installation while plan should be on the pipeline for one with a higher capacity to take care of development

1. a. Differentiate between the terms “Total Connected Load (TCL)” and “Probable Maximum Load (PML)”.

Total Connected Load (TCL) - is the load rating of an appliance or a system which it carries/supplies when operated throughout the day. This is the load consumed by the appliance during operations. etc

Probable Maximum Load (PML) – is the resulting load consumed when an appliance is operated only when needed i.e. effective period of service. etc

- a. Design the interior lighting system using “LUMEN method” for the fertilizer store with a floor dimension of 8m x 15m using Tungsten Lamp. Take E = 50 lux, Hm = 3, Coeff of utilization (C) for RI of 1.74 for medium surface = 0.55, Maintenance factor (M) = 0.7

Minimum service value of illumination for fertilizer store, E = 50 lux

$$\text{Area (A)} = 8 \times 15 = 120\text{m}^2$$

Using Tungsten lamp of 200W
From Table 10, Hm = 3.0

$$\text{Room Index} = 8 \times 15 / (3.0(8 + 15)) = 1.74$$

Using dispersive reflections for the lamp
From Table 11, Coeff of utilization (C) for RI of 1.74 for medium surface = 0.55 by interpolation on the table

From Table 9
Cleaning at average frequency for average surface, maintenance factor (M) = 0.7

$$\begin{aligned} \text{Installed flux therefore} &= EA/CM = 50 \times 120 / (0.55 \times 0.7) \\ &= 15584 \text{ lumens} \end{aligned}$$

$$\text{Maximum spacing is given as } 3/2 \text{ (Hm)} = 1.5 \times 3 = 4.5$$

Arrangement using this spacing gives ????? = 2 across, 3 along

Checking the selected lumen

$$\text{No of bulbs} = \text{no bulbs along} \times \text{no of bulbs across} = 6$$

$$\text{Lumens per bulb} = \text{Installed flux} \div \text{no of bulbs} = 15584 \div 6 = 2597$$

Is this equal, less or greater than the lumen for the 200W Yes this is equivalent for 200W (with 2720lumens).

If less then OK or select the appropriate bulb with the lumen and calculate the new arrangement

if higher select the appropriate bulb with the lumen and calculate the new arrangement

You are at liberty to select other types of lamp with justification hence all the our answers may not necessarily be the same. The arrangement is also dependent on the selection made.