What Is This Module About?

Are you always worrying about how much you pay for your electric bill? Would you like to know why your electric bill is so expensive sometimes? Would you like to check how much electricity you consume, but you don't understand what the electric bill or electric meter shows?

This module will help you with these concerns. In this module, you will learn how to read and interpret electric meters and electric bills. You will also learn how to compute for electric power consumption based on the use of appliances, and how to check the computation of your electric bill.

This module is divided into two lessons:

Lesson 1 – *How to Read and Interpret the Electric Meter*

Lesson 2 – *How to Read and Interpret the Electric Bill*

To further understand the topic, you can read two other modules on electricity, namely ***Electricity and Its Uses*** *and* ***The Proper Use of Electricity***. It is recommended that you also study these two modules to enrich your knowledge and gain useful information that you can apply in your daily life.

What Will You Learn From This Module?

After studying this module, you should be able to:

- explain the units of measurement for power rating and electric power consumption;
- solve math problems concerning electric power consumption of appliances;
- read and interpret electric meters;
- compute for power consumption by interpreting electric meters;
- read and interpret electric bills; and
- compute for the cost of power consumption using information from the electric bill.

Let's See What You Already Know

Before starting with the lessons of this module, answer the following test items first. This will determine what you already know about this topic.

A. 1. In the basement room, four appliances are being used for a period of 3 hours. The appliances are the washing machine (585 W), the clothes dryer (280 W), the flat iron (600 W) and the electric fan (120 W). What is the total electric power consumption in kilowatt-hours? (3 points)

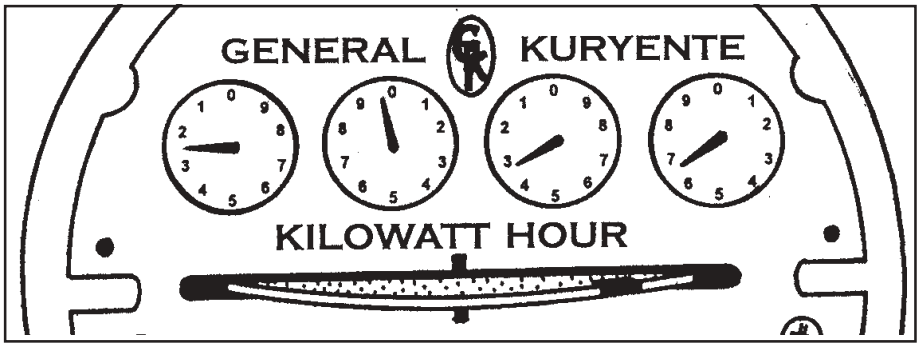
a) Total power rating: _____

b) Number of hours used: _____

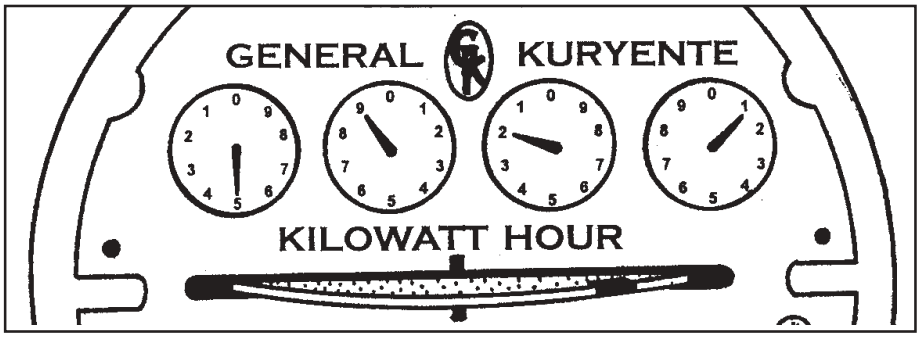
c) Total electric power consumption: _____

2. What is the reading on this electric meter?

_____

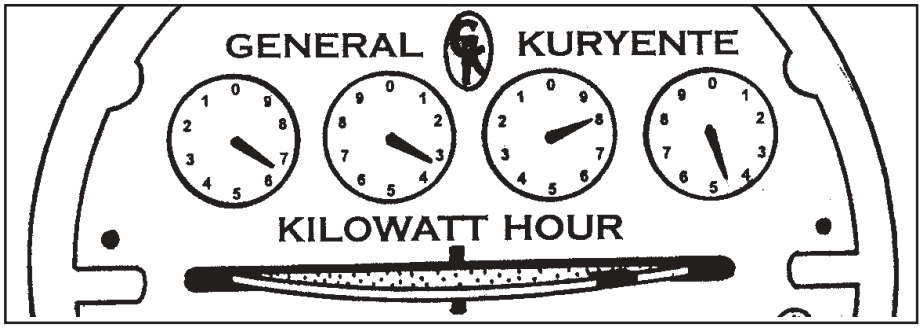


3. The electric meter inspector looked at the meter and saw this:



a) What is the reading on the electric meter? _____

After one month, the electric meter inspector came and saw this:



b) What is the reading on the electric meter?

_____

c) What is the total electric consumption for the month?

_____

B. 1. Aling Bebeng consumed 244 kilowatt-hours of electric power for the month of March.

a) What is Aling Bebeng's basic charge if the rates are as follows:

Basic Charge

- If less than 300 kilowatt-hours is consumed.

Energy (kW-h)	Rate	
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/kW-h	Energy =
Next 250 kW-h	₱ 3.4000/kW-h	Energy =

- If 300 kilowatt-hours and above is consumed, a flat rate of ₱ 3.4000 per kilowatt-hour is charged.

For the cost of basic charge:

Energy (kW-h)	Rate	
First _____kW-h	_____	_____
Next _____ kW-h	_____	_____
Next _____ kW-h	_____	_____
Total cost of basic charge		_____

Basic Charge _____

b) What is the cost of Aling Bebeng's currency adjustment if the currency adjustment rate is 3.92%?

For the currency adjustment:

Basic Charge	Percentage Rate	
_____	_____	____

Convert _____% to decimal form: _____

Currency adjustment: _____

c) What is the cost of Aling Bebeng's power purchase adjustment or PPA if the PPA rate is ₱ 1.548/kW-h?

For the power purchase adjustment:

Energy (kW-h)	PPA Rate	
_____	_____	____

PPA cost: _____

d) What is the total amount due for Aling Bebeng's electric bill?

_____

Well, how was it? Do you think you fared well? Compare your answers with those in the *Answer Key* on pages 56–57 to find out.

If all your answers are correct, very good! This shows that you already know much about the topics in this module. You may still study the module to review what you already know. Who knows, you might learn a few more new things as well.

If you got a low score, don't feel bad. This means that this module is for you. It will help you to understand important concepts that you can apply in your daily life. If you study this module carefully, you will learn the answers to all the items in the test and a lot more! Are you ready?

You may now go to the next page to begin Lesson 1.

How to Read and Interpret the Electric Meter

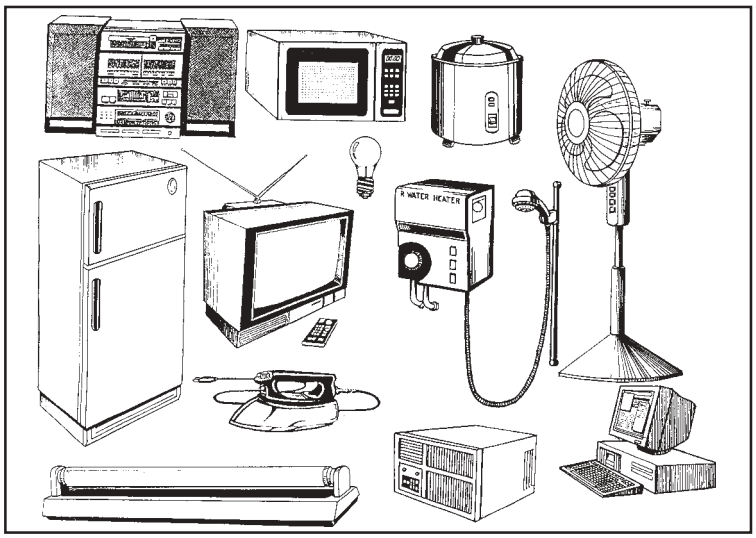
Do you have an electric meter at home? If so, do you know where to find it? Do you understand what it shows? Do you know how it is used by the electric company to compute your monthly electric bill? It looks difficult to understand at first glance, doesn't it?

In this lesson, you will learn all that you need to know about electric meters and how you can compute for the electric consumption using the information from it. After studying this lesson, you should be able to:

- describe the units of measurement for power rating and electric consumption;
- compute for the electric consumption based on the use of appliances;
- read and interpret the electric meter;
- compute for electric consumption using the information from the electric meter; and
- read and register daily electric consumption for a week.

Let's Try This

Can you identify which among the appliances below consume a lot of electricity?



1. List the appliances that you think consume a lot of electric power:

   _____

   _____

2. Review the appliances you have included in your list. Why do you think they consume a lot of electricity?

   _____

   _____

3. How might you calculate exactly how much electric power each appliance consumes?

   _____

   _____

If you were not able to fully answer questions 2 or 3 above, don't worry. We will learn more about the answers to these questions in the first part of this lesson.

Let's Study and Analyze

Appliances consume electric power. But how much electricity do they use? Appliances have a power rating that indicates the amount of electric power they consume. The power rating or wattage is measured in **watts** or **kilowatts**. The symbol for watts is "**W**" and the symbol for kilowatts is "**kW**."

$$1{,}000 \text{ watts} = 1 \text{ kilowatt}$$

To convert from watts to kilowatts, multiply the given watts by the conversion ratio: $\frac{1 \text{ kW}}{1{,}000 \text{ watts}}$

Example 1

Convert 3,678 watts to kilowatts.

$$3{,}678 \cancel{\text{watts}} \times \frac{1 \text{ kW}}{1{,}000 \cancel{\text{watts}}} = \frac{3{,}678}{1{,}000} \times 1 \text{ kW} = 3.678 \text{ kW}$$

3,678 watts is equivalent to 3.678 kilowatts.

Example 2

Convert 203 watts to kilowatts.

$$203 \cancel{\text{watts}} \times \frac{1 \text{ kW}}{1{,}000 \cancel{\text{watts}}} = \frac{203}{1{,}000} \times 1 \text{ kW} = 0.203 \text{ kW}$$

203 watts is equivalent to 0.203 kilowatts.

Let's Review

Convert the following from watts to kilowatts.

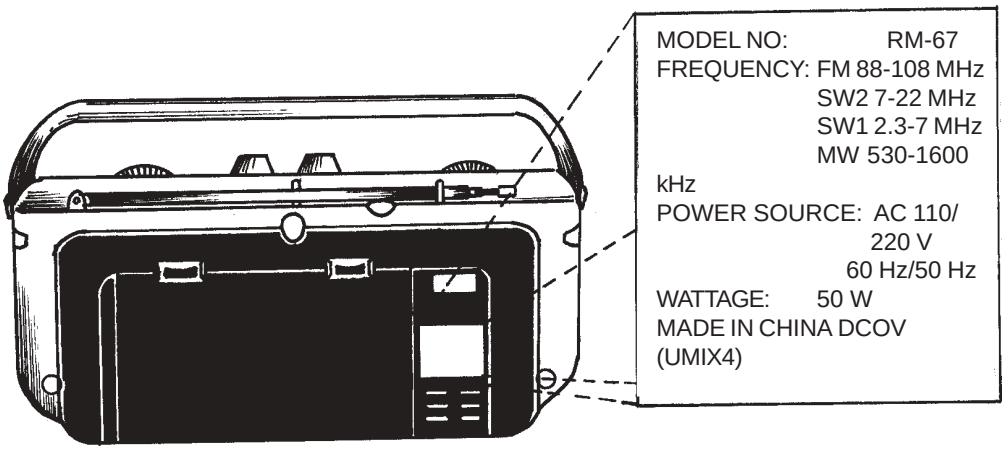
1. 45,871 W = _____ kW
2. 36 W = _____ kW
3. 2,980 W = _____ kW
4. 592 W = _____ kW
5. 3 W = _____ kW

Compare your answers with those in the *Answer Key* on page 57.

Let's Study and Analyze

You can determine the power rating or wattage of an appliance by looking at the back panel where it is indicated or else you can look it up in the appliance manual.

Back panel of a radio:



In this example, the power rating or wattage of the radio is 50 watts or 50 W. Look at the back of some of the appliances in your house. Try and identify the power rating or wattage and record it in the table below.

Appliances	

Here is a table of some appliances with their respective power rating. Compare your table with the appliances listed below.

Appliances	Wattage	Appliances
Water heater	3000 W	Refrigerator (11ft^3)
Oven (mini)	1500 W	Desk fan (18 in.)
Air Conditioner	1420 W	Television (color, 1
Flat Iron	600 W	Rice cooker (1 lit.)

Electric power consumption is the amount of electric energy that an appliance consumes within a certain period of time. Electric power consumption is obtained by multiplying the power rating of the appliance with the amount of time the appliance was used.

Power rating × Time used = Electric consumption

The power rating is usually expressed in **kilowatts** or "**kW.**" The time is usually expressed in hours with the symbol "**h.**" And electric consumption is usually expressed in **kilowatt-hours** or "**kW-h.**"

Example 1

The radio on the previous page has a power rating of 50 watts (50 W). If we turn the radio on for 4 hours, what is the electric power consumption?

Solution:

Power Rating: = 50 W

To convert to kW: $50 \cancel{W} \times \frac{1 \text{ kW}}{1{,}000 \cancel{W}} = \frac{50}{1{,}000} \times 1 \text{ kW} = .050 \text{ kW}$

Time of use: = 4 hours

Electric Power Consumption: = Power Rating × Time used

0.050 kW × 4 hours = 0.20 kW-h

So, a 50-W radio turned on for 4 hours will consume 0.20 kW-h of electric power.

Example 2

A desk fan with a power rating of 120 W is used for a period of 8 hours. What is the electric power consumption?

Solution:

Power Rating: = 120 W = 0.120 kW
Time of use: = 8 hours
Electric power consumption: = 0.120 kW × 8 h = $\boxed{0.96 \text{ kW-h}}$

So the 120-W desk fan, if used for 8 hours, will consume 0.96 kW-h of electric power.

Example 3

In a kitchen, an oven (1,500 W), a rice cooker (450 W) and a refrigerator (170 W) are used for three hours. What is the total electric power consumption?

Solution:

Power Rating: In order to calculate the total electric power consumption of the oven, rice cooker and refrigerator, we must first total the power rating of the three appliances.

1,500 W	+	450 W	+	170 W	=	2,120 W	=	2.12 kW
oven		rice cooker		refrigerator				

Time of use: 3 hours

Electric power consumption: Power Rating × Time

= 2.12 kW × 3 h = $\boxed{6.36 \text{ kW-h}}$

So the total electric power consumption of the oven, rice cooker and refrigerator is 6.36 kW-h.

Let's Review

1. A light bulb with a power rating of 120 W is turned on for 12 hours. What is its total power consumption?

   Solution:

   Power rating: _____
   Time of use: _____
   Electric power consumption: _____

2. In a living room, a flat iron (600 W), an electric fan (130 W) and a television (100 W) are used for 3 hours. What is the total electric power consumption?

   Solution:

   Power rating: _____
   Time of use: _____
   Electric power consumption: _____

3. In a bedroom, a television (80 W), an air conditioner (1,420 W) and a light bulb (100 W) are used for 6 hours. What is the total power consumption?

   Solution:

   Total power rating: _____
   Time of use:_____
   Electric power consumption: _____

Check to see if your answers are correct by referring to the *Answer Key* on pages 57–58.

Let's Think About This

You have learned how to calculate total electric power consumption for electrical appliances with different power ratings depending on time of use. Reflect for a while on how the power rating of appliances and the amount of time for which they are used affect total electric power consumption. Think carefully about the following questions and try to write possible answers on the spaces provided.

1. Which uses more electric power, a 75-W light bulb or a 100-W light bulb?
   _____
   _____

2. If an appliance, such as a television, is left switched on for a long period of time, what is the impact on electric consumption?

   _____
   _____

3. What are some ways to reduce electric power consumption?

   _____
   _____
   _____

4. What are the benefits of reducing electric power consumption?

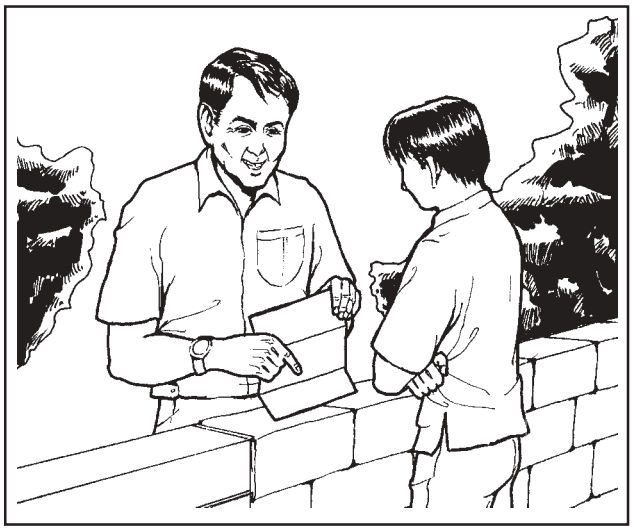
   _____
   _____
   _____

Compare your answers with those in the *Answer Key* on page 58. You may also discuss your answers with your Instructional Manager, family members or friends.

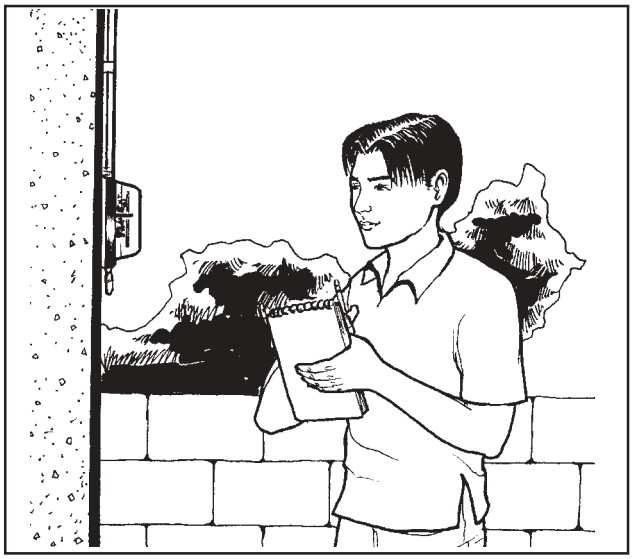
Let's Read

Boyet is an NFE A&E learner from a simple family. He dropped out of school when he was 15 years old because his parents could not afford to pay for the expenses of his schooling. One day, a notice of disconnection came from the electric company. Boyet's family is having a hard time paying for the electric bills because they can't really afford it.

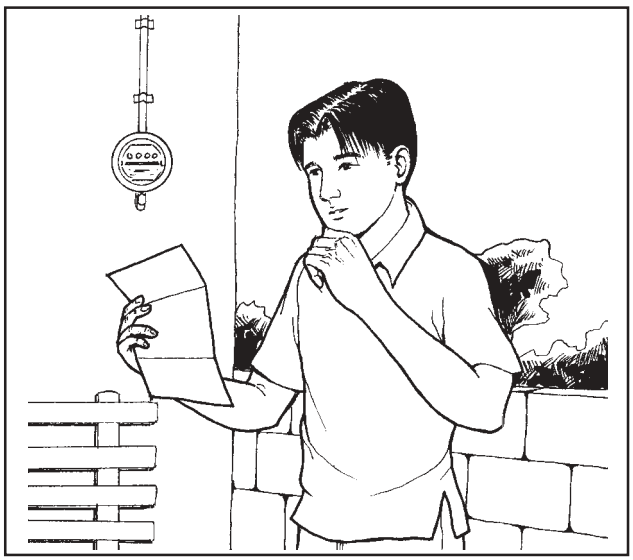
They usually borrow money from their relatives to pay for the bill in order to avoid a disconnection of electricity. Boyet started to think of a way to solve their problem. He looked at the electric bill but he had a difficult time understanding it. He also looked at the electric meter outside their house but he does not understand what it shows.



Then he met the electric inspector, who was about to check their meter. He asked help from the inspector, who then taught him how to read the electric meter and explained how it works.



Boyet now understands how much their electric consumption is. He even monitors how much electric power is consumed everyday. He thought of ways to reduce their daily electric consumption like turning off unused lights and electric fan or turning off the television when no one is watching. He told the other members of the family to do the same. He also suggested that they replace some of their 100-W light bulbs with 50-W and 75-W bulbs or fluorescent lights since these use less electricity.



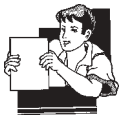
After another month has passed, the electric bill came and his parents were surprised to know that their electric bill had decreased considerably. Now they wouldn't have to borrow money from their relatives just to pay for their electric bill.

Let's Review

How did Boyet's knowledge of reading their electric meter help in reducing the cost of their electric bill?

_____
_____
_____
_____

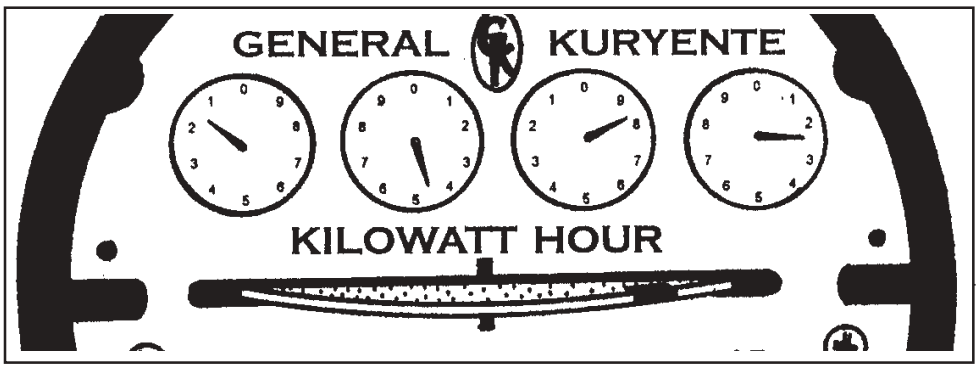
Compare your answer with that in the *Answer Key* on page 58.



Let's Learn

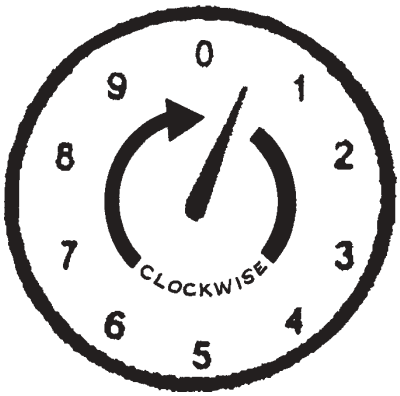
Have you ever seen an electric meter? Do you know how to read it?

You may have an electric meter at home. This meter is called a kilowatt-hour meter. Below is a picture of a typical electric meter.

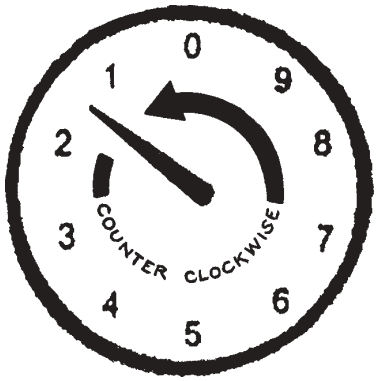


Check your own electric meter at home. By looking at the electric meter, you will see a round metal object spinning. It spins fast when you consume more electric power.

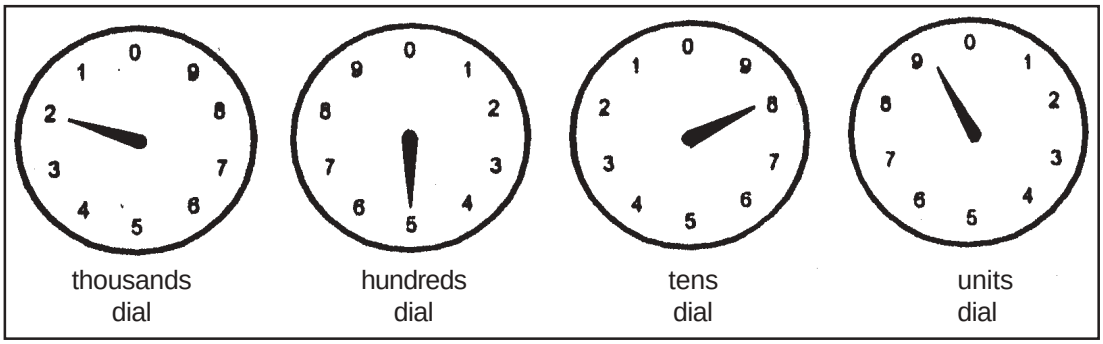
The electric meter has four dials that rotate either clockwise or counter-clockwise. The movement of the dial is according to the position or sequence of the numbers. If the numbers are arranged this way, the dial turns clockwise:



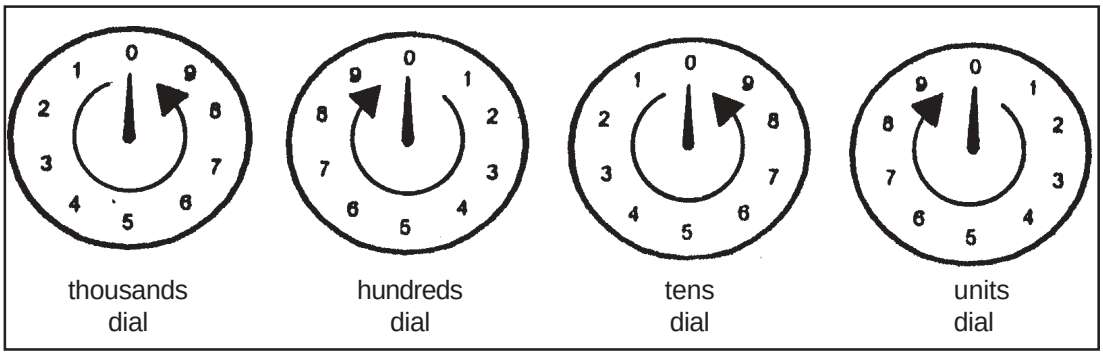
If the numbers are arranged this way, the dial turns counter-clockwise:



Observe the four dials in the electric meter carefully. There are ten numbers on each dial: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The numbers in each dial are read in sequence from left to right. The first dial indicates the thousands dial, the second dial is the hundreds dial, the third is the tens dial and the fourth is the units dial.



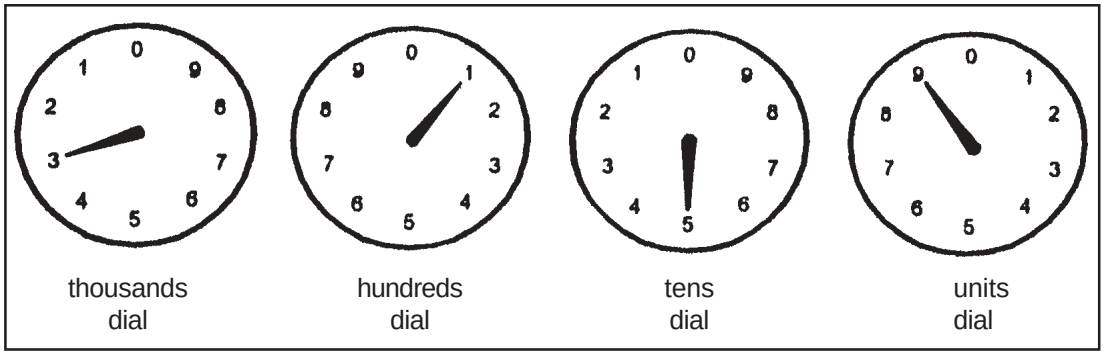
The pointer of the units dial and the hundreds dial rotate clockwise while the pointer of the tens dial and the thousands dial rotate counter-clockwise.



All the pointers rotate when electric power is being consumed. The units pointer rotates the fastest while the thousands pointer rotates the slowest.

It is easy to read the information on the electric meter. Just read the numbers where the pointers are pointing. Read the dials from left to right.

For example, let's read the information on the dials below:



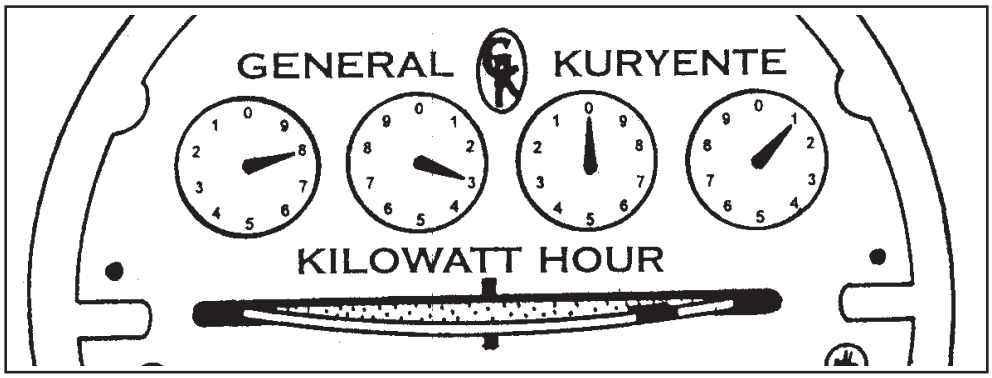
So how do you read the information on the 4 dials above?

- The pointer on the thousands dial is pointing to 3, which reads 3,000.
- The pointer on the hundreds dial is pointing to 1, which reads 100.
- The pointer on the tens dial is pointing to 5, which reads 50.
- The pointer on the units dial is pointing to 9.

So putting all the dials together, the meter should read from left to right as follows: 3,159 kW-h

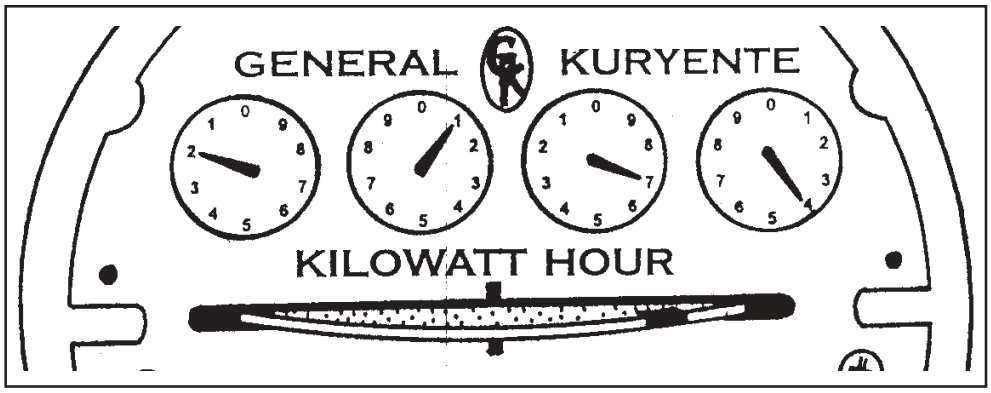
Let's Review

1. What is the reading on the electric meter below?



_____

2. What is the reading on the electric meter below?

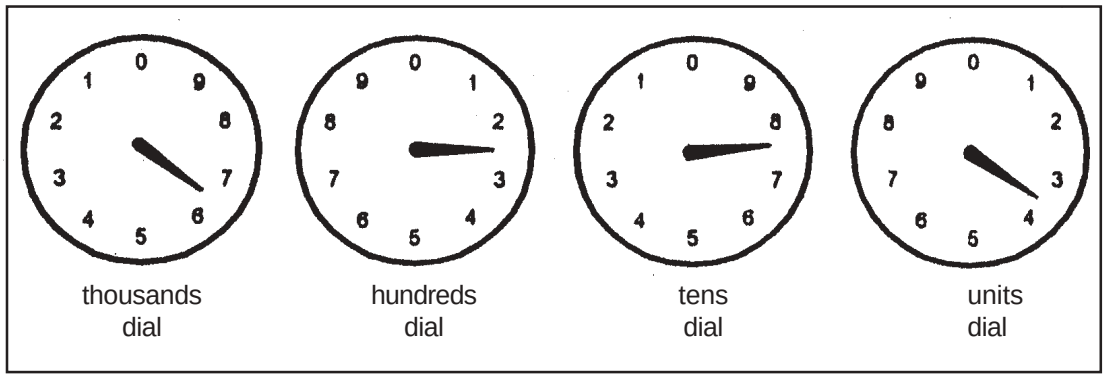


_____

Compare your answers with those in the *Answer Key* on pages 58–59.

Let's Study and Analyze

Now what if the pointers do not point exactly on a number but instead lies between two numbers? Do you read the lower number or the higher number?



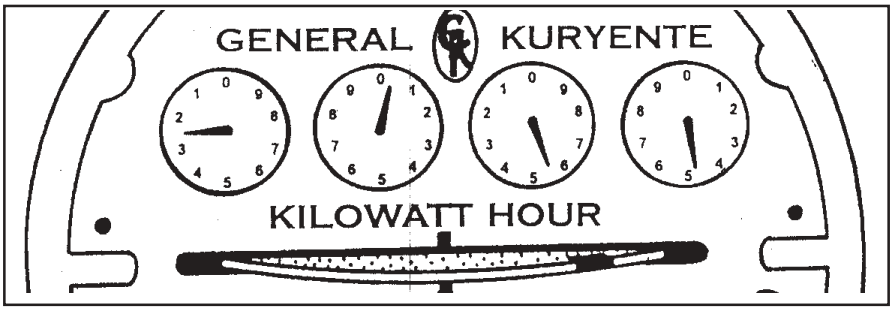
In this case, you should read the **lower number**.

- The thousands dial is between 6 and 7; the lower number is 6. It should therefore read 6,000.
- The hundreds dial is between 2 and 3; the lower number is 2. It should therefore read 200.
- The tens dial is between 7 and 8; the lower number is 7. It should therefore read 70.
- The units dial is between 3 and 4; the lower number is 3. It should therefore read 3.

Putting all the dials together the meter should read from left to right 6,273 kW-h.

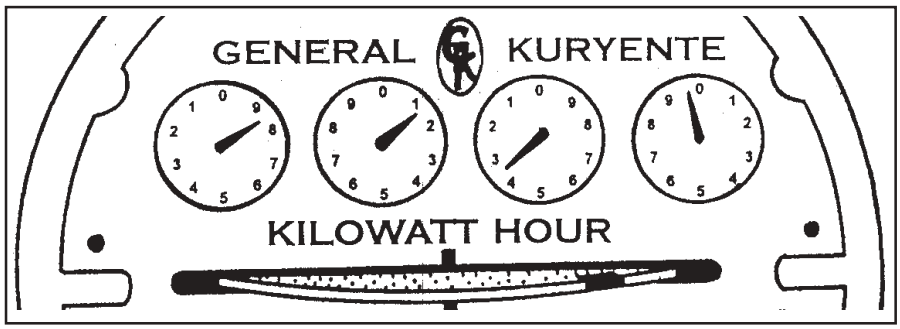
Let's Review

1. What is the reading on the electric meter below?



_____

2. What is the reading on the electric meter below?



_____

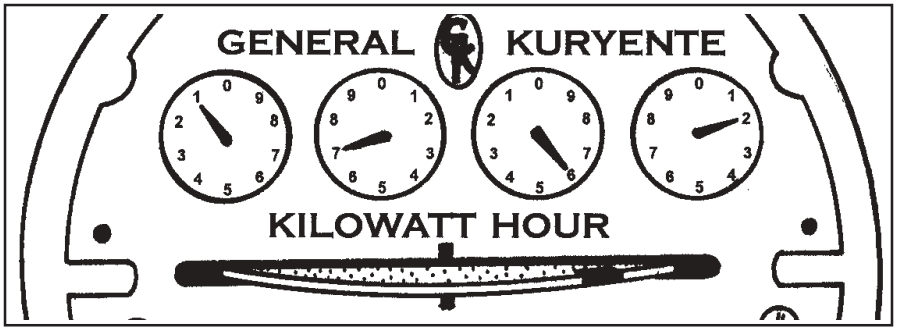
Compare your answers with those found in the *Answer Key* on page 59.

Let's Study and Analyze

How does the electric meter inspector check our electric power consumption? The inspector checks our electric meters monthly and compares the current reading on the dials of the electric meter with the reading taken the previous month.

Let us say that the inspector read an electric meter last month, on June 1 and saw this reading:

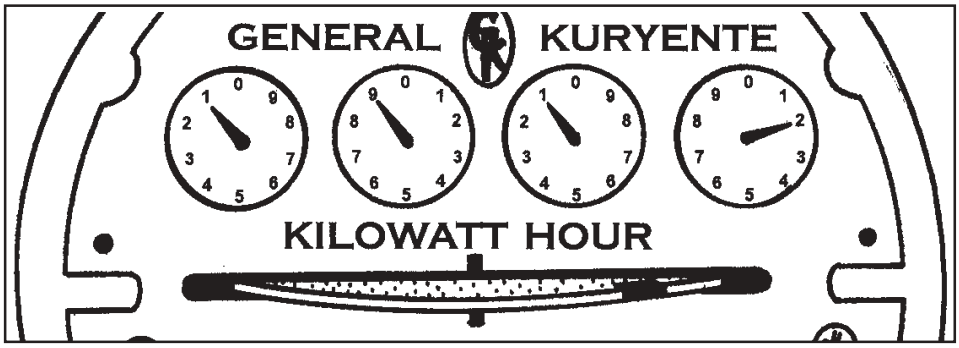
PREVIOUS READING



The meter reads 1,762 kW-h.

After one month, on July 1, the inspector again read the electric meter and saw this reading:

PRESENT READING



The meter reads 1,912 kW-h.

So how do we compute for the electric power consumption for the given period of time? We need to get the difference between the present reading and the previous reading.

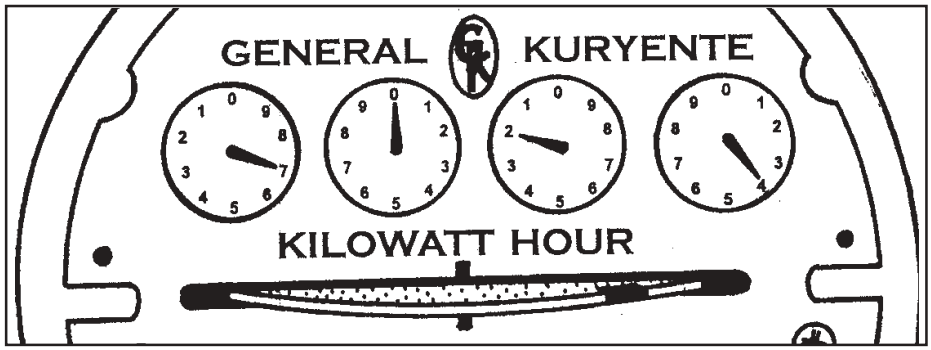
Present Reading: 1,912 kW-h
Previous Reading: 1,762 kW-h

Subtracting the two, we get:

1,912 kW-h
–1,762 kW-h
---
150 kW-h ⟹ This is the electric power consumed for the period of time between the date of the two readings.

Let's Solve This Problem

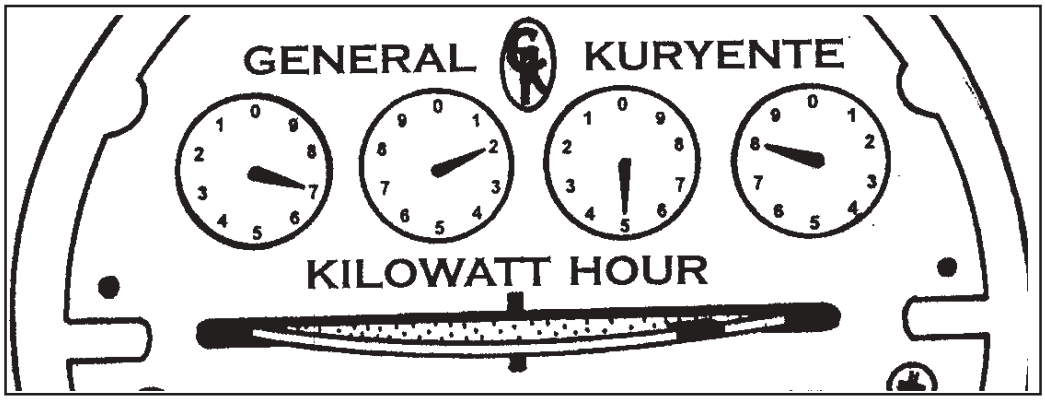
1. The inspector looked at the meter of Mang Berto and saw this:



a) What is the reading on the electric meter?

_____

After one month, the inspector again looked at the meter of Mang Berto and saw this:



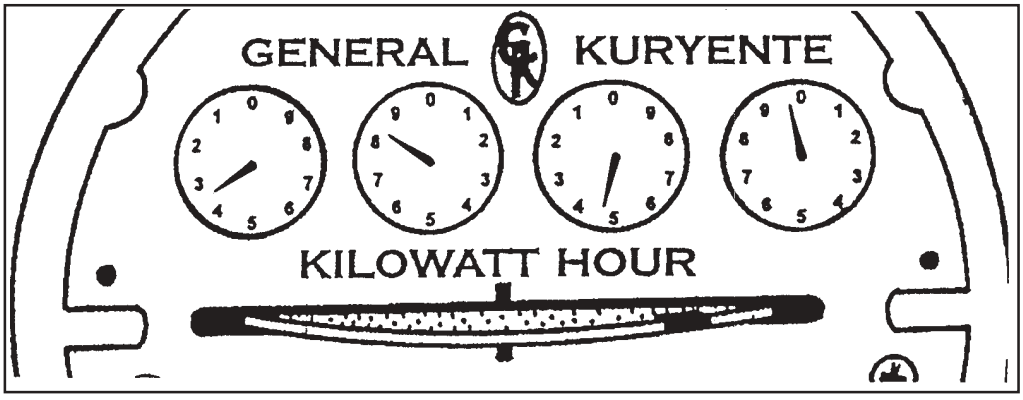
b) What is the reading on the electric meter?

_____

c) What is the total electric consumption of Mang Berto for the month?

_____

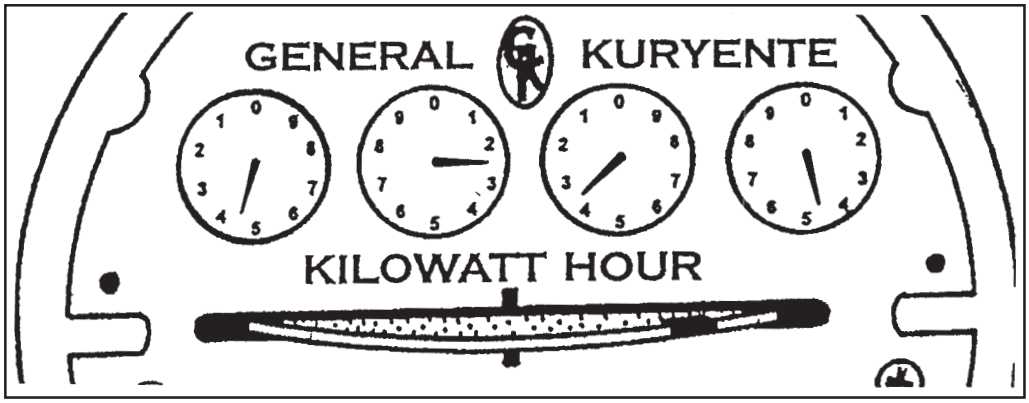
2. The inspector looked at the meter of Aling Elle and saw this:



a) What is the reading on the electric meter?

_____

After one month, the inspector again looked at the meter of Aling Elle and saw this:



b) What is the reading on the electric meter?

_____

c) What is the total electric consumption of Aling Elle for the month?

_____

Compare your answers with those in the *Answer Key* on page 59.

Let's Try This

You will do this activity for one week. Every day for seven consecutive days, you will observe your electric meter and compute for your daily electric consumption. You should inspect your meter at the same hour of the day for the whole week.

A sample table is shown as your guide:

Day, Time	Present Reading	Previous Re
1) Sunday, 8:00 a.m.	3,762 kW-h	**********
2) Monday, 8:00 a.m.	3,777 kW-h	3,762 kW-h
3) Tuesday, 8:00 a.m.	3,790 kW-h	3,777 kW-h
4) Wednesday, 8:00 a.m.	3,811 kW-h	3,790 kW-h
5) Thursday, 8:00 a.m.	3,830 kW-h	3,811 kW-h
6) Friday, 8:00 a.m.	3,855 kW-h	3,830 kW-h
7) Saturday, 8:00 a.m.	3,878 kW-h	3,855 kW-h
Total Power Consumed for the whole week: 116 kW-h 15 + 13 + 21 + 19 + 25 + 23 = 116 kW-h		

Use the table below when doing this activity:

Day, Time	Present Reading	Previous Readir
1)		**********
2)		
3)		
4)		
5)		
6)		
7)		
Total Power Consumed for the whole week: _____		

To check the computation for the total power consumption, you can subtract the very first meter reading on Sunday, 8:00 a.m. from the final present reading on Saturday, 8:00 a.m.

In the case of our sample table;

The present reading on Saturday, 8:00 a.m.	3,878 kW-h
The present reading on Sunday, 8:00 a.m.	– 3,762 kW-h
The difference between the two readings	116 kW-h

The answer is also 116 kW-h, which means the computations of the total power consumption in the sample table are correct. Try and check the computation of your own total power consumption for the week using the method described above.

Present reading on day 1	_____
Present reading on day 7	– _____
Difference between the two readings	_____

Are your answers the same? If so, your computations are correct.

Let's Review

Based on the activity above, answer the following questions:

1. On what day was your electric power consumption the highest? Why do you think your power consumption was high that day? What appliances did your family use that day?

   _____
   _____
   _____
   _____
   _____

2. On what day was your electric power consumption the lowest? Why do you think your power consumption was low that day? What appliances did your family use that day?

   _____
   _____
   _____
   _____
   _____

3. Can you suggest ways on how to reduce your daily electric power consumption?

   _____
   _____
   _____
   _____
   _____

Compare your answers with those in the *Answer Key* on page 60.

Let's Remember

- The measurement units for power rating is the watt (W) and the kilowatt (kW).
- 1,000 watts = 1 kilowatt
- The measurement unit for electric power consumption is the kilowatt-hour (kW-h).
- Electric power consumption is computed by subtracting the previous meter reading from the present meter reading for a given period of time (usually a month).

- You can decrease your electric power consumption by turning off electrical appliances such as the electric fan, TV or lights when they are not being used.

- You can also decrease your electric power consumption by choosing appliances with lower power ratings.

Let's See What You Have Learned

Congratulations, you have reached the final part of the first lesson. All you have to do now is to take a test. This will determine how much you have learned from the lesson. Good luck!

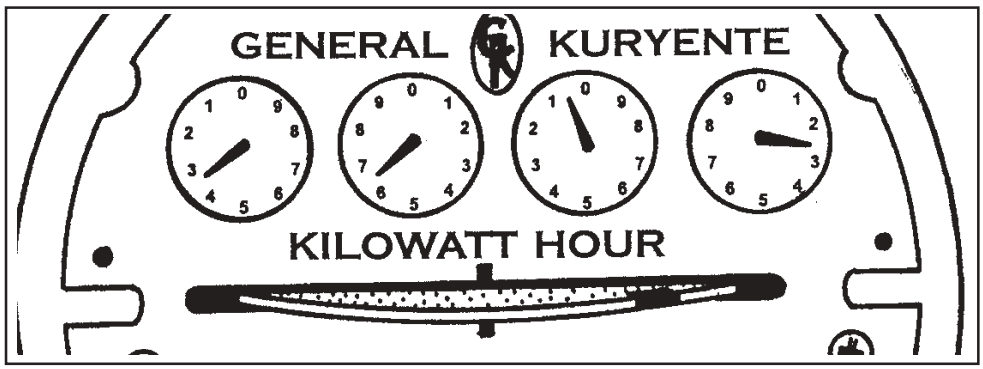
1. Four appliances are being used for a period of 5 hours. The appliances are the incandescent light bulb (100 W), the television (100 W), electric fan (130W) and refrigerator (170 W). What is the total electric power consumption? (3 points).

   Total power rating: _____ (1 point)

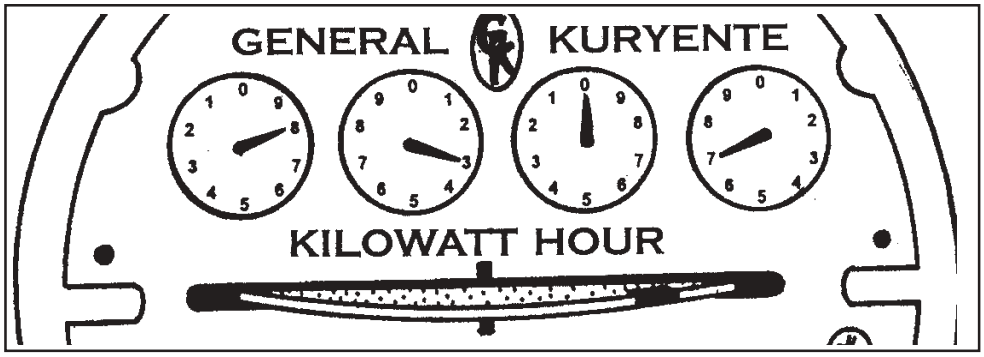
   Number of hours used: _____ (1 point)

   Total electric power consumption: _____ (1 point)

2. What is the reading on the electric meter in the picture below? (1 point)
   _____



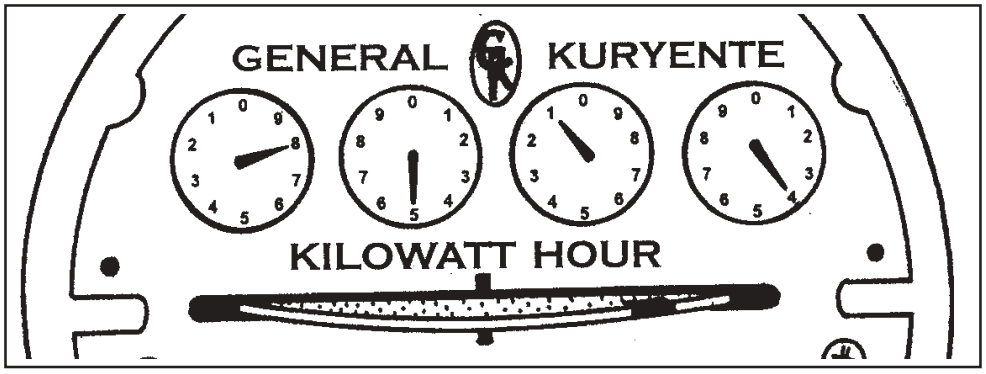
3. The inspector looked at the meter of Manong Edgar and saw this:



a) What is the reading on the electric meter? (1 point)

_____

After one month, the inspector again looked at the meter of Manong Edgar and saw this:



b) What is the reading on the electric meter? (1 point)

_____

c) What is the total electric consumption of Manong Edgar for the month? (1 point)

_____

4. Below is a record of the electric power consumption for one week. Fill in the missing information in the table. (10 points)

Day, Time	Present Reading	Previous I
1) Sunday, 7:00 a.m.	2,391 kW-h	**********
2) Monday, 7:00 a.m.	2,422 kW-h	a._____
3) Tuesday, 7:00 a.m.	c._____	2,422 kW
4) Wednesday, 7:00 a.m.	2,492 kW-h	2,457 kW
5) Thursday, 7:00 a.m.	2,539 kW-h	e._____
6) Friday, 7:00 a.m.	g._____	2,539 kW
7) Saturday, 7:00 a.m.	h._____	i._____
Total Power Consumed for the whole week: j._____		

5. Describe three ways to reduce total electric power consumption in one's house. (3 points)

_____

_____

_____

Was the test difficult? I'm sure that you got the answers correctly if you did the exercises in the lesson. Compare your answers with those in the *Answer Key* on pages 61–62. If your test score is:

0 – 5 You should study the whole lesson again.

6 – 10 Review the parts of the lesson which you did not understand.

11 – 15 Good! Study only the items in the lesson which you did not get correctly.

16 – 20 Excellent! You have understood the lesson well. Now you know how to read and interpret the electric meter. This will be a great help for you. You can now monitor your electric consumption and find ways of reducing it. You may now turn to the next page for the second lesson.

How to Read and Interpret the Electric Bill

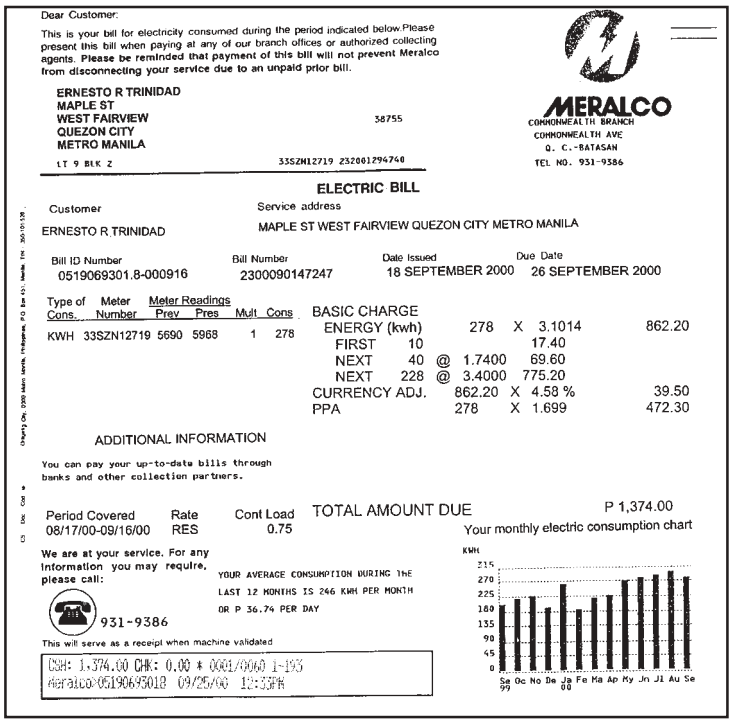
Every month you receive your electric bill. Do you understand what is written on it? Some of the items on the bill appear confusing, right? Do you understand what you are paying for? In Lesson 1 you have learned how to compute for your electric power consumption by reading your electric meter. Now, you will learn how the electric company charges you for your electric power consumption.

In this module, you will learn how to read and interpret the electric bill. After studying this lesson you should be able to:

- explain what is written on the electric bill;
- explain the meaning of the Basic Charge, Currency Adjustment and Power Purchase Adjustment (PPA); and
- compute for the electric consumption for a given period using the electricity rates on the electric bill.

Let's Study and Analyze

Below is a sample of an electric bill. This is from the Manila Electric Company or Meralco, which distributes electricity in Metro Manila.



Dear Customer:

This is your bill for electricity consumed during the period indicated below. Please present this bill when paying at any of our branch offices or authorized collecting agents. Please be reminded that payment of this bill will not prevent Meralco from disconnecting your service due to an unpaid prior bill.

ERNESTO R TRINIDAD
MAPLE ST
WEST FAIRVIEW
QUEZON CITY
METRO MANILA

38755

LT 9 BLK 2

33SZN12719 232001294740

MERALCO
COMMONWEALTH BRANCH
COMMONWEALTH AVE
Q. C.-BATASAN
TEL NO. 931-9386

ELECTRIC BILL

Customer	Service address
ERNESTO R TRINIDAD	MAPLE ST WEST FAIRVIEW QUEZON CITY METRO MANILA

Bill ID Number	Bill Number	Date Issued	Due Date
0519069301.8-000916	2300090147247	18 SEPTEMBER 2000	26 SEPTEMBER 2000

Type of Cons.	Meter Number	Meter Readings Prev	Pres	Mult	Cons
KWH	33SZN12719	5690	5968	1	278

BASIC CHARGE				
ENERGY (kwh)	278	X	3.1014	862.20
FIRST	10		17.40	
NEXT	40	@	1.7400	69.60
NEXT	228	@	3.4000	775.20
CURRENCY ADJ.	862.20	X	4.58 %	39.50
PPA	278	X	1.699	472.30

ADDITIONAL INFORMATION

You can pay your up-to-date bills through banks and other collection partners.

Period Covered	Rate	Cont Load
08/17/00-09/16/00	RES	0.75

TOTAL AMOUNT DUE P 1,374.00

We are at your service. For any information you may require, please call:

931-9386

YOUR AVERAGE CONSUMPTION DURING THE LAST 12 MONTHS IS 246 KWH PER MONTH OR P 36.74 PER DAY

This will serve as a receipt when machine validated

CSH: 1,374.00 CHK: 0.00 # 0001/0060 1-195
Meralco:0519069301.8 09/25/00 12:35PM

Your monthly electric consumption chart

KWH
315
270
225
180
135
90
45
0
Se Oc No De Ja Fe Ma Ap My Jn Jl Au Se
99 00

Study what is written in the electric bill.

Part A of an Electric Bill

This part of the bill contains the customer's name and address. This part also shows the date when the electric bill was issued and when it is supposed to be paid. Every customer has a special identification number shown as the bill ID number. Each bill also has its own number for record keeping purposes.

ELECTRIC BILL

Customer	Service address
ERNESTO R TRINIDAD	MAPLE ST WEST FAIRVIEW QUEZON CITY METRO MANILA

Bill ID Number	Bill Number	Date Issued	Due Date
0519069301.8-000916	2300090147247	18 SEPTEMBER 2000	26 SEPTEMBER 2000

This electric bill was issued on September 18, 2000 and should be paid before September 26, 2000. The bill ID number is 0519069301.8-000916. The bill number is 2300090147247.

A notice of disconnection will be issued about one week after the due date. You will be given three days to settle your account before your electricity is disconnected.

If Mr. Trinidad does not pay this electric bill before 26 September, he will be issued a notice of disconnection. If he does not settle his account within 3 days after receiving the notice, his power line will be disconnected.

Part B of an Electric Bill

This part of the bill shows the previous and present readings taken from a customer's electric meter. It indicates the power consumed within the period covered. This part of the bill also indicates the type of rate applied on the customer. The charge for residential properties is different from that of businesses. In this case, the rate for the residential type applies, indicated at the bottom of the bill as "RES."

Type of Cons.	Meter Number	Meter Readings Prev	Pres	Mult	Cons
KWH	33SZN12719	5690	5968	1	278

ADDITIONAL INFORMATION

You can pay your up-to-date bills through banks and other collection partners.

Period Covered	Rate	Cont Load
08/17/00-09/16/00	RES	0.75

In this electric bill, the previous meter reading was 5,690 kW-h. The present meter reading was 5.968 kW-h. The amount of power consumed for the one month period from 08/17/2000 to 09/16/2000 was 278 kW-h (5,968–5,690 = 278 kW-h).

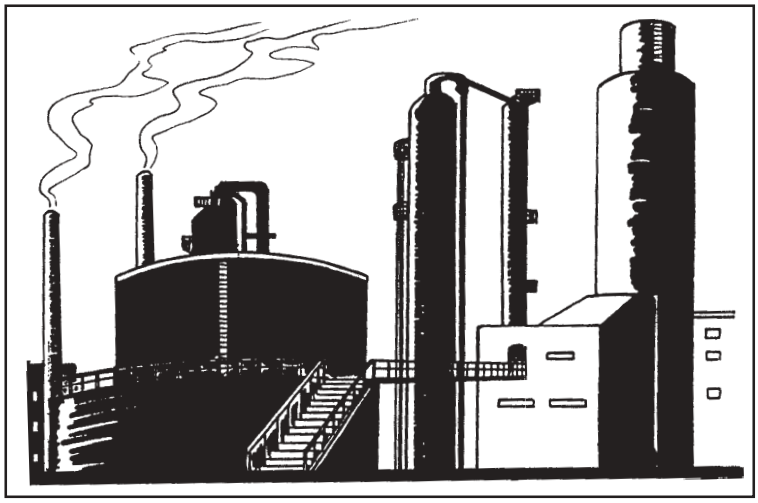
Part C of an Electric Bill

Below is another part of Mr. Trinidad's electric bill. This part of the bill shows the breakdown of computation of the amount due for electric consumption. The computations for basic charge, currency adjustment and power purchase adjustment (PPA) are shown here.

BASIC CHARGE					
ENERGY (kwh)			278	X 3.1014	862.20
FIRST	10			17.40	
NEXT	40	@	1.7400	69.60	
NEXT	228	@	3.4000	775.20	
CURRENCY ADJ.			862.20	X 4.58 %	39.50
PPA			278	X 1.699	472.30
TOTAL AMOUNT DUE					₱ 1,374.00

Basic Charge

The National Power Corporation (Napocor) is the distributor of electricity to companies like Meralco. Meralco and other companies buy electricity from Napocor. They distribute electricity to the cities and towns. Meralco and other electric companies, pass on to the customers the cost of the electricity they buy from Napocor. This is what makes up the basic charge or generation charge. But where do they base the cost of electricity?



The primary source of electricity in the Philippines are generators run by oil. Therefore, the cost of producing electricity is dependent on the price of oil. The **basic charge** or generation charge is then based on the price of oil. But the price of oil changes monthly. Napocor then estimates the amount for the basic charge or generation charge based on these oil price changes.

As you will observe, the rate for the basic charge increases when your electric consumption increases. Note that Mr. Trinidad is charged ₱ 17.40 for the first 10 kilowatt-hours of power consumed. This is the minimum amount you have to pay for the basic charge if your power consumption is 10 kW-h or lower.

A rate of ₱1.7400 kilowatt-hour will then be charged for the next 40 kW-h; and then ₱3.4000 per kilowatt-hour for the next 228 kW-h.

If your total power consumption reaches 300 kilowatt-hours, Meralco will charge you with a flat rate of ₱3.4000 per kilowatt hour.

Other electric companies have a flat rate per kilowatt-hour for the basic charge or generation charge.

Shown below is the computation of Mr. Trinidad's basic charge. Mr. Trinidad's total power consumption is 278 kW-h. He is charged ₱17.40 for the first 10 kilowatt-hours. For the next 40 kilowatt-hours, he is charged with a rate of ₱1.7400 per kilowatt-hour consumed.

$$40\ \cancel{kW\text{-}h} \times ₱1.7400/\cancel{kW\text{-}h} = ₱69.60$$

Therefore, he is charged ₱69.60 for the next 40 kilowatt-hours.

For the remaining 228 kilowatt-hours, Mr. Trinidad is charged ₱3.4000 per kilowatt-hour consumed.

$$228\ \cancel{kW\text{-}h} \times ₱3.4000/\cancel{kW\text{-}h} = ₱775.20$$

Therefore, Mr. Trinidad is charged ₱775.20 for the 228 remaining kilowatt-hours.

Adding up the cost of the basic charge:

$$₱17.40 + ₱69.60 + ₱775.20 = ₱862.20$$

The total basic charge adds up to ₱862.20.

Currency Adjustment

Did you notice that in addition to the Basic Charge for electricity consumed, there is another amount called the currency adjustment? What could this be?

$1 = ₱47.80

The **currency adjustment** is based on the Philippine peso and U.S. dollar exchange rate. This is because the U.S. dollar is used as payment for the oil we buy from other countries. Since the peso and dollar exchange rate changes, the currency adjustment is included in the computation of the electric consumption.

In the case of Mr. Trinidad, the currency adjustment is 4.58% of the ₱862.20 basic charge for the electricity consumed. 4.58% of ₱862.20 is ₱39.50.

Power Purchase Adjustment (PPA)

The **power purchase adjustment** or distribution charge is the electric company's service charge for distributing electricity to homes, offices, and industries in a certain region. Meralco charges with a flat rate per kilowatt-hour. Other electric companies charge progressively higher rates per kilowatt-hour as electric consumption increases.

The Power Purchase Adjustment (PPA) fee charged to Mr. Trinidad is ₱472.30.

Total Amount Due

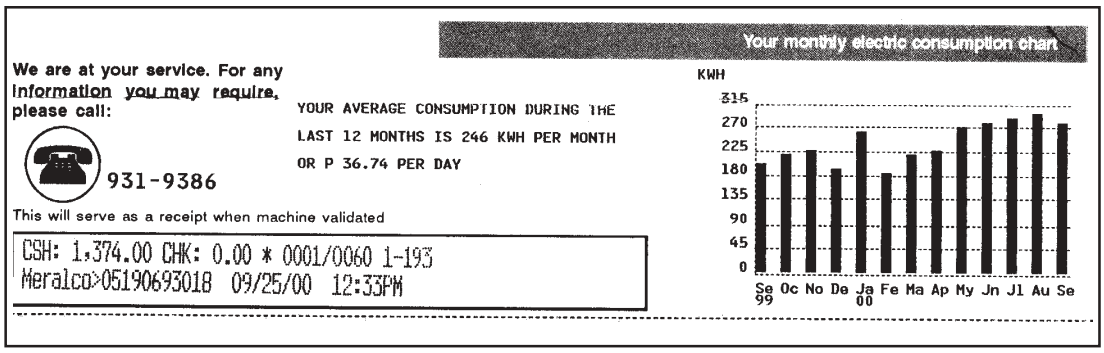
To check the total amount of the electric bill, we can add up all of the charges listed as follow:

Basic Charge:	₱ 862.20
Currency Adjustment:	₱ 39.50
PPA:	+ ₱ 472.30
	₱1,374.00

The total amount Mr. Trinidad must pay for his electric bill is ₱1,374.00.

Part D of an Electric Bill

This part of the bill gives the customer details on his or her monthly electric consumption for the last 12 months. This part shows the consumption chart and it also tells the customer's average monthly power consumption, as well as the average daily spending on electric power.



Looking at Mr. Trinidad's monthly electric consumption chart, there is a general trend showing an increase in his electric consumption over the past 12 months. The rise may be attributed to the increased use of appliances that consume a lot of electric power. It may also be attributed to his purchase of new electrical appliances — a bigger refrigerator, an additional electric fan, or an additional television.

Mr. Trinidad's average consumption during the last 12 months is 246 kW-h per month or ₱36.74 per day. This will give Mr. Trinidad an idea of how much electricity he consumes monthly and how much does it cost him per day. Decreasing Mr. Trinidad's electric consumption will affect the trend of the chart and the average consumption.

Let's Review

1) What does the basic charge in the electric bill account for?

_____
_____
_____

2) Why is there a currency adjustment for the basic charge?

_____
_____
_____

3) What does PPA stand for? What does it account for?

_____
_____
_____

Compare your answers with those in the *Answer Key* on page 63.

Let's Study and Analyze

In our study of the various parts of the Electric Bill, we found out that one of the most important elements is the Basic Charge, since this reflects the consumption of electric power for the month. It was mentioned that some electric companies have a flat rate per kilowatt-hour for the basic charge. The amount of electricity consumed is simply multiplied by this flat rate. For example, an electric company may charge a flat rate of ₱2.75 per kilowatt-hour. So if a customer consumes 100 kilowatt-hours:

100 kW-h × ₱2.75/ kW-h = ₱275.00

The customer will be charged ₱275.00.

Other electric companies such as Meralco have different rates depending on the amount of electricity consumed. In this case, as the amount of electric power consumed increases beyond certain limits, the rate also increases. How then do we compute the basic charge when the rate varies?

The table below shows Meralco's basic charge computation for customers who consume less than 300 kilowatt-hours per month. The rates for the basic charge are subject to change.

Basic Charge

Energy (kW-h)	Rate	Cost
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/kW-h	Energy x ₱ 1.7
Next 250 kW-h	₱ 3.4000/kW-h	Energy x ₱ 3.4

Example 1

Mang Pedro is a Meralco customer who consumed 37 kilowatt-hours of electricity for the month of April. How much is Mang Pedro's basic charge?

Solution:

To calculate Mang Pedro's Basic Charge we use the data in the table above that shows Meralco's basic charge computations for its customers.

Energy (kW-h)	Rate	Cost
First 10 kW-h	₱ 17.40	₱ 17.40

For the first 10 kW-h, Mang Pedro will have to pay ₱ 17.40.

Energy left: 37 kW-h – 10 kW-h = 27 kW-h

This falls under the next 40 kilowatt-hours:

Energy (kW-h)	Rate	Cost
Next 27 kW-h	₱ 1.7400/kW-h	₱ 46.98

$$27 \text{ kW-h} \times ₱\, 1.7400/\text{ kW-h} = ₱\, 46.98$$

Therefore, the total cost of Mang Pedro's basic charge is:

Energy (kW-h)	Rate	Cost
First 10 kW-h	₱ 17.40	₱ 17.40
Next 27 kW-h	₱ 1.7400/kW-h	₱ 46.98
Total cost of basic charge		₱ 64.38

Basic Charge: ₱ 17.40 + ₱ 46.98 = ₱ 64.38

Example 2

Mang Mario's electric consumption for the month of December is 268 kW-h. How much is Mang Mario's basic charge?

Solution:

Energy (kW-h)	Rate	Cos
First 10 kW-h	₱ 17.40	₱ 17.40

For the first 10 kW-h of electric power consumed, Mang Mario has to pay ₱ 17.40.

Energy left: 268 kW-h – 10 kW-h = 258 kW-h

The next 40 kW-h from the 258 kW-h will be computed this way:

Energy (kW-h)	Rate	Cos
Next 40 kW-h	₱ 1.7400/kW-h	₱ 69.60

40 ~~kW-h~~ × ₱ 1.7400/ ~~kW-h~~ = ₱ 69.00

Energy left: 258 kW-h – 40 kW-h = 218 kW-h

The remaining 218 kW-h will be computed this way:

Energy (kW-h)	Rate	Cos
Next 218 kW-h	₱ 3.4000/kW-h	₱ 741.20

218 ~~kW-h~~ × ₱ 3.4000/ ~~kW-h~~ = ₱ 741.20

Therefore, the total cost of Mang Mario's basic charge is:

Energy (kW-h)	Rate	Cos
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/kW-h	₱ 69.60
Next 218 kW-h	₱ 3.4000/kW-h	₱ 741.20
Total cost of basic charge		₱ 828.20

Basic Charge: ₱ 17.40 + ₱ 69.60 + ₱ 741.20 = ₱ 828.20

Let's Solve This Problem

1. Aling Letty is a Meralco customer. She consumed 39 kilowatt-hours of electric power for one month. How much does she have to pay for the basic charge?

Solution:

Energy (kW-h)	Rate	
First _____ kW-h	₱ _____	=
Next _____ kW-h	₱ _____	=
Total cost of basic charge		=

2. Mang Lino consumed 242 kilowatt-hours of electric power for the month of November. How much does he have to pay for the basic charge?

Solution:

Energy (kW-h)	Rate	
First _____kW-h	₱ _____	₱ _
Next _____ kW-h	₱ _____	₱ _
Next _____ kW-h	₱ _____	₱ _
Total cost of basic charge		₱ _

Compare your answers with those in the *Answer Key* on pages 63–64.

Let's Study and Analyze

We have learned from the lessons above how to compute for the basic charge when the electric power consumption is below 300 kilowatt-hours. If the monthly electric power consumption reaches 300 kilowatt-hours or more, the computation for the basic charge will change.

To compute for the cost of the basic charge when the electric power consumption exceeds 300 kilowatt-hours, a constant rate is charged for **every** kilowatt-hour consumed. The rate for Meralco customer is ₱ 3.4000/kW-h. Other electric companies have similar rates. However, it is subject to change according to the discretion of the electric power companies.

Notice that the constant rate of P 3.4000/kW-h **replaces** the progressive rates that was explained earlier when the electric power consumption exceeds 300 kilowatt-hours per month. What is the implication of this for the cost of the electric bill? As you will notice, the progressive rates are cheaper than the high constant rate of ₱ 3.4000 per kilowatt-hour consumed.

It is, therefore, advantageous to keep your electric consumption under 300 kW-h per month. If not, **then the cost per kilowatt-hour increases dramatically**.

Example 1

Aling Flor, a Meralco customer, consumed 336 kilowatt-hours of electricity for the month of December. What is the cost of the basic charge?

Solution:

Energy (kW-h)	Rate	Cos
336 kW-h	₱ 3.4000/kW-h	₱ 1,142.40

Basic Charge: 336 kW-h × ₱ 3.4000/ kW-h = ₱ 1,142.40

Example 2

Mang Carlos consumed 360 kilowatt-hours of electric power for the month of January. What is the cost of the basic charge?

Solution:

Energy (kW-h)	Rate	Cos
360 kW-h	₱ 3.4000/kW-h	₱ 1,224.00

Basic Charge: 360 ~~kW-h~~ × ₱ 3.4000/ ~~kW-h~~ = ₱ 1,224.00

Let's Solve This Problem

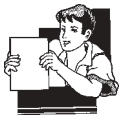
Aling Azon consumed 387 kilowatt-hours of electric power for a period of one month. What is the cost of the basic charge?

Solution:

Energy (kW-h)	Rate	
_____	_____	₱

Basic Charge: _____

Compare your answers with those in the *Answer Key* on page 64.



Let's Learn

You can save money by keeping your monthly electric power consumption below 300 kilowatt-hours. Electric power companies charge at a higher rate when your electric power consumption is high.

As we discussed in Lesson 1, you should, therefore, reduce your monthly electric power consumption by conserving electricity. You can turn off appliances that are not in use such as:

- electric fans turned on when nobody is in the room;
- the television turned on the whole night; and
- a light bulb turned on in an unoccupied room.

Let's Study and Analyze

Currency Adjustment Computations

We have now computed the basic charge. But what about the currency adjustment computation?

The currency adjustment for the basic charge is computed using a percentage rate. The total cost of the basic charge is multiplied by the percentage rate to get the currency adjustment. Since the peso-dollar rate changes often, the percentage rate varies from month to month.

Example 1

Mang Carlos' basic charge is ₱ 1,224.00. If the percentage rate for the currency adjustment is 4.23%, what is the cost of the currency adjustment?

Solution:

Basic Charge	Percentage Rate	
₱ 1,224.00	4.23%	₱

Convert 4.23% to decimal form: 0.0423

Currency adjustment:

$$₱\,1{,}224.00 \times 0.0423 = ₱\,51.7752 \cong \boxed{₱\,51.78} \text{ (round off)}$$

Example 2

Mang Mario's basic charge is ₱828.20. If the percentage rate for the currency adjustment is 3.14%, what is the cost of the currency adjustment?

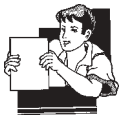
Solution:

Basic Charge	Percentage Rate	
₱828.20	3.14%	₱26.0

Convert 3.14% to decimal form: 0.0314

Currency adjustment:

$$₱828.20 \times 0.0314 = ₱26.00548 \cong \boxed{₱26.01} \text{ (round off)}$$



Let's Learn

You will notice from the examples given above that the cost of the currency adjustment increases as the monthly electric power consumption increases. Decreasing your monthly electric power consumption will likewise decrease the amount you pay for the currency adjustment.

It is, thus, advantageous to conserve on your electric power consumption to minimize the amount you pay for the currency adjustment and most importantly, to decrease the cost you pay for your electric bill.

Let's Solve This Problem

1. Aling Senya's basic charge is ₱233.20. If the percentage rate for the currency adjustment is 4.53%, what is the cost of the currency adjustment?

   Solution:

Basic Charge	Percentage Rate	

   Convert _____% to decimal form: _____

   Currency adjustment:

   _____

2. Mang Obet's basic charge is ₱938.40. If the percentage rate for the currency adjustment is 3.97%, what is the cost of the currency adjustment?

Solution:

Basic Charge	Percentage Rate	

Convert _____% to decimal form: _____

Currency adjustment:

_____

3. How does the cost of the basic charge affect the amount to be paid for the currency adjustment?

_____
_____
_____

Compare your answers with those in the *Answer Key* on page 64.

Let's Study and Analyze

Power Purchase Adjustment Computations

The final component of the charges that make up a household's electric bill is the power purchase adjustment computation.

The cost for the power purchase adjustment (PPA) is computed using a flat rate estimated by companies such as Meralco. To compute for the PPA, the total electric power consumed is multiplied by this rate.

Example 1

Aling Trining consumed a total of 173 kilowatt-hours of electric power for the month of August. How much will she pay for the power purchase adjustment if the PPA rate is ₱1.732 per kilowatt-hour?

Solution:

Energy (kW-h)	PPA Rate	Co
173 kW-h	₱1.732/ kW-h	₱299.64

PPA cost: 173 ~~kW-h~~ × ₱1.732/ ~~kW-h~~ = ₱299.636 ≅ ₱299.64
(round off)

Example 2

Mang Boyet consumed a total of 328 kilowatt-hours of electric power for the month of December. What is the cost of his power purchase adjustment if the PPA rate is ₱1.391 per kilowatt-hour?

Solution:

Energy (kW-h)	PPA Rate	C
328 kW-h	₱1.391/ kW-h	₱456.25

PPA cost: 328 ~~kW-h~~ × ₱1.391/ ~~kW-h~~ = ₱456.248 ≅ ₱456.25 (round off)

Let's Solve This Problem

1) Mang Kiko consumed a total of 265 kilowatt-hours of electric power. How much is the cost of his power purchase adjustment if the PPA rate is ₱1.394/ kW-h?

Solution:

Energy (kW-h)	PPA Rate	

PPA cost: _____

2) Manang Nita consumed a total of 318 kilowatt-hours of electric power. How much is the cost of her power purchase adjustment if the PPA rate is ₱1.246/ kW-h?

Solution:

Energy (kW-h)	PPA Rate	

PPA cost: _____

Compare your answers with those in the *Answer Key* on page 65.

Let's Study and Analyze

Computations for Cost of Electric Bill

We have learned how to compute for the basic charge, currency adjustment and power purchase adjustment. We will now try to solve for the total cost of the electric bill using what we have learned.

The computations will be the same as what we did in the previous exercises, but it will be longer as we will be adding all the different computations together to get the total cost of the electric bill.

Example 1

Aling Remia's electric power consumption is 258 kilowatt-hours.

a) What is Aling Remia's basic charge if the rates are as follows:

Basic Charge

- If less than 300 kilowatt-hours is consumed.

Energy (kW-h)	Rate	Cos
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/kW-h	Energy x ₱ 1.7
Next 250 kW-h	₱ 3.4000/kW-h	Energy x ₱ 3.4

- If 300 kilowatt-hours and above is consumed, a flat rate of ₱ 3.4000 per kilowatt-hour is charged.

For the cost of basic charge:

Energy (kW-h)	Rate	Cos
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400	₱ 69.60
Next 208 kW-h	₱ 3.4000	₱ 707.20
Total cost of basic charge		₱ 794.20

Basic Charge: ₱ 794.20

b) What is the cost of Aling Remia's currency adjustment if the currency adjustment rate is 4.84 %?

For the currency adjustment:

Basic Charge	Percentage Rate	
₱ 794.20	4.84%	₱ 3

Convert 4.84% to decimal form: 0.0484

Currency adjustment: ₱ 794.20 × 0.0484 = ₱ 38.43928 ≅ ₱ 38.44 (round off)

c) What is the cost of Aling Remia's PPA if the PPA rate is ₱ 1.387/ kW-h?

For the power purchase adjustment:

Energy (kW-h)	PPA Rate	
258 kW-h	₱ 1.387/ kW-h	₱ 357.

PPA cost: 258 ~~kW-h~~ × ₱ 1.387/ ~~kW-h~~ = ₱ 357.846 = ₱ 357.85 (round off)

d) What is the total amount due for Aling Remia's electric bill?

Basic charge + Currency adjustment + PPA = Total Amount Due

₱ 794.20 + ₱ 38.44 + ₱ 357.85 = ₱ 1,190.49

The total amount of Aling Remia's electric bill is ₱ 1,190.49.

Example 2

Mang Tiago's previous meter reading was 7,853 kW-h and his present meter reading is 8,215 kW-h.

a) What is Mang Tiago's electric consumption?

Total electric consumption: 8,215 kW-h – 7,853 kW-h = 362 kW-h

b) What is the cost of Mang Tiago's basic charge if the rates are as follows:

Basic Charge

- If less than 300 kilowatt-hours is consumed.

Energy (kW-h)	Rate	Co
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/ kW-h	Energy x ₱ 1
Next 250 kW-h	₱ 3.4000/ kW-h	Energy x ₱ 3

- If 300 kilowatt-hours and above is consumed, a flat rate of ₱ 3.4000 per kilowatt-hour is charged.

Energy (kW-h)	Rate	
362 kW-h	₱ 3.4000/kW-h	₱ 1,23

Basic charge: 362 ~~kW-h~~ × ₱ 3.4000/~~kW-h~~ = ₱ 1,230.80

c) What is the cost of the currency adjustment if the percentage rate is 4.25%?

Basic Charge	Percentage Rate	
₱ 1,230.80	4.25%	₱ 52.3

Convert 4.25% to decimal form: 0.0425

Currency adjustment: ₱ 1,230.80 × 0.0425 = ₱ 52.309 ≅ ₱ 52.31 (round off)

d) What is the cost of the PPA if the PPA rate is ₱ 1.714/ kW-h?

For the power purchase adjustment:

Energy (kW-h)	PPA Rate	
362 kW-h	₱ 1.714/kW-h	₱ 620.

PPA cost: 362 ~~kW-h~~ × ₱ 1.714/ ~~kW-h~~

e) What is the total amount due for the electric bill?

Total Amount Due:

Basic charge + Currency adjustment + PPA = Total Amount Due

₱ 1,230.80 + ₱ 52.31 + ₱ 620.47 = ₱ 1,903.58

The total amount of Mang Tiago's electric bill due for payment is ₱ 1,903.58. He will need to pay this amount no later than one week after the due date- or his power line would be disconnected.

Let's Solve This Problem

1. Manong Carlos consumed 281 kilowatt-hours of electric power for the month of October.

   a) What is the total cost of the basic charge if these are the rates:

   Basic Charge

   - If less than 300 kilowatt-hours is consumed.

Energy (kW-h)	Rate	Cos
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/ kW-h	Energy x ₱ 1
Next 250 kW-h	₱ 3.4000/ kW-h	Energy x ₱ 3

   - If 300 kilowatt-hours and above is consumed, a flat rate of ₱ 3.4000 per kilowatt-hour is charged.

For the cost of basic charge:

Energy (kW-h)	Rate	Cos
First _____kW-h	_____	_____
Next _____ kW-h	_____	_____
Next _____ kW-h	_____	_____
Total cost of basic charge		_____

Basic Charge: _____

b) What is the amount to be paid for the currency adjustment if the rate is 3.94%?

Basic Charge	Percentage Rate	Co

Convert _____% to decimal form: _____

Currency adjustment:

_____

c) What is the amount to be paid for the power purchase adjustment (PPA) if the PPA rate is ₱ 1.562/kW-h?

Energy (kW-h)	PPA Rate	

PPA cost: _____

d) What is the total amount due for the electric bill?

Total Amount Due:

_____

2. Aling Lolit has a previous meter reading of 5,297 kW-h and has a present meter reading of 5,638 kW-h.

a) What is the total electric consumption?

_____

b) What is the total cost of the basic charge if these are the rates:

Basic Charge

If less than 300 kilowatt-hours is consumed

Energy (kW-h)	Rate	
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400 per kW-h	Energy =
Next 250 kW-h	₱ 3.4000 per kW-h	Energy =

- If 300 kilowatt-hours and above is consumed, a flat rate of ₱ 3,4000 per kilowatt-hour is charged.

Energy (kW-h)	Rate	

Basic Charge: _____

c) What is the amount to be paid for the currency adjustment if the rate is 4.38%?

Basic Charge	Percentage Rate	

Convert _____% to decimal form: _____

Currency adjustment:

_____

d) What is the amount to be paid for the power purchase adjustment (PPA) if the PPA rate is ₱ 1.684/kW-h?

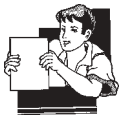
Energy (kW-h)	PPA Rate	

PPA cost: _____

e) What is the total amount due for the electric bill?

_____

Compare your answers with those in the *Answer Key* on pages 65–66.



Let's Learn

As you have seen from the examples above, the cost of your electric bill will vary depending on your electric power consumption. The more electric power you consume, the higher the rates for the electric bill.

You will observe that your electric bill will dramatically rise when you consume 300 kilowatt-hours or more of electric power per month. This is because of the increase in the rate of the basic charge, which also affects and increases the cost of the currency adjustment.

It is, therefore, advisable to keep your monthly electric consumption below 300 kilowatt-hours.

Let's Try This

Let us look at the electric bill of Mr. Trinidad again. We will now see if you can read and interpret the bill correctly.

Dear Customer:

This is your bill for electricity consumed during the period indicated below. Please present this bill when paying at any of our branch offices or authorized collecting agents. **Please be reminded that payment of this bill will not prevent Meralco from disconnecting your service due to an unpaid prior bill.**

ERNESTO R TRINIDAD
MAPLE ST
WEST FAIRVIEW
QUEZON CITY
METRO MANILA

38755

LT 9 BLK 2

33SZN12719 232001294740

MERALCO
COMMONWEALTH BRANCH
COMMONWEALTH AVE
Q. C.-BATASAN
TEL NO. 931-9386

ELECTRIC BILL

Customer	Service address
ERNESTO R TRINIDAD	MAPLE ST WEST FAIRVIEW QUEZON CITY METRO MANILA

Bill ID Number	Bill Number	Date Issued	Due Date
0519069301.8-000916	2300090147247	18 SEPTEMBER 2000	26 SEPTEMBER 2000

Type of Cons.	Meter Number	Meter Readings Prev	Pres	Mult	Cons
KWH	33SZN12719	5690	5968	1	278

BASIC CHARGE				
ENERGY (kwh)	278	X	3.1014	862.20
FIRST 10			17.40	
NEXT 40	@	1.7400	69.60	
NEXT 228	@	3.4000	775.20	
CURRENCY ADJ.	862.20	X	4.58 %	39.50
PPA	278	X	1.699	472.30

ADDITIONAL INFORMATION

You can pay your up-to-date bills through banks and other collection partners.

Period Covered	Rate	Cont Load
08/17/00-09/16/00	RES	0.75

TOTAL AMOUNT DUE P 1,374.00

We are at your service. For any information you may require, please call:

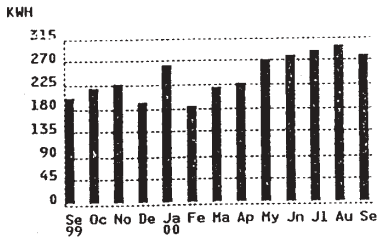
931-9386

YOUR AVERAGE CONSUMPTION DURING THE LAST 12 MONTHS IS 246 KWH PER MONTH OR P 36.74 PER DAY

This will serve as a receipt when machine validated

CSH: 1,374.00 CHK: 0.00 * 0001/0060 1-193
Meralco>05190693018 09/25/00 12:33PM

Your monthly electric consumption chart



Based on the bill above, answer the following questions.

1. When is the deadline for paying the bill? _____
2. How much is the electric power consumption? _____
3. What is the previous meter reading? _____
4. What is the bill number? _____
5. What is the rate for the currency adjustment? _____

6. What is the average consumption (in kilowatt-hours) during the last 12 months? _____

7. What is the total cost of the bill? _____

Compare your answers with those found in the *Answer Key* on page 67.

Let's Study and Analyze

So far, we have only been using the sample bill of Meralco as a basis of the lesson, but what about the bills of other electric companies from different parts of the country? Most electric companies issue electric bills that are quite similar to Meralco's. Some electric companies, however, use a flat rate for their basic charge (also called generation charge) rather than the progressive rates used by Meralco.

Below is a bill from Panay Electric Company Inc. (PECO). It is an electric company based in Iloilo City. Below is a sample of the bill.

PANAY ELECTRIC COMPANY, INC.
ILOILO CITY • TIN-001-002-833 NON-VAT
STATEMENT OF ACCOUNT
THIS IS YOUR RECEIPT IF MACHINE VALIDATED

SANTOS, MARICEL MAHARLIKA SUBD., JARO	36 30	SERVICE NO	MTR	METER NO	SERIAL NO
		3-28163	01	36-475	82225720

METER READING PRESENT	METER READING PREVIOUS	MULT.	CONSUMPTION	CLASS	LOAD	PERIOD COVERED
7433	7053	01	380	R	1100	05/31 –06/29/2000

Generation Charge- 380 kwh @ 4.69	1, 782.20	UNPAID BILLS MO	YR	BILL NO	SURCHARGE	AMOUNT DUE
		6	00	88296		2,054.25
Distribution Charge-	272.05				Thank you for paying your account on time.	
1st 30 @ 1.10	33.00					
nxt 55 @ .86	47.30					
nxt 295 @ .65	191.75					
		TOTAL CHARGES ☐				2,054.25

CURRENT CHARGES ☐	2 ,054.25	DATE OF LAST PAYMENT ☐	06/23/2000
PAYMENT DUE DATE ☐ 07/24/2000	SUBJECT TO CONDITIONS AT THE BACK HEREOF	PAY THE ABOVE ACCOUNT ON OR BEFORE DUE DATE, OTHERWISE, WE SHALL DISCONNECT YOUR ELECTRIC SERVICE AFTER THE LAPSE OF FORTY EIGHT (48) HOURS FROM DUE DATE	
Received payment _____ Date _____		088395 - E	

The generation charge in the bill is the cost of PECO's purchase of electricity from Napocor passed on to customers.

Note that the generation charge is similar to the basic charge found in the Meralco bill. The difference is that the rate for the generation charge is flat while the rate for the basic charge is progressive. Below is a comparison of the rates between PECO's generation charge and Meralco's basic charge.

PECO's generation charge

Generation Charge-	**1, 782.73**
380 kwh @ 4.691400	

MERALCO's basic charge

BASIC CHARGE					
ENERGY (kwh)		278	X	3.1014	862.20
FIRST	10			17.40	
NEXT	40	@	1.7400	69.60	
NEXT	228	@	3.4000	775.20	

The distribution charge in the PECO bill is the cost of PECO's distribution of electricity to many parts of Iloilo.

Note that the distribution charge is similar to the power purchase adjustment (PPA). The difference is that the rate for the distribution charge is progressive while the rate for the PPA is flat. Below is a comparison of the rates between PECO's distribution charge and Meralco's PPA.

PECO's distribution charge

Distribution Charge-				**275.03**
1st	30	@	1.10	33.06
nxt	55	@	.86	47.46
nxt	295	@	.65	194.51

MERALCO's PPA

PPA	278	X	1.699	472.30

Let's Solve This Problem

1. Aling Cely is a customer of PECO. She has consumed 289 kilowatt-hours of electricity for the month of September. How much should she pay for the generation charge if the rate is ₱ 4.54/kW-h?

   Solution: _____

2. How much should Aling Cely pay for the distribution charge if the progressive rates are as follows:

Energy (kW-h)	
First 30 kW-h	₱ 1.10/kW-h
Next 55 kW-h	₱ 0.86/kW-h
Succeeding kilowatt-hours	₱ 0.65/kW-h

Solution:

a) Cost for first 30 kW-h:
_____

b) Cost for next 55 kW-h:
_____

c) Cost for succeeding kilowatt-hours:
_____

d) Total cost of distribution charge:
_____

3. How much is the total cost of the electric bill?
_____

Compare your answers with those in the *Answer Key* on page 67.

Let's Remember

- The basic charge or generation charge is the cost of the electric company's purchase of electricity from Napocor passed on to customers.
- The currency adjustment is the charge for price fluctuations between the Philippine peso against the US dollar.
- The power purchase adjustment or distribution charge is the cost of the electric company's distribution of electricity to a certain region.

Let's See What You Have Learned

We have come to the conclusion of the second lesson. Now you need to take a test to determine how much you have learned from the topics discussed in this lesson. The test will certainly be easy for you if you successfully completed the exercises above. Good luck!

1. Mang Carlos, a Meralco customer, consumed 237 kilowatt-hours of electric power for the month of September.

   a) What is Mang Carlos' basic charge? (1 point)

Energy (kW-h)	Rate	
First _____kW-h	_____	_____
Next _____ kW-h	_____	_____
Next _____ kW-h	_____	_____
Total cost of basic charge		_____

   b) What is the cost of Mang Carlos' currency adjustment if the currency adjustment is 4.17%? (1 point)

Basic Charge	Percentage Rate	

   c) What is the cost of Mang Carlos' power purchase adjustment or PPA if the PPA rate is ₱ 1.691/kW-h? (1 point)

Energy (kW-h)	PPA Rate	

   d) What is the total amount due for Mang Carlos' electric bill? (1 point):

   _____

2. Aling Lolit, a Meralco customer, has a previous meter reading of 4,567 kW-h and has a present meter reading of 4,904 kW-h.

   a) What is the total electric consumption? (1 point)

   _____

b) What is Aling Lolit's basic charge? (1 point)

Energy (kW-h)	Rate	Co

c) What is the cost of Aling Lolit's currency adjustment if the currency adjustment is 3.64%? (1 point)

Basic Charge	Percentage Rate	

d) What is the cost of Aling Lolit's power purchase adjustment or PPA if the PPA rate is ₱ 1.723/kW-h? (1 point)

Energy (kW-h)	PPA Rate	Cos

e) What is the total amount due for Aling Lolit's electric bill? (1 point):

_____

3. Below is a Meralco electric bill with some missing entries indicated with the letters from a–h. Fill in the missing data. (8 points):

Type of Cons.	Meter Number	Meter Readings Prev	Pres	Mult	Cons
KWH	33SZN12719	(a)	6653	1	262

BASIC CHARGE					
ENERGY (kwh)		262	X	3.0971	811.44
FIRST	10			17.40	
NEXT	40	@	1.7400	69.60	
NEXT	(b)	@	3.4000	(c)	
CURRENCY ADJ.		(d)	X	3.43 %	(e)
PPA		(f)	X	1.202	(g)
TOTAL AMOUNT DUE				P	(h)

a) _____

b) _____

c) _____

d) _____

e) _____

f) _____

g) _____

h) _____

How did you find the test? Now compare your answers with those in the *Answer Key* on pages 67–69. If your test score is:

0 – 8 You should study this lesson again.

9 – 13 Review the topics which you did not understand.

14 – 17 Excellent! You have understood this lesson well.

Let's Sum Up

- The measurement units for power rating is the watt (**W**) and the **kilowatt (kW)**.
- 1,000 watts = 1 kilowatt
- The measurement unit for electric power consumption is the **kilowatt-hour (kW-h)**.
- Electric power consumption is computed by subtracting the previous meter reading from the present meter reading.
- The basic charge or generation charge is the cost of the electric company's purchase of electricity from Napocor passed on to customers.
- The currency adjustment is the charge for price fluctuations between the Philippine peso against the US dollar.
- The power purchase adjustment or distribution charge is the cost of the electric company's distribution of electricity to a certain region.
- The cost of the electric bill increases as the electric power consumption increases.
- It is important to conserve electricity to keep the cost of your electric bill low by turning off unnecessary appliances, using appliances with lower power ratings and other energy saving measures.

What Have You Learned?

Congratulations for making it this far! You have reached the final part of the module. All you need to do is take one last test. This will determine how much you understood the lessons in the module. Do your best. Good luck!

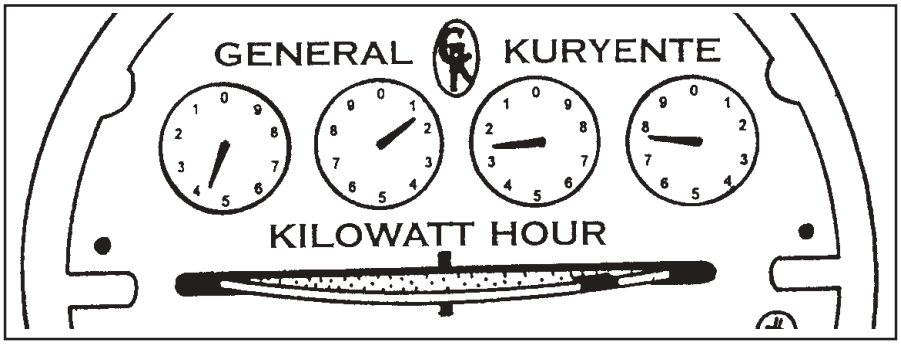
A. 1. In Aling Linda's kitchen, four appliances were used for a period of 4 hours. The appliances are the incandescent bulb (100 W), refrigerator (170 W), rice cooker (450 W), and electric fan (120 W). What is the total electric power consumption in kilowatt-hours? (3 points)

a) Total power rating: _____

b) Number of hours used: _____

c) Total electric power consumption: _____

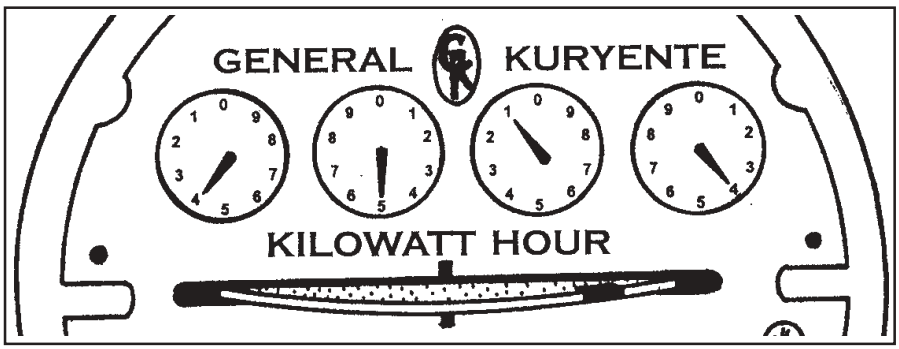
2. The electric inspector looked at the meter of Aling Linda and saw this:



a) What is the reading on the electric meter of Aling Linda? (1 point)

_____

After one month, the inspector again looked at the meter of Aling Linda and saw this:



b) What is the reading on the electric meter? (1 point)

_____

c) What is the total electric consumption of Aling Linda for the month? (1 point)

_____

B. 1. Mang Lito consumed 291 kilowatt-hours of electric power for the month of May.

a) What is the cost of Mang Lito's basic charge? (1 point)

Energy (kW-h)	Rate	C
First _____kW-h	_____	_____
Next _____ kW-h	_____	_____
Next _____ kW-h	_____	_____
Total cost of basic charge		_____

b) What is the cost of the currency adjustment if the rate is 4.35%? (1 point)

Basic Charge	Percentage Rate	

c) What is the cost of the PPA if the PPA rate is ₱ 1.391/kW-h? (1 point)

Energy (kW-h)	PPA Rate	

d) What is the total amount due for the electric bill? (1 point):

_____

2. Check if the computations on the electric bill below are correct. If not, solve for the correct answers. (6 points)
Note: For purposes of computation, you can safely assume that the given charge rates (underlined) are correct.

Type of Cons.	Meter Number	Meter Readings Prev	Pres	Mult	Cons
KWH	33SZN12719	5697	5968	1	271

BASIC CHARGE				900.00
ENERGY (kwh)	271			
FIRST	10		17.40	
NEXT	40	@ 1.7400	69.60	
NEXT	241	@ 3.4000	819.40	
CURRENCY ADJ.	900	X 3.43 %		30.87
PPA	271	X 1.202		325.74
TOTAL AMOUNT DUE				P 1,256.61

C. 1. How can you reduce your monthly electric power consumption? (2 points)

_____

_____

_____

Compare your answers with those in the *Answer Key* on pages 69–71.

If your test score is:

0 – 9 You have to study this module again.

10 – 14 Review the topics which you did not understand.

15 – 18 Excellent! You have understood the topics in this module very well. You may now study the next module.

Answer Key

A. Let's See What You Already Know *(pages 2–4)*

A. 1. a) Total power rating:
585 W + 280 W + 600 W + 120 W = 1,585 W or 1.585 kW

b) Number of hours used: 3 hours

c) Total electric power consumption:
1.585 kW × 3 hours = 4.755 kW-h (or kilowatt-hours)

2. 2,936 kW-h

3. a) 5,921 kW-h

b) 6,384 kW-h

c) 6,384 kW-h - 5,921 kW-h = 463 kW-h

B. 1. a) For the cost of basic charge:

Energy (kW-h)	Rate	Cost
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400 per kW-h	₱ 69.60
Next 194 kW-h	₱ 3.4000 per kW-h	₱ 659.60
Total cost of basic charge		₱ 746.60

Basic Charge: ₱ 17.40 + ₱ 69.60 + ₱ 659.60 = ₱ 746.60

b) For the currency adjustment:

Basic Charge	Percentage Rate	Cos
₱ 746.60	3.92%	₱ 29.27

Convert 3.92% to decimal form: 0.0392

Currency adjustment: ₱ 746.60 × 0.0392 = ₱ 29.26672 ≅ ₱ 29.27 (round off)

c) For the power purchase adjustment:

Energy (kW-h)	PPA rate	Cos
244 kW-h	₱ 1.548/ kW-h	₱ 377.71

PPA cost: 244 kW-h × ₱ 1.548/ kW-h = ₱ 377.712 ≅ ₱ 377.71 (round off)

d) Total Amount Due: ₱ 746.60 + ₱ 29.27 + ₱ 377.71 = ₱ 1,153.58

B. Lesson 1

Let's Review (page 7)

1. $45{,}871\ \cancel{W} \times \frac{1\ kW}{1{,}000\ \cancel{W}} = \frac{45{,}871}{1{,}000} \times 1\ kW = 45.871\ kW$

2. $36\ \cancel{W} \times \frac{1\ kW}{1{,}000\ \cancel{W}} = \frac{36}{1{,}000} \times 1\ kW = 0.036\ kW$

3. $2{,}980\ \cancel{W} \times \frac{1\ kW}{1{,}000\ \cancel{W}} = \frac{2{,}980}{1{,}000} \times 1\ kW = 2.980\ kW$

4. $592\ \cancel{W} \times \frac{1\ kW}{1{,}000\ \cancel{W}} = \frac{592}{1{,}000} \times 1\ kW = 0.592\ kW$

5. $3\ \cancel{W} \times \frac{1\ kW}{1{,}000\ \cancel{W}} = \frac{3}{1{,}000} \times 1\ kW = .003\ kW$

Let's Review (page 10)

1. Power rating: 120 W = 0.120 kW

   Time of use: 12 hours

   Electric power consumption: 0.120 kW × 12 h = 1.44 kW-h

2. Total power rating:

   600 W (flat iron) + 130 W (electric fan) + 100 W (television) = 830 W = 0.830 kW

   Time of use: 3 hours

   Electric power consumption: 0.830 kW × 3 hours = 2.49 kW-h

3. Total power rating: 80 W + 1420 W + 100 W = 1,600 W = 1.6 kW

   Time of use: 6 hours

   Electric power consumption: 1.6 kW × 6 h = 9.6 kW-h

Let's Think About This (pages 10–11)

1. Electric power is measured in watts. Since a 100 W bulb has a greater wattage than a 75 W bulb, then the 100 W bulb uses more electric power.
2. Electric power consumption increases as the time of use of an appliance increases. Therefore, the longer time the television is left turned on, the greater will be the electric power consumption.
3. You can reduce on your electric power consumption by immediately turning off appliances after using them. This includes the lights, the electric fan, the television, and the radio. We must also monitor our use of appliances that consume a lot of electric power such as the flat iron and the air-conditioner.
4. The cost of the electric bill depends on the electric power consumption. The greater the electric power consumption, the higher the cost of the electric bill. Thus, reducing your electric power consumption will help you save money by lowering the cost of the electric bill.

Let's Review (page 13)

By his knowledge of reading the electric meter, Boyet was able to monitor his family's daily electric power consumption. He became aware of the appliances that consumed more electric power such as the 100 W light bulbs. He became conscious of appliances that were turned on even when they are not in use. Because of this, Boyet was able to make measures in order to reduce his family's electric power consumption, such as turning off unused lights, turning off the television when no one is watching, and choosing appliances with lower power ratings (e.g. fluorescent lights).

Let's Review (pages 15–16)

1. Answer: 8,301 kW-h

   - The pointer on the thousands dial is pointing to 8, which reads 8,000.
   - The pointer on the hundreds dial is pointing to 3, which reads 300.
   - The pointer on the tens dial is pointing to 0, which reads 0.
   - The pointer on the units dial is pointing to 1, which reads 1. Adding all the values, the meter should read 8,301 kW-h.

2. Answer: 2,174 kW-h

- The pointer on the thousands dial is pointing to 2, which reads 2,000.
- The pointer on the hundreds dial is pointing to 1, which reads 100.
- The pointer on the tens dial is pointing to 7, which reads 70.
- The pointer on the units dial is pointing to 4, which reads 4.
  Adding all the values, the meter should read 2,174 kW-h.

Let's Review (page 17)

1. Answer: 2,054 kW-h

- The thousands dial is between 2 and 3; the lower number is 2, it should therefore read 2,000.
- The hundreds dial is between 0 and 1; the lower number is 0, it should therefore read 0.
- The tens dial is between 5 and 6; the lower number is 5, it should therefore read 50.
- The units dial is between 4 and 5; the lower number is 4, it should therefore read 4.
  Adding all the values, the meter should read 2,054.

2. Answer: 8,139 kW-h

- The thousands dial is between 8 and 9; the lower number is 8, it should therefore read 8,000.
- The hundreds dial is between 1 and 2; the lower number is 1s, it should therefore read 1.
- The tens dial is between 3 and 4; the lower number is 3, it should therefore read 30.
- The units dial is between 9 and 0 (10); the lower number is 9, it should therefore read 9.
  Adding all the values, the meter should read 8,139.

Let's Solve This Problem (pages 18–20)

1. a) 7,024 kW-h

   b) 7,258 kW-h

   c) Electric power consumed: 7,258 kW-h – 7,024 kW-h = 234 kW-h

2. a) 3,849 kW-h

   b) 4,234 kW-h

   c) Electric power consumed: 4,234 kW-h – 3,849 kW-h = 385 kW-h

Let's Review (page 22)

Here is a sample answer based on the table guide on page 20. Your answer will differ depending on the appliances you use and the pattern of your daily electric consumption.

Day, Time	Present Reading	Previous R
1) Sunday, 8:00 a.m.	3,762 kW-h	**********
2) Monday, 8:00 a.m.	3,777 kW-h	3,762 kW-h
3) Tuesday, 8:00 a.m.	3,790 kW-h	3,777 kW-h
4) Wednesday, 8:00 a.m.	3,811 kW-h	3,790 kW-h
5) Thursday, 8:00 a.m.	3,830 kW-h	3,811 kW-h
6) Friday, 8:00 a.m.	3,855 kW-h	3,830 kW-h
7) Saturday, 8:00 a.m.	3,878 kW-h	3,855 kW-h
Total Power Consumed for the whole week: 116 kW-h		
15 kW-h + 13 kW-h + 21 kW-h + 19 kW-h + 25 kW-h + 23 kV		

1. In the sample table, electric consumption was highest on Friday. Our electric consumption was high from Thursday to Friday morning because it was very hot and we had to use our air conditioner for a longer period of time. The electric fans were also turned on for quite some time.

2. Our electric consumption was lowest from Monday morning to Tuesday morning. No one was left in the house except I so only a few appliances were used that time. Only the refrigerator and some lights were turned on.

3. To minimize on electric power consumption, our family can turn off appliances that are not in use. We could turn off the electric fan or television when it is not in use. We could turn off the lights when these are not used or necessary. We could also replace our 100 W and 75 W light bulbs with bulbs of lower power ratings or fluorescent lamps that consume less electric power.

Let's See What You Have Learned (pages 23–25)

1. Total power rating:

   100 W + 100 W + 130 W + 170 W = 500 W = 0.5 kW
   light bulb television electric fan refrigerator

   Number of hours used: 5 hours

   Total electric power consumption: 0.5 kW × 5 h = 2.5 kW-h

2. 3,602 kW-h

3. a) 8,307 kW-h

   b) 8,514 kW-h

   c) Electric power consumed: 207 kW-h

4.

Day, Time	Present Reading	Previous R
1) Sunday, 7:00 a.m.	2,391 kW-h	**********
2) Monday, 7:00 a.m.	2,422 kW-h	**a. 2,391 kW-**
3) Tuesday, 7:00 a.m.	**c. 2,457 kW-h**	2,422 kW-
4) Wednesday, 7:00 a.m.	2,492 kW-h	2,457 kW-
5) Thursday, 7:00 a.m.	2,539 kW-h	**e. 2,492 kW-**
6) Friday, 7:00 a.m.	**g. 2,584 kW-h**	2,539 kW-
7) Saturday, 7:00 a.m.	**h. 2617 kW-h**	**i. 2,584 kW-**
Total Power Consumed for the whole week: **j. 226 kW-h** 31 + 35 + 35 + 47 + 45 + 33 = 226 kW-h		

Computations:

a) The previous reading for Monday, 7:00 a.m., should be the same as the present reading for the previous day (Sunday, 7:00 a.m.). This is equal to 2,391kW-h.

b) To get the power consumed, subtract the previous reading from the present reading.

   2,422 kW-h – 2,391kW-h = 31kW-h

c) The present reading can be obtained by adding the previous reading and the power consumed.

2,422 kW-h + 35kW-h = 2,457 kW-h

d) To get the power consumed, subtract the previous reading from the present reading.

2,492 kW-h – 2,457 kW-h = 35 kW-h

e) The previous reading for Thursday, 7:00 a.m., should be the same as the present reading for the previous day (Wednesday, 7:00 a.m.). This is equal to 2,492 kW-h.

f) To get the power consumed, subtract the previous reading from the present reading.

2,539 kW-h – 2,492 kW-h = 47 kW-h

g) The present reading can be obtained by adding the previous reading and the power consumed.

2,539 kW-h + 45 kW-h = 2,584 kW-h

h) To get the present reading, add the previous reading and the power consumed.

2,584 kW-h + 33 kW-h = 2,617 kW-h

i) The previous reading for Saturday, 7:00 a.m., should be the same as the present reading for the previous day (Friday, 7:00 a.m.). This is equal to 2,584 kW.

j) To get the total power consumed for the week, add the power consumed for all days (Monday to Saturday). We then get:

31 + 35 + 35 + 47 + 45 + 33 = 226 kW-h

5. Here are possible answers:

- Turn off electric appliances such as electric fans and TV when they are not being used.
- Turn off the lights when you don't need them, such as in broad daylight or when it is light enough.
- Choose to buy or use appliances with lower power ratings.

C. Lesson 2

Let's Review (page 31)

1. The basic charge in the electric bill accounts for the cost of generation of electricity by Napocor. The oil used to fuel the generators is the basic factor for the computation of the basic charge.

2. The currency adjustment for the basic charge is for the fluctuations between the peso and dollar rates. Since Napocor buys oil in dollars, they have to make the necessary currency adjustments to make allowance for these fluctuations since the customers pay in pesos.

3. PPA stands for Power Purchase Adjustment. This is what Meralco charges the customers for the service of distributing electricity to their homes, offices, and other establishments all over Metro Manila.

Let's Solve This Problem (page 34)

1. *Solution*:

Energy (kW-h)	Rate	
First 10 kW-h	₱ 17.40	₱ 17.40
Next 29 kW-h	₱ 1.7400/ kW-h	₱ 50.46
Total cost of basic charge		₱ 67.86

Cost for first 10 kW-h: ₱ 17.40

Energy remaining: 39 kW-h – 10 kW-h = 29 kW-h

Cost for next 29 kW-h: 29 ~~kW-h~~ × ₱ 1.7400/ ~~kW-h~~ = ₱ 50.46

Total cost of basic charge: ₱ 17.40 + ₱ 50.46 = ₱ 67.86

2. *Solution*:

Energy (kW-h)	Rate	
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/ kW-h	₱ 69.60
Next 192 kW-h	₱ 3.4000/ kW-h	₱ 652.8
Total cost of basic charge		₱ 739.8

Cost for first 10 kW-h: ₱ 17.40

Energy left: 242 kW-h – 10 kW-h = 232 kW-h

Cost for next 40 kW-h: 40 ~~kW-h~~ × ₱ 1.7400/ ~~kW-h~~ = ₱ 69.60

Energy left: 232 kW-h – 40 kW-h = 192 kW-h

Cost for next 192 kW-h: 192 ~~kW-h~~ × ₱ 3.4000/ ~~kW-h~~ = ₱ 652.80

Total cost of basic charge: ₱ 17.40 + ₱ 69.60 + ₱ 652.80
= ₱ 739.80

Let's Solve This Problem (page 35)

Since the electric consumption is above the 300 kW-h limit, the rate for the basic charge is flat:

Energy (kW-h)	Rate	
387 kW-h	₱ 3.4000/ kW-h	₱ 1,31

Basic Charge: 387 ~~kW-h~~ × ₱ 3.4000/ ~~kW-h~~ = ₱ 1,315.80

Let's Solve This Problem (pages 37–38)

1.

Basic Charge	Percentage Rate/ kW-h	
₱ 233.20	4.53%	₱ 10.5

Convert 4.53% to decimal form: 0.0453

Currency adjustment: ₱ 233.20 × 0.0453 = ₱ 10.56396 ≅ ₱ 10.56
(round off)

2.

Basic Charge	Percentage Rate/ kW-h	
₱ 938.40	3.97%	₱ 37.2

Convert 3.97% to decimal form: 0.0397

Currency adjustment: ₱ 938.40 × 0.0397 = ₱ 37.25448 ≅ ₱ 37.25
(round off)

3. The amount to be paid for the currency adjustment depends on how high or how low the basic charge is. The higher the basic charge, the higher the amount to be paid for the currency adjustment. The lower the basic charge, the lower the amount to be paid for the currency adjustment.

Let's Solve This Problem (page 39)

1.

Energy (kW-h)	PPA Rate	
265 kW-h	₱ 1.394/ kW-h	₱ 369.4

PPA cost: 265 ~~kW-h~~ × ₱ 1.394/ ~~kW-h~~ = ₱ 369.41

2.

Energy (kW-h)	PPA Rate	
318 kW-h	₱ 1.246/ kW-h	₱ 396.2

PPA cost: 318 ~~kW-h~~ × ₱ 1.246/ ~~kW-h~~ = ₱ 396.228 ≅ ₱ 396.23
(round off)

Let's Solve This Problem (pages 43–45)

1. a) For the cost of basic charge:

Energy (kW-h)	Rate	
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/ kW-h	₱ 69.60
Next 231 kW-h	₱ 3.4000/ kW-h	₱ 785.4
Total cost of basic charge		₱ 872.4

Basic Charge: ₱ 17.40 + ₱ 69.60 + ₱ 785.40 = ₱ 872.40

b) For the currency adjustment:

Basic Charge	Percentage Rate/ kW-h	
₱ 872.40	3.94%	₱ 34.37

Convert 3.94% to decimal form: 0.0394

Currency adjustment: ₱ 872.40 × 0.0394 = ₱ 34.37256 ≅ ₱ 34.37
(round off)

c) For the power purchase adjustment:

Energy (kW-h)	PPA Rate	
281 kW-h	₱ 1.562/ kW-h	₱ 438.9

PPA cost: 281 ~~kW-h~~ × ₱ 1.562/ ~~kW-h~~ = ₱ 438.922 ≅ ₱ 438.92
(round off)

d) Total Amount Due:

Basic charge + Currency Adjustment + PPA = Total Amount Due

₱ 872.40 + ₱ 34.37 + ₱ 438.92 = ₱ 1,345.69

2. a) Total electric consumption: 5,638 kW-h – 5,297 kW-h = 341 kW-h

b) Since the power consumption exceeds the limit of 300 kW-h, the cost of the basic charge is:

Energy (kW-h)	Rate	
341 kW-h	₱ 3.4000/ kW-h	₱ 1,159

Basic Charge: 341 kW-h × ₱ 3.4000/ kW-h = ₱ 1,159.40

c) For the currency adjustment:

Basic Charge	Percentage Rate/ kW-h	
₱ 1,159.40	4.38%	₱ 50.7

Convert 4.38% to decimal form: 0.0438

Currency adjustment: ₱ 1,159.40 × 0.0438 = ₱ 50.78172 ≅ ₱ 50.78 (round off)

d) For the power purchase adjustment:

Energy (kW-h)	PPA Rate	
341 kW-h	₱ 1.684/ kW-h	₱ 574.

PPA cost: 341 kW-h × ₱ 1.684/ kW-h = ₱ 574.244 ≅ ₱ 574.24 (round off)

e) Total Amount Due: ₱ 1,159.40 + ₱ 50.78 + ₱ 574.24 = ₱ 1,784.42

Let's Try This (pages 46–47)

1. September 26, 2000
2. 278 kW-h
3. 5690 kW-h
4. 2300090147247
5. 4.58%
6. 246 kW-h
7. ₱ 1,374.00

Let's Solve This Problem (pages 48–49)

1. 289 × ₱ 4.54 = ₱ 1,312.06
2. a) 30 × ₱ 1.10 = ₱ 33.00

   b) 55 × ₱ 0.86 = ₱ 47.30

   c) kilowatt-hours remaining: 289 - 30 - 55 = 204 kW-h

   204 × ₱ 0.65 = ₱ 132.60

   d) Total cost: ₱ 33.00 + ₱ 47.30 + ₱ 132.60 = ₱ 212.90
3. Total cost of electric bill:

	₱ 1,312.06	(generation charge)
+	₱ 212.90	(distribution charge)
	₱ 1,524.96	

Let's See What You Have Learned (pages 50–52)

1. a) For the cost of basic charge:

Energy (kW-h)	Rate	Co
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400 per kW-h	₱ 69.60
Next 187 kW-h	₱ 3.4000 per kW-h	₱ 635.80
Total cost of basic charge		₱ 722.80

Basic charge: ₱ 17.40 + ₱ 69.60 + ₱ 635.80 = ₱ 722.80

b) For the currency adjustment:

Basic Charge	Percentage Rate	Co
₱ 722.80	4.17%	₱ 30.14

Convert 4.17 % to decimal form: 0.0417

Currency adjustment: ₱ 722.80 × 0.0417 = ₱ 30.14076 ≅ ₱ 30.14 (round off)

c) For the power purchase adjustment:

Energy (kW-h)	PPA Rate	Cos
237 kW-h	₱ 1.691/ kW-h	₱ 400.77

PPA cost: 237 × ₱ 1.691 = ₱ 400.767 ≅ ₱ 400.77 (round off)

d) Total Amount Due:

Basic charge + Currency Adjustment + PPA = Total Amount Due

₱ 722.80 + ₱ 30.14 + ₱ 400.77 = ₱ 1,153.71

2. a) Total electric consumption: 4,904 kW-h - 4,567 kW-h = 337 kW-h

b) Since the power consumption exceeds the limit of 300 kW-h, the cost of the basic charge is:

Energy (kW-h)	Rate	Cost
337 kW-h	₱ 3.4000/ kW-h	₱ 1,145.80

Basic Charge: 337 kW-h × ₱ 3.4000/ kW-h = ₱ 1,145.80

c) For the currency adjustment:

Energy (kW-h)	Percentage Rate	Cost
₱ 1,145.80	3.64%	₱ 41.71

Convert 3.64% to decimal form: 0.0438

Currency adjustment: ₱ 1,145.80 × 0.0364 = ₱ 41.70712 ≅ ₱ 41.71 (round off)

d) For the power purchase adjustment:

Energy (kW-h)	PPA Rate	Cost
337 kW-h	₱ 1.723/ kW-h	₱ 580.65

PPA cost: 337 kW-h × ₱ 1.723/ kW-h = ₱ 580.651
≅ ₱ 580.65

e) Total Amount Due: ₱ 1,145.80 + ₱ 41.71 + ₱ 580.65 = ₱ 1,768.16

3. a) Previous reading – power consumption = Previous reading 6653 – 262 = 6391 kW-h

b) 262 – 10 – 40 = 212 kW-h

c) 212 kW-h × ₱ 3.4000/ kW-h = ₱ 720.80

d) cost of basic charge: ₱ 811.44

e) ₱ 811.44 × 0.0343 = ₱ 27.83

f) Power consumed = 262 kW-h

g) 262 kW-h × 1.202 = ₱ 314.92

h) ₱ 811.44 + ₱ 27.83 + ₱ 314.92 = ₱ 1,154.19

D. What Have You Learned? *(pages 53–55)*

A. 1. a) Total power rating:
100 W + 170 W + 450 W + 120 W = 840 W = 0.84 kW

b) Number of hours used: 4 hours

c) Total electric power consumption:
0.84 kW × 4 hours = 3.36 kW-h

2. a) 4,127 kW-h

b) 4,514 kW-h

c) Electric power consumed:
4,514 kW-h – 4,127 kW-h = 387 kW-h

B. 1. a) For the cost of basic charge:

Energy (kW-h)	Rate	Cost
First 10 kW-h	₱ 17.40	₱ 17.40
Next 40 kW-h	₱ 1.7400/ kW-h	₱ 69.60
Next 241 kW-h	₱ 3.4000/ kW-h	₱ 819.40
Total cost of basic charge		₱ 906.40

b) For the currency adjustment:

Basic Charge	Percentage Rate	Cos
₱ 906.40	4.35%	₱ 39.43

c) For the power purchase adjustment:

Energy (kW-h)	PPA rate	Cost
291 kW-h	₱ 1.391/ kW-h	₱ 404.78

d) Total Amount Due: ₱ 906.40 + ₱ 39.43 + ₱ 404.78 = ₱ 1,350.61

2. Look at the portion of the bill below:

BASIC CHARGE		**(a)** 900.00
ENERGY (kwh)	271	
FIRST	10	17.40
NEXT	40 @ 1.7400	69.60
NEXT	**(b)** 241 @ 3.4000	819.40 **(c)**
CURRENCY ADJ.	**(d)** 900 X 3.43 %	**(e)** 30.87
PPA	271 X 1.202	325.74
TOTAL AMOUNT DUE		₱ **(f)** 1, 256.61

Those with marked letters are the ones with incorrect computations. Below are shown the correct computations and answers.

a) *Basic charge*: ₱17.40 + ₱69.60 + ₱751.40 = ₱838.40

Energy (kW-h)	Rate	Cost
First 10 kW-h	₱17.40	₱17.40
Next 40 kW-h	₱1.7400/ kW-h	₱69.60
Next 221 kW-h	₱3.4000/ kW-h	₱751.40
Total cost of basic charge		₱838.40

b) 271 kW-h - 10 kW-h - 40 kW-h = 221 kW-h not 241 kW-h

c) 221 ~~kW-h~~ × ₱3.4000/~~kW-h~~ = ₱751.40 not ₱819.40

d) ₱838.40 (total cost of basic charge) not ₱900

e) ₱838.40 × 0.0343 = ₱28.7571 ≅ ₱28.76 not ₱30.87 (round off)

f) ₱838.40 + ₱28.76 + ₱325.74 = ₱1,192.90 not ₱1,256.61

The billing statement with the correct computations should appear this way:

BASIC CHARGE				838.40
ENERGY (kwh)				
FIRST	10		17.40	
NEXT	40	@ 1.7400	69.60	
NEXT	221	@ 3.400	751.40	
CURRENCY ADJ.	838.40 X 3.43%			28.75
PPA	271	X 1.202		375.74
TOTAL AMOUNT DUE				₱ 1,192.89

C. 1. You can reduce your electric power consumption by turning off appliances that are not in use, such as the TV, electric fan, lights or radio. You can also save on power consumption by choosing appliances that have low power ratings over appliances with high power ratings (e.g. fluorescent bulbs, which give more light but consume less electric power than incandescent bulbs).

Glossary

Basic charge The cost of the electric company's purchase of electricity from Napocor passed on to customers

Currency adjustment The charge for price fluctuations between the Philippine peso against the U.S. dollar

Distribution charge (See PPA)

Electric power consumption The use of electricity to run electric appliances

Generation charge (See basic charge)

Kilowatt-hour A unit for measuring electric power

PPA Power Purchase Adjustment The cost of the electric company's distribution of electricity to a certain region

Watt A unit for measuring electric power consumption

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