

UNIT 6

ELECTRIC MOTORS

VOCABULARY AND PRONUNCIATION

Exercise 1 Match English terms and Vietnamese translations

English	Vietnamese
1. mechanical energy	Cổ góp
2. armature	Cơ năng
3. reverse polarity	cuộn dây kích thích
4. impedance	đảo cực
5. pulsating force	đầu máy xe lửa
6. traction motor	Động cơ kéo
7. electric railways	Động cơ xén cỏ
8. locomotives	Đường xe điện
9. torque	lực mạch động
10.compact design	Mạch thyristo
11.commutator	mô men xoắn, mô men quay
12.thyristor circuit	nửa chu kỳ
13.half-wave	Phản ứng
14.revolutions per minute (rpm)	Ray tiếp xúc
15.weed trimmer motors	số vòng quay trong một giây
16.field windings	thiết kế nhỏ gọn
17.third rail	Trở kháng

Exercise 2 T.S 1 Listen and practise

1. mechanical energy	7. electric railways	13.half-wave
2. armature	8. locomotives	14.revolutions per minute (rpm)
3. reverse polarity	9. torque	15.weed trimmer motors
4. impedance	10.compact design	16.field windings
5. pulsating force	11.commutator	17.third rail
6. traction motor	12.thyristor circuit	

Exercise 3 T.S 2 Listen and complete the sentences by selecting the correct word from the box to fill in the gap

mechanical energy	electric railways	half-wave
armature	locomotives	revolutions per minute (rpm)
reverse polarity	torque	weed trimmer motors
impedance	compact design	field windings
pulsating force	commutator	third rail
traction motor	thyristor circuit	



1. An inside rotor attached to the output shaft that is given aby the rotating field.
2. An electric motor uses electrical energy to produce
3. Universal motors can rotate at relatively(rpm).
4. a small fan blade attached to theacts as an artificial load to limit the motor speed to a safe value.
5. By changing theconnected to the rotor circuit, the speed/current and speed/torque curves can be altered.

READING: Universal motors**Exercise 4 Read the passage carefully and decide whether the statements are true (T) or false (F)**

A variant of the wound field DC motor is the universal motor. The name derives from the fact that it may use AC or DC supply current, although in practice they are nearly always used with AC supplies. The principle is that in a wound field DC motor the current in both the field and the armature (and hence the resultant magnetic fields) will alternate (reverse polarity) at the same time, and hence the mechanical force generated is always in the same direction. In practice, the motor must be specially designed to cope with the AC current (impedance must be taken into account, as must the pulsating force), and the resultant motor is generally less efficient than an equivalent pure DC motor. Operating at normal power line frequencies, the maximum output of universal motors is limited and motors exceeding one kilowatt are rare. But universal motors also form the basis of the traditional railway traction motor in electric railways. In this application, to keep their electrical efficiency high, they were operated from very low frequency AC supplies, with 25 Hz and $16\frac{2}{3}$ hertz operation being common. Because they are universal motors, locomotives using this design were also commonly capable of operating from a third rail powered by DC.

The advantage of the universal motor is that AC supplies may be used on motors which have the typical characteristics of DC motors, specifically high starting torque and very compact design if high running speeds are used. The negative aspect is the maintenance and short life problems caused by the commutator. As a result such motors are usually used in AC devices such as food mixers and power tools which are used only intermittently. Continuous speed control of a universal motor running on AC is very easily accomplished using a thyristor circuit, while stepped speed control can be accomplished using multiple taps on the field coil. Household blenders that advertise many speeds frequently combine a field coil with several taps and a diode that can be inserted in series with the motor (causing the motor to run on half-wave rectified AC).

1. The universal motor can operate in AC only.
2. Impedance is not important in designing a universal motor.
3. It is difficult for a universal motor to produce the output of over one kilowatt when operating at normal power line frequencies.
4. The commutator can work for a short time.
5. A thyristor circuit is a solution to continuous speed control of a universal motor running on AC

Exercise 5 Choose a correct word to fill in the gap

useful	rotate	limit	cost
into	permanent	due to	exceed

Universal motors can (1)at relatively high revolutions per minute (rpm). This makes them (2)for appliances such as blenders, vacuum cleaners, and hair dryers where high-speed operation is desired. Many vacuum cleaner and weed trimmer motors exceed 10,000 rpm, Dremel and other similar miniature grinders will often(3)30,000 rpm. Motor damage may occur (4)overspeed (rpm in excess of design specifications) if the unit is operated with no significant load. On larger motors, sudden loss of load is to be avoided, and the possibility of such an occurrence is incorporated (5)the motor's protection and control schemes. Often, a small fan blade attached to the armature acts as an artificial load to (6)the motor speed to a safe value, as well as provide cooling airflow to the armature and field windings.

With the very low (7)of semiconductor rectifiers, some applications that would have previously used a universal motor now use a pure DC motor, sometimes with a (8)magnet field.

Exercise 6 Complete the sentences by finding the missing letters

- The energy acquired by the objects upon which work is done is known as m.....l energy.
- In electrical engineering, an a.....e is one of the two principal electrical components of an electromechanical machine--a motor or generator.
- Electrical i.....e describes a measure of opposition to a sinusoidal alternating current (AC).
- A t.....n motor is a type of electric motor used to power the driving wheels of a vehicle such as a railroad locomotive, electrical multi-unit train (such as a subway or light rail vehicle train), a tram, or an automobile.
- A l.....e is a railway vehicle that provides the motive power for a train.

6. A t.....e (τ) in physics, also called a moment, is a vector that measures the tendency of a force to rotate an object about some axis.
7. A c.....r is an electrical switch that periodically reverses the current direction in an electric motor or electrical generator.
8. R.....ns per minute (abbreviated rpm, RPM, r/min, or $\text{r}\cdot\text{min}^{-1}$) is a unit of frequency: the number of full rotations completed in one minute around a fixed axis.

UNIT 7

BATTERIES

Vocabulary and Pronunciation

Exercise 1 Match English terms and Vietnamese translations

English	Vietnamese
Battery	pin sơ cấp
Charge	pin điện phân
charging current	có thể nạp lại
chemical energy	pin thứ cấp
chemical reaction	pin nhiên liệu
Discharge	nạp, sạc
Disposable	dòng điện nạp (sạc)
electrochemical	pin, ắc quy
electrolytic cell	phản ứng hóa học
fuel cell	pin vonta
irreversible reaction	dùng một lần
primary cell	phản ứng không thuận nghịch
Rechargeable	hóa năng
secondary cell	xả, phóng điện
voltaic pile	điện hóa

Exercise 2 T.S 1 Listen and practise

- | | | |
|----------------------|----------------------|---------------------------|
| 1. battery | 6. discharge | 11. irreversible reaction |
| 2. charge | 7. disposable | 12. primary cell |
| 3. charging current | 8. electrochemical | 13. rechargeable |
| 4. chemical energy | 9. electrolytic cell | 14. secondary cell |
| 5. chemical reaction | 10. fuel cell | 15. voltaic pile |

Exercise 3 T.S 2 Listen and complete the sentences by selecting the correct word from the box to fill in the gap

fuel cell	secondary cells	irreversible reaction
Charge	electrolytic cell	primary cell
charging current	electrochemical	rechargeable

1. A is an electrochemical conversion device.
2. An is an reaction which cannot be changed.
3. is the current that flows into a capacitor when a voltage is first applied.
4. A rechargeable battery is a group of two or more
5. The anode of an is positive, and the cathode is negative.

READING:**BATTERY**

In electronics, a battery is two or more electrochemical cells which store chemical energy and make it available as electrical energy. Common usage has evolved to include a single electrical cell in the definition. There are many types of electrochemical cells, including galvanic cells, electrolytic cells, fuel cells, flow cells and voltaic piles. A battery's characteristics may vary due to many factors including internal chemistry, current drain and temperature.

One common division of batteries distinguishes two types: primary (disposable) and secondary (rechargeable). Primary batteries are designed to be used once only because they use up their chemicals in an effectively irreversible reaction. Secondary batteries can be recharged because the chemical reactions they use are reversible; they are recharged by running a charging current through the battery, but in an opposite direction to the discharge current. Secondary, also called rechargeable batteries can be charged and discharged many times before wearing out. After wearing out some batteries can be recycled.

The name "battery" was coined by Benjamin Franklin for an arrangement of multiple Leyden jars (an early type of capacitor) after a *battery* of cannon.

Although an early form of electrochemical battery may have been used in antiquity, the modern development of batteries started with the Voltaic pile, invented by the Italian physicist Alessandro Volta in 1800. Since then, batteries have gained popularity as they became portable and useful for many purposes. The widespread use of batteries has created many environmental concerns, such as toxic metal pollution. Many reclamation companies recycle batteries to reduce the number of batteries going into landfills.

Exercise 4: Are these sentences true (T) or false (F)?

1. A battery is two or more electrochemical cells which store electrical energy and make it available as chemical energy.
2. Internal chemistry, current drain and temperature are factors that contribute to a battery's characteristics.
3. A primary battery is rechargeable while a secondary is disposable.
4. In primary batteries, the chemical reactions are reversible while in secondary batteries, the chemical reactions are irreversible.
5. Secondary batteries can be charged and discharged many times before wearing out.
6. An early form of electrochemical battery was invented by the Italian physicist Alessandro Volta in 1800
7. Since the invention of the Voltaic pile, batteries have gained popularity as they became portable and useful for many purposes.
8. One of the environmental concerns caused by use of batteries is toxic metal pollution.

LISTENING:

Exercise 5 Listen to T.S3 and fill in the blanks with the words given

Environment	chemicals	purchase
Landfills	regulations	materials
Services	harmful	elements
Mercury		

BATTERIES - ENVIRONMENTAL CONCERNS

Battery manufacture consumes resources and often involves hazardous (1) Used batteries also contribute to electronic waste. Some areas now have battery recycling (2) available to recover some of the (3)

..... from used batteries. Batteries may be (4) or fatal if swallowed. Recycling or proper disposal prevents dangerous (5) (such as lead, mercury, and cadmium) found in some types of batteries from entering the (6) In the United States, Americans (7) nearly three billion batteries annually, and about 179,000 tons of those end up in (8) across the country. In the United States the Environmental Protection Agency's Mercury-Containing and Rechargeable Battery Management Act of 1996, has reduced the amount of (9) in regular household batteries. Recycling programs for lead and cadmium batteries have been put in place. Recycling and disposal (10) may in the future apply to alkaline and nickel-metal hydride batteries.

LANGUAGE WORK

We use CAN to express possibility or ability: S + CAN + V infinitive

E.g

We can produce electricity using a generator.

Exercise 6 Match a line in A with a line in B to make meaningful sentences.

- | A | B |
|--------------------|---------------------------------------------------------------------------------------------------------------|
| 1. We can recharge | a. light bulbs to either AC or DC sources. |
| 2. We can extend | b. a simple wet zinc-carbon battery in the laboratory using dilute sulphuric acid as an electrolyte solution. |
| 3. We can make | c. the simple half wave rectifier in two versions with the diode pointing in opposite directions. |
| 4. We can connect | d. secondary batteries by applying electrical current. |
| 5. We can build | e. battery life by storing the batteries at a low temperature. |

When we change the sentence into passive, we can use the formula:

S + CAN + BE + PAST PARTICIPAL

E.g.

Active: *We can produce electricity using a generator.*

Passive: *Electricity can be produced using a generator.*

Exercise 7 Change the following sentences into passive

1. We can recharge secondary batteries by applying electrical current.
2. We can extend battery life by storing the batteries at a low temperature.
3. We can make a simple wet zinc-carbon battery in the laboratory using dilute sulphuric acid as an electrolyte solution.
4. We can connect light bulbs to either AC or DC sources.
5. We can build the simple half wave rectifier in two versions with the diode pointing in opposite directions.

UNIT 8

INCANDESCENT LIGHT BULB

VOCABULARY AND PRONUNCIATION

Exercise 1 Match English terms and Vietnamese translations

English	Vietnamese
1. incandescence	bóng thủy tinh
2. filament	quang phổ liên tục
3. glass bulb	dây tóc
4. headlamp	đèn huỳnh quang
5. tungsten	nóng sáng
6. fluorescent light	đui cài
7. high-intensity	ánh sáng nhìn thấy
8. inert gas	vonfram
9. continuous spectrum	cường độ cao
10. visible light	đèn pha
11. screw base	khí trơ
12. bayonet base	tiếp xúc
13. leak (n,v)	rò rỉ
14. insulation	cách (điện, nhiệt)
15. contact	đui xoáy

Exercise 2 T.S 1 Listen and practise

1. incandescence	6. fluorescent light	11. screw base
2. filament	7. high-intensity	12. bayonet base
3. glass bulb	8. inert gas	13. leak
4. headlamp	9. continuous spectrum	14. insulation
5. tungsten	10. visible light	15. contact

Exercise 3 T.S 2 Listen and complete the sentences by selecting the correct word from the box to fill in the gap

incandescence	fluorescent light	screw base
filament	high-intensity	bayonet base
light bulb	inert gas	visible light

1. is the emission of from a hot body due to its temperature.
2. A is a gas-discharge lamp that uses electricity to excite mercury vapor.
3. discharge lamps are a type of arc lamp.
4. The first successful filaments were made of carbon, later replaced with tungsten.
5. An is any gas that is not reactive under normal circumstances.

LISTENING:**Exercise 4 Listen to T.S3 and fill in the blanks with the words given**

voltages	household	headlamps
Lighting	incandescence	glass bulb
filament	equipment	fluorescent
Electrical		

The incandescent light bulb is a source of artificial light that works by (1) An electric current passes through a thin (2), heating it until it produces light. The enclosing (3) prevents the oxygen in air from reaching the hot filament, which otherwise would be destroyed rapidly by oxidation.

Incandescent bulbs are made in a wide range of sizes and (4), from 1.5 volts to about 300 volts. They require no external regulating (5) and have a low manufacturing cost, and work well on either alternating current or direct current. As a result the incandescent lamp is widely used in (6) and commercial lighting, for portable lighting, such as table lamps, some car (7) and electric flashlights, and for decorative and advertising lighting.

Incandescent light bulbs are gradually being replaced in many applications by (8) lights, high-intensity discharge lamps, LEDs, and other devices, which give more visible light for the same amount of (9) energy input. Some jurisdictions are attempting to ban the use of incandescent lightbulbs in favour of more energy-efficient (10)

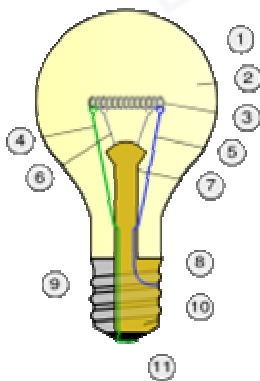
READING

CONSTRUCTION OF LIGHTBULB

Incandescent light bulbs consist of a glass enclosure (the envelope, or bulb) which is filled with an inert gas to reduce evaporation of the filament. Inside the bulb is a filament of tungsten wire, through which an electric current is passed. The current heats the filament to an extremely high temperature (typically 2000 K to 3300 K depending on the filament type, shape, size, and amount of current passed through). The heated filament emits light that approximates a continuous spectrum. The useful part of the emitted energy is visible light, but most energy is given off in the near-infrared wavelengths.

Incandescent light bulbs usually contain a glass mount, which supports the filament lead wires and allows the electrical contacts to run through the envelope without gas/air leaks. Many arrangements of electrical contacts are used. Large lamps may have a screw base (one or more contacts at the tip, one at the shell) or a bayonet base (one or more contacts on the base, shell used as a contact or used only as a mechanical support). Some tubular lamps have an electrical contact at either end. Miniature lamps may have a wedge base and wire contacts, and some automotive and special purpose lamps have screw terminals for connection to wires. Contacts in the lamp socket allow the electric current to pass through the base to the filament. Power ratings range from about 0.1 watt to about 10,000 watts.

Exercise 5: Match each on the left with its name on the right



- a. Contact wire (goes out of stem)
- b. Low pressure inert gas (argon, neon, nitrogen)
- c. Electrical contact
- d. Tungsten filament
- e. Support wires
- f. Contact wire (goes into stem)
- g. Contact wire (goes out of stem)
- h. Stem (Glass mount)
- i. Insulation (Vitrex)
- j. Cap (Sleeve)
- k. Outline of Glass bulb

Exercise 6: Are the following sentences true (T) or false (F)?

1. The glass enclosure of the incandescent light bulbs is filled with an inert gas.
2. The filament type, shape, and size decide the amount of current passing through it.
3. The only function of the glass mount is to support the filament lead wires.
4. A screw base has one or more contacts at the tip, one at the shell while a bayonet base has one or more contacts on the base, shell used as a contact or used only as a mechanical support.
5. Large lamps may have a screw base or a wedge base.
6. Some tubular lamps have an electrical contact at either end and wire contacts.
7. Automotive and special purpose lamps have screw terminals for connection to wires.
8. Contacts in the lamp socket allow the electric current to pass through the filament to the base.

LANGUAGE WORK

Noun phrase (1)

A noun phrase in English may take the following structure:

Adverb + Past Participle + Noun

E.g: A horizontally polarized antenna

The noun phrase ‘A horizontally polarized antenna’ means “an antenna which is polarized horizontally”

Exercise 7 Convert each of the following clauses into a noun phrase

E.g: An antenna which is polarized horizontally

→ A horizontally polarized antenna

1. domes which are mounted eccentrically
2. A resistor which is connected directly
3. An atom which carries positive charge
4. A mechanism which is operated electrically
5. A bridge which is operated manually
6. A detector which is coupled eletromagnetically.

Exercise 8 Translate the noun phrase into Vietnamese

E.g.

A horizontally polarized antenna (An antenna which is polarized horizontally)

→ Một ăng-ten được phân cực kiểu nằm ngang

1. eccentrically mounted doms (doms which are mounted eccentrically)
2. directly connected resistor (A resistor which is connected directly)
3. positively charged atom (An atom which carries positive charge)
4. electrically operated mechanism (A mechanism which is operated electrically)
5. manually operated bridge (A bridge which is operated manually)
6. electromagnetically coupled detector (A detector which is coupled electromagnetically)

UNIT 9

CIRCUIT BREAKER

VOCABULARY AND PRONUNCIATION

Exercise 1 Match English terms and Vietnamese translations

English	Vietnamese
1. arc	lỗi, trục trặc, hư hỏng
2. circuit breaker	bộ biến đổi, biến thế, biến áp
3. compressed air	đoản mạch, ngắn mạch
4. electrical circuit	công tắc
5. fault	không khí nén
6. fuse	mạch điện
7. latch	cắt điện, cầu giao
8. overload	hồ quang
9. Relay	cơ cấu đóng mạch, chuyển mạch
10. self-contained	chốt, then
11. short circuit	độc lập, có đủ các bộ phận
12. Spring	Quá tải
13. switch	rơ le
14. switchgear	lò xo
15. transformer	cầu chì

Exercise 2 T.S 1 Listen and practise

1. arc	6. fuse	11. short circuit
2. circuit breaker	7. latch	12. spring
3. compressed air	8. overload	13. switch
4. electrical circuit	9. relay	14. switchgear
5. fault	10. self-contained	15. transformer

Exercise 3 T.S 2 Listen and complete the sentences by selecting the correct word from the box to fill in the gap



- | | | |
|--------------------|--------|---------------|
| Transformer | fuses | short circuit |
| circuit breakers | switch | spring |
| electrical circuit | Relay | switchgear |

1. An is a path which electrons from a voltage or current source follow.
2. A usually consists of two coils of wire wound on the same core.
3. A allows a current along a different path from the one intended.
4. A is an electrical that opens and closes under the control of another electrical circuit.
5. The term refers to the combination of electrical disconnects, and used to isolate electrical equipment.

LISTENING

Exercise 4 Listen to T.S3 and fill in the blanks with the words given

- | | | |
|-------------|----------------|------------|
| Operation | circuits | replaced |
| Application | switch | overload |
| fuses | short-circuits | switchgear |

 <p>A 2 pole miniature circuit breaker</p>	 <p>Photo of inside of a circuit breaker</p>
-------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------

Circuit Breakers

A circuit breaker is an automatically-operated electrical (1) designed to protect an electrical circuit from damage caused by (2) or short circuit. Unlike a fuse, which operates once and then has to be (3) , a circuit breaker can be reset either manually or automatically to resume normal (4) Circuit breakers are made in varying sizes, from small devices that protect an individual household appliance up to large (5) designed to protect high voltage (6) feeding an entire city.

An early form of circuit breaker was described by Edison in an 1879 patent (7) , although his commercial power distribution system used (8) Its purpose was to protect lighting circuit wiring from accidental (9) and overloads.

READING

Operation of Circuit Breakers

All circuit breakers have common features in their operation, although details vary substantially depending on the voltage class, current rating and type of the circuit breaker.

The circuit breaker must detect a fault condition; in low-voltage circuit breakers this is usually done within the breaker enclosure. Circuit breakers for large currents or high voltages are usually arranged with pilot devices to sense a fault current and to operate the trip opening mechanism. The trip solenoid that releases the latch is usually energized by a separate battery, although some high-voltage circuit breakers are self-contained with current transformers, protection relays, and an internal control power source.

Once a fault is detected, contacts within the circuit breaker must open to interrupt the circuit; some mechanically stored energy within the breaker is used to separate the contacts, although some of the energy required may be obtained from the fault current itself. The stored energy may be in the form of springs or compressed air. Small circuit breakers may be manually operated; larger units have solenoids to trip the mechanism, and electric motors to restore energy to the springs.

The circuit breaker contacts must carry the load current without excessive heating, and must also withstand the heat of the arc produced when interrupting the circuit. Contacts are made of copper or copper alloys, silver alloys, and other materials. Service life of the contacts is limited by the erosion due to interrupting the arc. Miniature circuit breakers are usually discarded when the

contacts are worn, but power circuit breakers and high-voltage circuit breakers have replaceable contacts.

When a current is interrupted, an arc is generated - this arc must be contained, cooled, and extinguished in a controlled way, so that the gap between the contacts can again withstand the voltage in the circuit. Different circuit breakers use vacuum, air, insulating gas, or oil as the medium in which the arc forms.

Exercise 5: Are the following sentences true (T) or false (F)?

1. All circuit breakers have common features in their operation, but details are not always the same.
2. In low-voltage circuit breakers a fault condition is detected within the breaker enclosure.
3. The only function of pilot devices is to sense a fault current.
4. The trip solenoid that releases the latch is self-contained with current transformers, protection relays, and an internal control power source.
5. Contacts within the circuit breaker must open to interrupt the circuit when some mechanically stored energy within the breaker is used to separate the contacts.
6. The circuit breaker contacts must withstand the heat of the arc produced when interrupting the circuit.
7. The erosion due to interrupting the arc limits the service life of the contacts.
8. Miniature circuit breakers are usually replaced when the contacts are worn.
9. When a current is interrupted, an arc is extinguished in a controlled way by the current.
10. Vacuum, air, insulating gas, or oil can be used in different circuit breakers.

LANGUAGE WORK: Noun phrase (2)

A noun phrase in English may take the following structure:

Noun + Past Participle + Noun

E.g: A hand operated valve

The noun phrase ‘A hand operated valve’ means “a valve which is operated by hand”

Exercise 6 Now convert each of the following clauses into a noun phrase

E.g:

A valve which is operated by hand

→ a hand operated valve

1. transformer which is cooled by air
2. engineering which is aided by a computer
3. switchgear which is insulated by gas
4. end which is sprayed with metal
5. valve which is operated by a motor
6. screen which is coated with phosphor

Exercise 7 Translate the noun phrases into Vietnamese

E.g: hand operated valve (valve which is operated by hand)

→ van được thao tác bằng tay

1. air-cooled transformer (transformer which is cooled by air)
2. computer-aided engineering (engineering which is aided by a computer)
3. gas-insulated switchgear (switchgear which is insulated by gas)
4. metal-sprayed end (metal sprayed end)
5. motor-operated valve (valve which is operated by a motor)
6. phosphor-coated screen (screen which is coated with phosphor)

UNIT 10

RECTIFIER

VOCABULARY AND PRONUNCIATION

Exercise 1 Match English terms and Vietnamese translations

English

1. alternating current
2. anode
3. arc
4. cathode
5. center-tapped
6. direct current
7. full-wave rectification
8. half wave rectification
9. inverter
10. negative half
11. polarity
12. positive half
13. rectifier
14. vacuum tube
15. waveform

Vietnamese

- dạng sóng
bộ chỉnh lưu, bộ nắn dòng
dòng xoay chiều
chỉnh lưu cả sóng
hồ quang
phân cực, cực tính
cực dương
nửa dương
đèn chân không
dòng một chiều
cực âm
nửa âm
bộ đảo điện, bộ đảo lưu
trích giữa
chỉnh lưu nửa sóng

Exercise 2 T.S 1 Listen and practise

- | | | |
|------------------------|----------------------------|-------------------|
| 1. alternating current | 6. direct current | 11. polarity |
| 2. anode | 7. full-wave rectification | 12. positive half |
| 3. arc | 8. half wave rectification | 13. rectifier |
| 4. cathode | 9. inverter | 14. vacuum tube |
| 5. center-tapped | 10. negative half | 15. waveform |

Exercise 3 T.S 2 Listen and complete the sentences by selecting the correct word from the box to fill in the gap.

alternating current	direct current	anode
arc	center-tapped	rectifier
cathode	inverter	vacuum tube

1. A transformer is a transformer with a tap in the middle of the secondary winding.
2. An is an electrical device that converts to
3. Some special function are filled with low-pressure gas.
4. An is an electrode through which electric current flows into a polarized electrical device.
5. A is an electrode through which electric current flows out of a polarized electrical device.

LISTENING:

Exercise 4 Listen to T.S3 and fill in the blanks with the words given

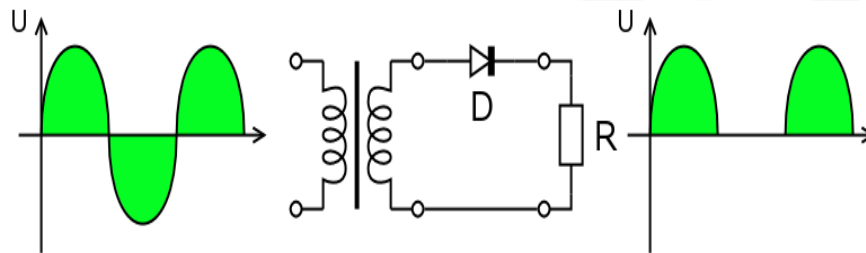
detectors	convert	diodes	components	arrangement
difference	converts	rectification	development	function

A **rectifier** is an electrical device that (1) alternating current (AC) to direct current (DC), a process known as (2) Rectifiers have many uses including as components of power supplies and as (3) of radio signals. Rectifiers may be made of solid state diodes, vacuum tube diodes, mercury arc valves, and other (4) A device which performs the opposite (5) (converting DC to AC) is known as an inverter. When only one diode is used to rectify AC (by blocking the negative or positive portion of the waveform), the (6) between the term *diode* and the term *rectifier* is merely one of usage, i.e., the term *rectifier* describes a *diode* that is being used to (7) AC to DC. Almost all rectifiers comprise a number of diodes in a specific (8) for more efficiently converting AC to DC than is possible with only one diode. Before the (9) of silicon semiconductor rectifiers, vacuum tube (10) and copper(I) oxide or selenium rectifier stacks were used.

READING

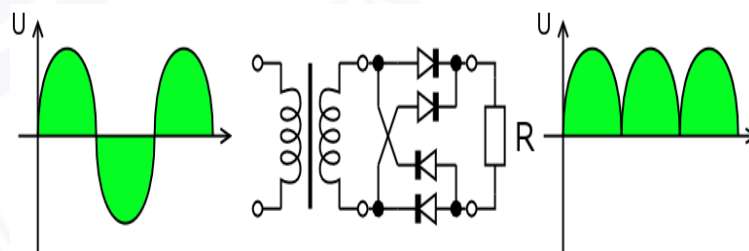
Half-wave rectification

In half wave rectification, either the positive or negative half of the AC wave is passed, while the other half is blocked. Because only one half of the input waveform reaches the output, it is very inefficient if used for power transfer. Half-wave rectification can be achieved with a single diode in a one phase supply, or with three diodes in a three-phase supply.

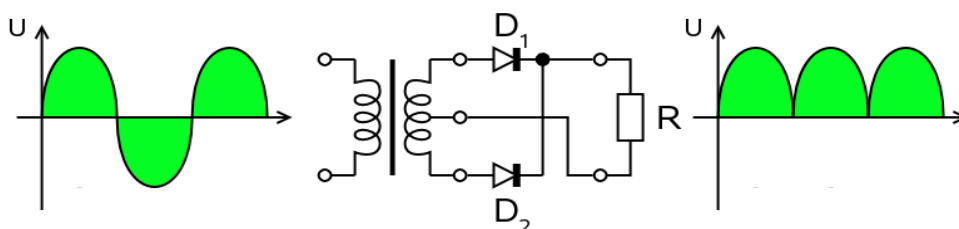


Full-wave rectification

A full-wave rectifier converts the whole of the input waveform to one of constant polarity (positive or negative) at its output. Full-wave rectification converts both polarities of the input waveform to DC (direct current), and is more efficient. However, in a circuit with a non-center tapped transformer, four diodes are required instead of the one needed for half-wave rectification. (See semiconductors, diode). Four rectifiers arranged this way are called a diode bridge or bridge rectifier:

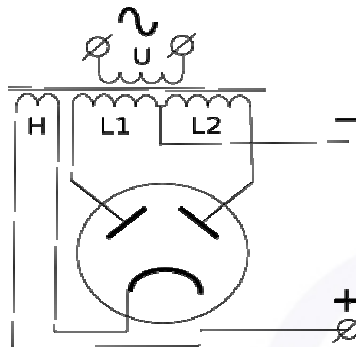


For single-phase AC, if the transformer is center-tapped, then two diodes back-to-back (i.e. anodes-to-anode or cathode-to-cathode) form a full-wave rectifier (in this case, the voltage is half of that for the non-tapped bridge circuit above, and the diagram voltages are not to scale).



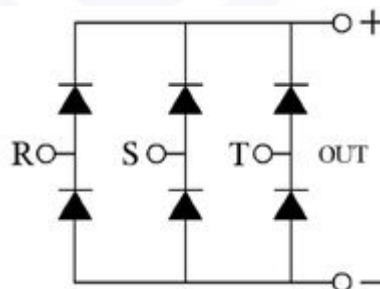
A very common vacuum tube rectifier configuration contained one cathode and twin anodes inside a single envelope; in this way, the two diodes required only

one vacuum tube. The 5U4 and 5Y3 were popular examples of this configuration.



Full-wave rectifier, with vacuum tube having two anodes.

For three-phase AC, six diodes are used. Typically there are three pairs of diodes, each pair, though, is not the same kind of **double diode** that would be used for a full wave single-phase rectifier. Instead the pairs are in series (anode to cathode). Typically, commercially available double diodes have four terminals so the user can configure them as single-phase split supply use, for half a bridge, or for three-phase use.



Exercise 5: Are the following sentences true (T) or false (F)?

1. In half wave rectification, only one half of the AC wave is passed, while the other half is blocked.
2. Half-wave rectification can only be achieved with a single diode in a one phase supply.
3. Full-wave rectification converts both halves of the AC wave to DC.
4. Full-wave rectification is more efficient than half-wave rectification.
5. In half-wave rectification, more diodes are used than in full-wave rectification.
6. A rectifier with a center-tapped transformer requires more diodes than a rectifier with a non-center tapped transformer.

7. A rectifier with a center-tapped transformer is more efficient than a rectifier with a non-center tapped transformer.
8. A common vacuum tube rectifier configuration contained one anode and twin cathodes inside a single envelope.
9. For three-phase AC, three pairs of diodes are used.

LANGUAGE WORK: Noun phrase (3)

A noun phrase in English may take the following structure:

Noun + Present Participle + Noun

E.g: A current-carrying conductor

The noun phrase ‘A current-carrying conductor’ means “a conductor which is carrying a current”

Exercise 6 Now convert each of the following clauses into a noun phrase

E.g: a conductor which is carrying a current

→ A current-carrying conductor

1. radar which can find direction
2. material which conducts current
3. material which insulates heat
4. device which can sense temperature
5. pump which feeds oil
6. system which processes data

Exercise 7 Translate the noun phrase into Vietnamese

A current-carrying conductor (a conductor which is carrying a current)

→ vật dẫn mang dòng

1. direction finding radar (radar which can find direction)
2. current conducting material (material which conducts current)
3. heat insulating material (material which insulates heat)
4. temperature sensing device (device which can sense temperature)
5. oil feeding pump (pump which feeds oil)
6. data processing system (which processes data)

REFERENCES

<http://wiki pedia.org/>

<http://www.freepatentsonline.com/5278681.html>

http://searchstorage.techtarget.com/sDefinition/0,,sid5_gci811276,00.html

<http://en.wikipedia.org/wiki/>

<http://en.wikipedia.org/wiki/>

Jump to: navigation, search

<http://whitepapers.techrepublic.com.com/abstract.aspx?docid=344314>

[www.viasatellite.com/glossary/glossary2.html](http://viasatellite.com/glossary/glossary2.html)