



ΤΕΧΝΟΛΟΓΙΚΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ (Τ.Ε.Ι.) ΛΑΜΙΑΣ

ΚΕΝΤΡΟ ΞΕΝΩΝ ΓΛΩΣΣΩΝ ΚΑΙ ΦΥΣΙΚΗΣ ΑΓΩΓΗΣ

ΤΜΗΜΑ ΗΛΕΚΤΡΟΝΙΚΗΣ



ΔΙΔΑΚΤΙΚΕΣ ΣΗΜΕΙΩΣΕΙΣ

ΜΑΘΗΜΑ: ΑΓΓΛΙΚΑ Ι

ΛΑΜΙΑ 2012

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Κέντρο Ξένων Γλωσσών και Φυσικής Αγωγής
Τμήμα Ηλεκτρονικής
Διδακτικές Σημειώσεις Μαθήματος «Αγγλικά Ι»

Η Ψηφιοποίηση έγινε βασισμένη σε παλαιότερη έκδοση
Φρέρης Πέτρος – Ψηφιοποίηση Κειμένων / Σελιδοποίηση
Λέκκας Κωνσταντίνος – Ψηφιοποίηση εικονογράφησης / Δακτυλογράφηση
Μεταξάς Δαλαμπίρας – Ορθογραφικός έλεγχος / Διορθώσεις

Λαμία 2012

Electronics

Electronics is the branch of electrical science concerned with the behaviour of free electrons and their control and applications to useful purposes. It is thus distinguished from other branches of electricity, in which the electrons are held captive in conductors or electrolytes. The subject may be said to have begun with John Ambrose Fleming's study of Edison effect in 1904, and his use of it in the thermionic valve, for though the experiments with cathode rays by William Crooks in 1944 were electronic, their nature had not yet been organised.

Fleming's diode valve was followed by the triodes of R. von Lieben and Lee De Forest in 1905 and 1907 respectively. These valves exploited the fact that hot metals emit electrons, and employed a cathode heated by an independent circuit. They were improved later by coating them with metallic oxides, but cold cathode valves also appeared. They emit electrons by "field emission", a high potential difference being maintained between the cathode and the region around it.

The original purpose of the valve was to provide a one-way passage for electrons, but the grid introduced in the triode enabled signals to be inserted in the current, or signals already present to be amplified. Another method of achieving these results sprang from Oliver Lodge's wireless detector of about 1980. This consisted of a needle-point resting on an aluminium plate, but it was later improved by using a crystal of galena instead of aluminium and the needle became a wire "cat's whisker".

The "cat's whisker" radio receiver was so sensitive that no supply of electricity was needed, yet the principle involved was not developed until 1948, when the transistor was invented in the United States. In the transistor the galena is replaced by other semiconductors, such as germanium or silicon, and instead of the cat's whisker the contact is made between prepared surfaces. Since this form of electronic rectifier and amplifier can be made on a minute scale, and is sensitive to extremely weak electric currents, it has become the essential element in miniature radio sets on the one hand, and in the large computers employing thousands of elements on the other.

The release of electrons in semiconductors by exposure to light has led to other types of electronic apparatus. The silicon cell converts sunlight into electricity and it is used to maintain the supply of current to the telemetry instruments in space vehicles. It has also been applied experimentally to driving vehicles, and to the production of cheap electricity in desert regions where sunshine is continuous. The emission of electrons by certain substances when exposed to light is called "photo-electric effect" and it was first observed by A. C. Becquerel in 1839. The photo-electric virtues of the semiconductor galenium were noticed by accident by a telegraph operator named May in 1873 and the photo-electric effect with metals was exhaustively studied in 1904 and 1905 by Albert Einstein who explained the electronic emission.

This led to the "electric eye" of Julius Elster and H. F. Goitel, who used a film of potassium on the inside of an exhausted tube, and finally to the sensitive "mosaic" of caesium droplets used in T.V. cameras.

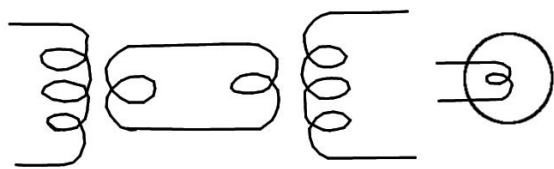
Another application of the photoelectric effect is the photo-multiplier used by astronomers to increase the light of faint stars.

The uses of electronic elements in suitable circuits are manifold. The detector turning and amplifying circuits in radio receivers are examples, but circuits may be designed to modify a supplied "input" current in any desired manner. For example, a direct current may be made to produce an oscillating current of predetermined frequency or to emerge as a pulsating current in which the output pulses can be controlled so that they occur only when the input has an amplitude falling between two chosen limits. Coincidence circuits give output pulses only if two or more signals are applied to the input simultaneously, and anticoincidence circuits only if they are separate. Pulse circuits and switching circuits may be used to throw valves and other electronic elements into, or out of, operation according to the state of other elements in connected circuit, and so on. These various devices have an immense field of application in computer-controlled automation

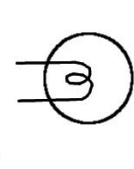
Other departments of electronics are concerned with the direct application of cathode rays.

The production of X-rays, discovered by W. C. Roentgen in 1895, results from the simple bombardment of a metal "target" by cathode rays, but in other types of apparatus the rays are made to strike an anode with a hole in the centre, when some of them shoot straight through and provide a free beam of electrons. This device is called an "electron gun" and it plays an essential part in the cathode-ray oscillograph (oscilloscope), the television tube, and the electron microscope.

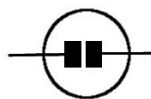
SYMBOLS FOR DIAGRAMS



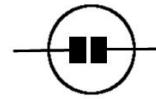
Link coupling



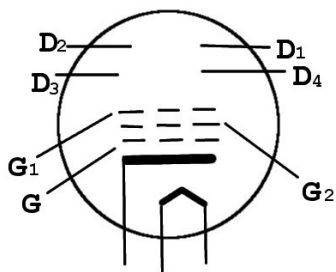
Pilot Lamp



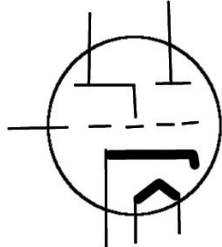
Neon Lamp



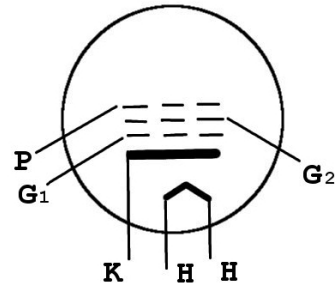
phototube



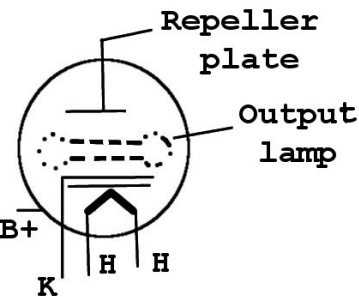
Cathode-ray tube
electrostatic
deflection



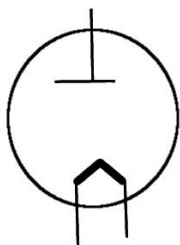
Electron-ray
indicator tube



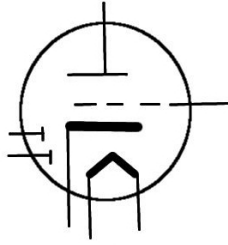
Cathode-ray tube
electromagnetic
deflection



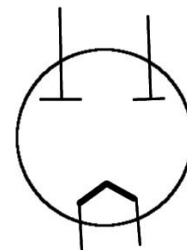
klystron



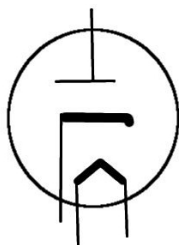
Diode
directly heated
cathode



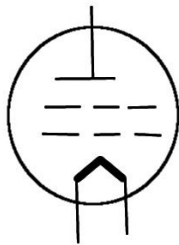
Duplex
diode-triode



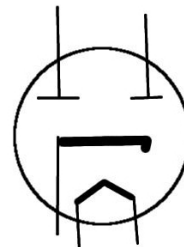
Duo-diode
directly heated
cathode



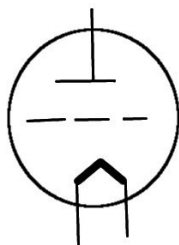
Diode, Indirectly
heated cathode



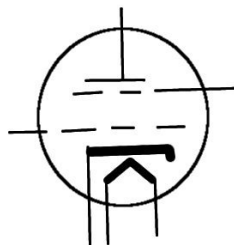
Tetrode, directly
heated cathode



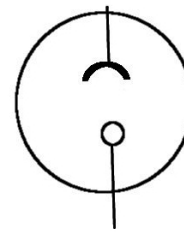
duo-diode, indirectly
heated cathode



Triode, directly
heated cathode



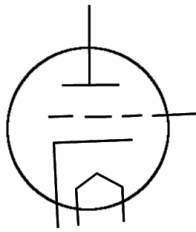
Pentode, indirectly
heated cathode



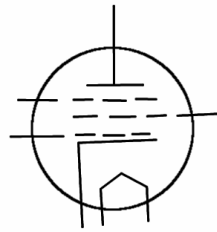
Voltage reg, cold
cathode-gaseous



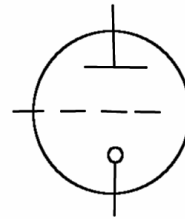
Variable/Adjustable capacitor



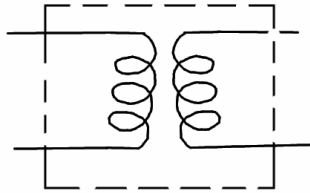
Triode Indirectly
heated cathode



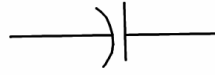
Pentode indirectly
Beam-power amplifier



Cold cathode
triode-gaseout



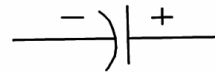
Shielded
transformer



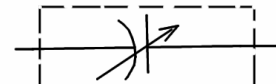
Fixed capacitor



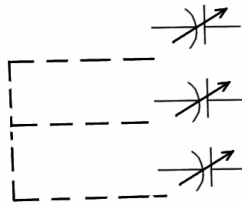
Split stator
variable capacitor



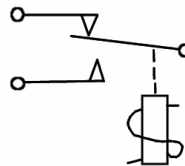
Electrolytic capacitor



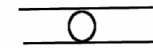
Shielded capacitor



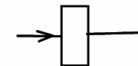
Capacitor
mechanical linkage



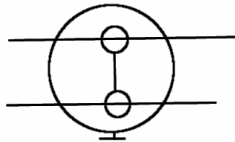
Relay circuit A open
when De-energized



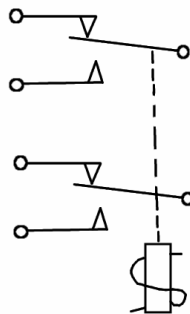
Coaxial cable



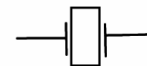
Crystal detector



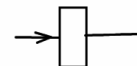
Twin coaxial cable



Relay circuits A
and B closed
when deenergized



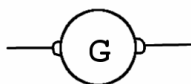
Crystal



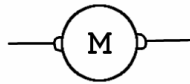
Contact rectifier,
half wave



Shielded cable



Dc generator



Dc Motor



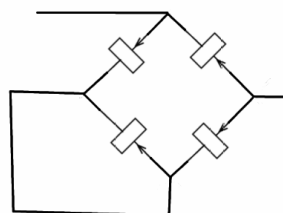
AC generator
single-phase



Ac Motor
Single-phase



AC voltage
source



Contact
rectifier
full-wave

DC output

THERMIONIC VALVES

A thermionic valve is a device that uses thermionic emission. It consists of a set of electrodes sealed in an evacuated glass or metal container. A gas at low pressure may be used in the container.

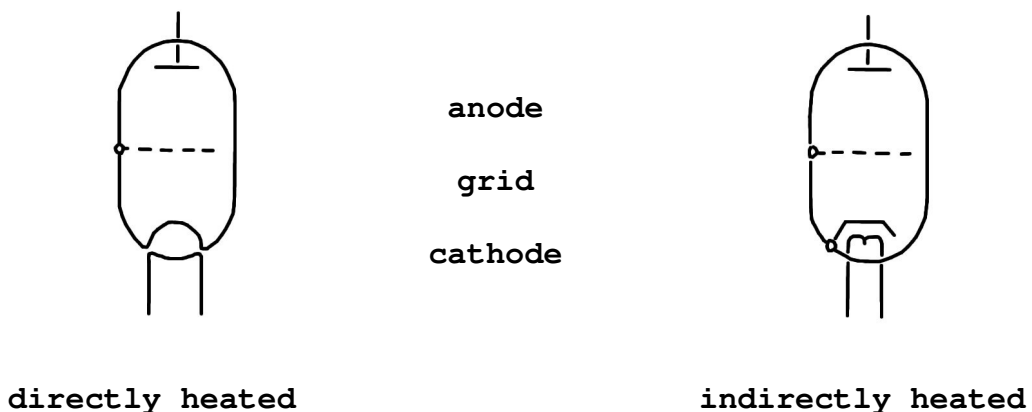
The electrodes are:

- a. a cathode, heated to emit electrons,
- b. an anode, at a positive potential with respect to the cathode, to attract electrons
- c. one or more perforated electrodes, called grids.

The cathode can be,

- a. directly heated, i.e. a filament heated by the passage of an electric current, and acting also as a cathode,
- b. a metal cathode, heated indirectly by a separate filament.

Thermionic valves are described as diodes, triodes, tetrodes, or pentodes, depending on the number of electrodes they possess.



THERMIONIC VALVES (circuit symbols)

diode. A thermionic valve containing a cathode and an anode only. It is used in half-wave rectification.

A double-diode has two anode plates and is used in full-wave rectification.

triode. A thermionic valve containing an anode, a grid, and a cathode, i.e. three electrodes. The basic function of a triode is the amplification of current, voltage or power.

tetrode. A thermionic valve containing an anode, a control grid, a cathode, and a screen grid between the anode and the control grid. It is a triode with a screen grid added to reduce the capacitance between the control grid and the anode.

pentode. A thermionic valve containing an anode, screen grid, control grid, cathode, and a suppressor grid between the anode and the screen grid. Its function is to reduce the secondary emission of electrons emitted by the anode. It is usually connected directly to the cathode. Pentodes are mainly used for power amplification.

Unknown words

thermionic valve	θερμιονική λυχνία
device	συσσκευή
emission	εκπομπή
seal	σφραγίζω
evacuate	εκκενώνω, αδειάζω
evacuated container	δοχείο κενού
emit	εκπέμπω
emitter	πομπός
heat	θερμότητα
cathode	κάθοδος
anode	άνοδος
potential	δυναμικό
perforate	διατρυνώ
grid	πλέγμα
filament	νήμα (λυχνίας)
indirectly	έμμεσα
separate	διαχωρίζω
describe	περιγράφω
possess	κατέχω
contain	περιέχω
half-wave	ημικυματοειδής
rectification	ανόρθωση
function	λειτουργία
amplification	ενίσχυση
control grid	πλέγμα ελέγχου
screen grid	προστατευτικό πλέγμα
reduce	μειώνω
capacitance	χωρητικότητα
suppressor	πλέγμα αναστολής
secondary	δευτερεύοντος
mainly	κατά κύριο λόγο

Comprehension

1. What does a thermionic valve consist of?
 2. Give the names of the electrodes.
 3. Why is the cathode heated?
 4. What electrode is used to attract electrons?
 5. What is a grid?
 6. How can a cathode be heated?
 7. How are thermionic valves described?
 8. What does the name of thermionic valves depend on?
 9. What is a diode? Where is it used?
 10. What is a double diode?
 11. What is a triode? What is its basic function?
 12. What is a tetrode? Why is the screen grid added to the triode?
 13. What is a pentode? What is its function?
 14. How is a pentode usually connected to the cathode?
 15. What are pentodes mainly used for?
-

Pay attention to the following

consist of
with respect to directly to
depend on

Exercises

A. True or false? If false Correct it.

1. A gas at high pressure may be used in the glass or metal container.
2. A thermicnic valve consists of a set of electrons, sealed in a container.
3. The electrodes are a cathode, an anode and one more grids.
4. The cathode is used to control the flow of electrons.
5. A diode is used in full wave rectification.
6. The basic function of a diode is the amplification of voltage.
7. A screen grid is placed between the anode and the control grid.
8. A screen grid is a added to increase the capacitance between the control grid and the anode.
9. Pentodes are mainly used for power rectification.
10. A tetrode is used to reduce the secondary emission of electrons emitted by the anode.

B. Give the nouns of the following

- | | | |
|------------|-------------|-------------|
| 1.emit | 6.attract | 11.describe |
| 2.seal | 7.perforate | 12.rectify |
| 3.evacuate | 8.direct | 13.add |
| 4.press | 9.heat | 14.reduce |
| 5.contain | 10.pass | 15.connect |
-

C. Turn into Passive

1. The grid controls the passage of electrons.
 2. Will it reduce capacitance between the anode and the control grid?
 3. A capacitor will connect the grid to earth.
 4. The passage of the electric current has heated the filament.
 5. Have they connected the pentode directly to the cathode?
 6. We will not place this electrode between the anode and the cathode.
 7. We can use them for power amplification.
 8. Does it reduce the secondary electrons emitted by the anode?
 9. Have they applied it to the control grid?
 10. It gradually gains an electric charge.
-

D. The following words are used in the passage.

electrode rectification anode filament cathode

Complete each of these definitions with a word taken from the above list.

1. An.....is the electrode towards which the anions (negative ions) move during electrolysis.
2. Ais a negative electrode towards which cations (positive ions) move in electrolysis.
3. An.....is a piece of conducting material inserted in a gas solution, or molten ionic solid, to enable an electric current to pass through.
4.is the transformation of alternating current to direct current.
5. A.....is a fine wire with a high resistance which is heated by the passage of an electric current.

E. Choose the correct word a, b, c and d to each of the following sentences.

1. The electrodes are sealed in an evacuated
a. vessel b. box c. Container d. glass
 2. A cathode is an electrode heated to electrons.
a. emit b. send away c. collect d. discharge
 3. The gas used in the conductor is at low.....
a. pressure b. compression c. press d. passage
 4. The cathode can be directly.....
a. used b. controlled c. pressed d. heated
 5. The screen grid is added to.....capacitance between the control grid and the anode.
a. increase b. reduce c. intensify d. extend
-

F. Can you spell your science vocabulary?

Choose the correct word a ,b, c and d.

- | | | | |
|-----------------|--------------|--------------|---------------|
| 1. a. Elektrod | b. electrode | c. Elektrode | d. ilectrode |
| 2. a. Emited | b. emmitted | c. Emitted | d. enmited |
| 3. a. Potential | b. Potensial | c. Potencial | d. potentiale |
| 4. a. separat | b. seperate | c. separate | d. seperete |
| 5. a. possessed | b. possesed | c. poseded | d. Posessed |

COMPUTERS

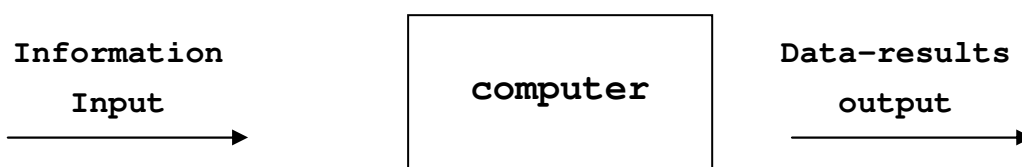
A computer is a complex machine, that is a computing device able to do complex calculations in a fraction of a second, to accept data in a specified form, to process the data and to supply the results in one of several specified forms. The processes include simple mathematical operations, logical processes and control of other machines and devices. They can also store information so that it is available for immediate use.

There are two types of computers. The digital computers which are complex electrically operated mechanisms and they work with numbers as numbers. Each number or digit -a number written with one symbol- fed into a digital computer becomes an electric pulse. Information fed into a computer is known as input. The summation of the input data is called the output. In practice, this may be accomplished by punching holes in a card or a tape with a special typewriter, where each hole represents a number, letter or symbol headed for the output data. As this card or tape is run through the digital number, each hole punched permits an electrical contact, to create the proper pulse to produce the total of the input data. Other methods feed the input data into magnetic tape or drum. The totals may go to a printer where the results in numbers, letters or symbols are printed on large tabulation sheets.

Another type of computer is the analog which handles symbols. It is used principally for scientific and technical problems involving actual measurements. It can also be part of a training device that makes use of simulation-imitating conditions that would occur in reality.

The recent and growing wide use of computers has resulted in a "computer language" all its own. Computers are responsible for tremendous time savings in such areas as engineering business, science, the military and space technology. However a computer cannot think for itself. It must be given the correct information and the correct instructions in an appropriate sequence.

In other words it can go no further than the human brain that programmed it.



Unknown words

compute	υπολογίζω
complex	σύνθετος
calculation	υπολογισμός
fraction	κλάσμα
second	δεύτερος
accept	δέχομαι
data	δεδομένα
specify	αναφέρω με λεπτομέρειες
process	επεξεργασία
supply	προμηθεύω, παρέχω, δίνω
results	αποτελέσματα
include	περιλαμβάνω
operation	λειτουργία
control	έλεγχος
store	εναποθηκεύω
information	πληροφορίες
available	διαθέσιμος
immediate	άμεσος
digital	ψηφιακός
digit	ψηφίο
feed	τροφοδοτώ
pulse	παλμός
summation	σύνολο, άθροισμα
input	είσοδος
output	έξοδος
accomplish	πραγματοποιώ, επιτυγχάνω
punch	τρυνώ με διατρητική μηχανή
represent	παριστάνω
permit	επιτρέπω
contact	επαφή
create	δημιουργώ
drum	τύμπανο
total	συνολικός
printer	εκτυπωτής
tabulation	Πίνακας
handle	Χειρίζομαι
involve	Περιλαμβάνω
actual	ακριβής, πραγματικός
simulation	μίμηση
imitate	αντιγράφω
occur	απαντώ
reality	πραγματικότητα
recent	πρόσφατος
responsible	υπεύθυνος
tremendous	τρομακτικός
saving	εξοικονόμηση
area	περιοχή
instruction	οδηγία
appropriate	κατάλληλος
sequence	ακολουθία
brain	εγκέφαλος

Comprehension

1. What can a computer do?
2. How is information stored?
3. How do digital computers operate?
4. What is a digit
5. What does the word "input" mean in the computer language?
6. What does the word "output" mean?
7. What is the typewriter used for?
8. What does each hole represent?
9. What happens as a punched card is run through the digital number?
10. How are the results printed?
11. What is the analogue computer principally used for?
12. What does the term "computer language" mean?
13. Why are computers useful?
14. In what areas can computers be used?
15. What is the difference between a computer and a human brain?
16. Can a computer replace a human brain? Why?

Pay attention to the following

The tape is run through the digital number
instruction - instructions
information -

Exercises

A. True or false? If false, correct it.

1. Information fed into a computer is known as the output.
2. It takes a long time for a computer to do the calculations.
3. After a digit is fed into a digital computer, it becomes a digital number.
4. The summation of the input data is called the information.
5. Holes are punched in a tape with the help of a special drum.
6. Digital computers are complex electrically operated mechanisms.
7. The analogue computer is principally used for scientific problems.
8. A computer can replace human brain.
9. A computer is a very simple machine.
10. Computers are responsible for tremendous time savings.

B. Choose the correct tense a,b,c and d to each of the following sentences

1. If the core.....it can serve as a transformer.

- | | |
|---------------------------|---------------------------|
| a.has not be magnetized | b.has not been magnetize |
| c.has not been magnetized | d.Has been not magnetized |

2.into the store?

- | | |
|-----------------------------------------|-------------------------------------------|
| a.must the program be first
inserted | b.must be the program first
inserted |
| c.must be first the program
inserted | d.must the program been first
inserted |

3. The results.....in the output unit until the final instruction stop is read.

- | | |
|----------------------|------------------|
| a.will been placed | c.will be placed |
| b.will not be placed | d.will place |

4.We to prepare the special program by the Professor.

- | | |
|---------------------|--------------------------|
| a. were helped | b. had be helped |
| c. were been helped | d. shall had been helped |

5.The cable to break by the earthquake.

- | | |
|-------------------|---------------|
| a.shall be caused | b.was caused |
| c.had caused | d.were caused |

C. Contextual ference

1. In line 5 the Word they refers to

- a. processes b. computers c. operations d. forms

2. In line 11 the word input refers to

- a. information b. pulse c. digit d. symbol

3. In line 20 the word handles refers to

- a. analogue b. type c. problem d. symbol

4. In line 21 the word involving refers to

- a. measurements b. scientific c. problems d. Principally

5. In line 30 the word it refers to

- a. computer b. human brain c. sequence d. information

D. Give the adjectives of the following

- | | | |
|---------------|--------------------|---------------|
| 1. complexity | 6. digit | 11. scientist |
| 2. ability | 7. symbol | 12. width |
| 3. result | 8. practice | 13. use |
| 4. simplicity | 9. create | 14. reality |
| 5. operation | 10. responsibility | 15. magnet |

E. Complete the unfinished words in the following sentences.

1. Semiconduct.... are mater..... with electrical proper....between good conduct....and insulat..... .
2. The role of the store is to hold the instruct.... and data of the prog..... until the appropriate moment during the source of comput...
3. To opera... a dig..... compu.... the program must first be insert... into the store.
4. Then after the circ... have been activat... ,the control unit reads the first instruct.... of the prog.... and prepares the circuits accordin...
5. Usual... these are tape record.... capa..... of record.... and reproduc... the digit.. wavefor.. represent... the instruc.... and data of the program

RADIO

Radio is the use of certain frequencies of electromagnetic radiation to communicate electrical signals. As no wires are employed in the communication it is also known as wireless transmission.

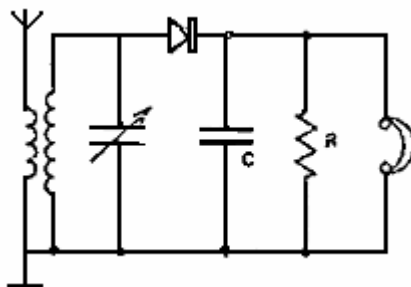
Radio includes radio telephony, radio telegraphy and broadcasting.

The two principal parts of a radio system are the radio transmitter and the radio receiver

Radio transmitter In broadcasting and radio telephony, the transmitter generates a carrier wave which is modulated by a microphone circuit. The modulated carrier wave is fed to an aerial and emitted. The term transmitter is a misnomer, as it should be a radio emitter, the carrier wave being transmitted by space. In radio telegraphy, the carrier wave is interrupted to form a series of long and short impulses based on the Morse code.

Radio receiver A device for receiving radio transmissions. The receiver has an aerial circuit adjusted to resonate to the carrier wave. The carrier wave is demodulated by rectification using a crystal rectifier, a thermionic valve, or a transistor. The audiofrequencies are either amplified by an amplifying circuit or fed directly to an earphone of loudspeaker with a by-pass condenser to remove any radio frequencies. In the diagram an aerial circuit resonates to the carrier wave. This wave is rectified by the crystal diode. The capacitor, C, and the resistor, R, have values such that the time constant for the combination is about 5×10^{-5} second. This period is long compared with the period of oscillation of radio frequencies, but short compared with that of audiofrequencies. The plates of the capacitor have a variation in p.d. which follows that of the audiofrequency. The audiofrequencies reproduce sound in the high-resistance earphones.

Radio set or wireless set are alternative terms, for radio receiver.



Simple crystal diode radio receiver

Unknown words

certain	ορισμένος, βέβαιος
frequency	συχνότητα
radiation	ακτινοβολία
communicate	επικοινωνώ
signal	σήμα
wireless	ασύρματος
transmission	εκπομπή
include	περιλαμβάνω
broadcasting	εκπομπή προγράμματος
principal	κυριότερος
carrier wave	φέρον κύμα
modulate	διαμορφώνω
aerial	κεραία
misnomer	λανθασμένη ονομασία
space	διάστημα
interrupt	διακόπτω
series	σειρά
impulse	ώθηση
adjust	τακτοποιώ
resonate	συντονίζω
demodulate	αποδιαμορφώνω
rectification	ανόρθωση
rectifier	ανορθωτής
amplify	ενισχύω
loudspeaker	μεγάφωνο
by-pass	παρακαμπτήριος οδός
condenser	πυκνωτής/συμπυκνωτής
time constant	σταθερά χρόνου
combination	συνδυασμός
compare	συγκρίνω
oscillation	ταλάντωση
variation	ποικιλία
reproduce	αναπαράγω
alternative	εναλλακτικός
by-pass condenser	πυκνωτής διαρροής

Pay attention to the following

Singular -> datum plural -> data

base on

Comprehension

1. What is radio?
2. Why is radio also known as wireless transmission?
3. What does radio include?
4. Which are the two principal parts of a radio system?
5. What wave does the transmitter generate in radio telephony?
6. Why is the carrier wave interrupted in-radio telegraphy?
7. On what code are the impulses based?
8. What is a radio receiver?
9. What is the used of a by-pass condenser?
10. What do the audiofrequencies reproduce?
11. Are there any alternative terms for radio receiver? If any, name them.

Exercises

A. True or false? If false, correct it

1. Radio communication is also known as wireless communication.
 2. Radio includes radio telephony>radio telegraphy and radio receiver.
 3. The radio transmitter and the radio emitter are the two parts of a radio system.
 4. A transmitter generates a carrier wave, which is modulated by a microphone circuit.
 5. A radio receiver is a device for receiving radio transmissions.
 6. The carrier wave is demodulated by rectification using a crystal rectifier, a thermionic valve, or a tube
 7. The by-pass capacitor is used to remove any radio frequencies.
 8. Wireless radio is an alternative term for radio receiver.
 9. The audiofrequencies are amplified by an aerial circuit.
 10. The plates of the capacitor have a variation in p.d which follows that of the audiofrequency.
-

B. Contextual reference

1. In line 8 the verb is modulated refers to
a. broadcasting b. transmitter c. carrier wave d. microphone circuit
2. In line 10 the word misnomer refers to
a. term b. transmitter c. radio d. emitter
3. In line 12 the verb based refers to
a. carrier wave b. impulses c. series d. radio telegraph
4. In line 15 the participle using refers to
a. carrier wave b. rectification c. rectifier d. transistor
5. In line 24 the word that refers to
a. capacitor b. variation c. plates d. Audiofrequency
-

C. Give the verbs of the following.

- | | | |
|------------------|------------------|------------------|
| 1. use | 6. transmission | 11. combination |
| 2. radiation | 7. receiver | 12. oscillation |
| 3. signal | 8. generator | 13. reproduction |
| 4. communication | 9. rectification | 14. short |
| 5. knowledge | 10. resistor | 15. long |
-

D. Put the following words or phrases in order so as to construct meaningful sentences

1. is used, electric waves, to send, a connecting wire, radio, and, receive, without, signals, using, by means of
2. means of communication, used for, an important, radio, is, entertainment, commercial, and for, public broadcasting
3. transmitting antennas, radiated, voltages, set up, the waves, from, so that, in a receiving antenna, function of a receiving set, the signal desired, is, the first, to select
4. of a carrier wave, a radio transmitter, in the form, is, a device, radiofrequency power, for producing, for transmission.
5. the radio transmitter, and, the two, radio receiver, principal, of, parts, a, are, radio system, the
-

E. Can you spell your science vocabulary?

Choose the correct word a, b, c and d

- | | | | |
|----------------|----------------|-----------------|----------------|
| a. osillator | b. oscillator | c. oscilatto | d. oscillattor |
| a. computter | b. computor | c. computer | d. computer |
| a. device | b. devise | c. divide | d. devaice |
| a. calculation | b. calculasion | c. calculeition | d. kalkulation |
| a. receiver | b. reciever | C. reseiver | d. riceiver |

F. Complete the unfinished words in the following sentences.

1. The other princip.... function.. of a radio recei.... are to amplify the radio-frequen... signal select..., to detect the signal, thereby produc... an audio frequen.... signal, to amplify this signal and to produce it audibl.. by means of a loudspeak.....
2. Radio broadcast... is radio transmit.... inten... for general recept....
3. Radio frequen... is a frequen... use.. for radio transmit....

G. The following words are used in the passage.

Transistor rectifier loudspeaker amplifier transmitter

Complete each of these- definitions with a word taken from the above list

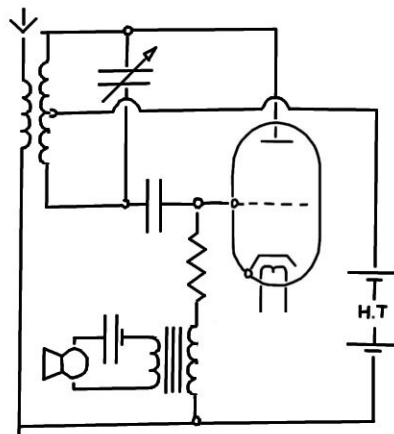
1. A(n).....is an electro-acoustic transducer normally intended to radiate acoustic power into the air so that it is effective at a distance.
2. A(n).....is a device for converting an alternating or oscillating current into an unidirectional current by the inversion or suppression of alternate half-waves.
3. A(n).....is a device whose output is a magnified function of its input and which draws its power from sources other than the input signal.
4. A(n).....is a device which converts audio, video, or coded signals into modulated radio-frequency signals which can be propagated by electromagnetic waves.
5. A(n).....is an active semiconductor device with three or more electrodes.

MODULATION DEMODULATION

Modulation is the process of varying the characteristics of a wave motion by superimposing on it the characteristics of a second wave motion. The term is usually applied to a carrier wave, which has superimposed on it the characteristics of an audio frequency wave. A carrier-wave does not transmit a radio signal by itself the signal (speech or vision) is carried by the modulated wave.

There are three main types of modulation ,amplitude modulation, frequency modulation and phase modulation.

In amplitude modulation the amplitude of the carrier wave is changed by the wave characteristics of the audio frequency signal. (see diagram). Modulation is carried out-by the circuit shown. This consists of a oscillatory circuit powered by the high tension through the triode. The microphone circuit imposes a fluctuating p.d. on the control grid, and this alters the amplitude of. the oscillations in the aerial circuit. This is the simplest method of modulation.



amplitude modulated transmitter

AMPLITUDE MODULATION

In frequency modulation the amplitude of the carrier wave-remains constant and the wave characteristics of the audio frequency wave are translated into changes of frequency of the carrier wave. The frequency of the carrier wave fluctuates above and below its nominal .value. The number of fluctuations per second corresponds to the frequency of the audio frequency wave and the magnitude of the fluctuation corresponds to the amplitude of the audio frequency wave. Frequency modulation can only be used with VHF radio carrier waves

In phase modulation the amplitude and frequency of the carrier wave remain constant and the phase angle of the carrier wave is altered by an amount proportional to the instantaneous amplitude of the audiofrequency wave.

Demodulation is the separation and extraction of audio frequency waves from a modulated carrier wave. The device or circuit used for demodulation is called a detector or demodulator.

Unknown words

modulation	Διαμόρφωση
process	Επεξεργασία/διαδικασία
superimpose	βάζω από πάνω/υπερθέτω
motion	Κίνηση
apply	Εφαρμόζω
carrier wave	φέρον κύμα
audiofrequency wave	ακουστική συχνότητα
transmit	Εκπέμπω
vision	Θέαμα
modulated wave	διαμορφωμένο κύμα
amplitude modulation	Διαμόρφωση εύρους
frequency modulation	Διαμόρφωση συχνότητας
phase modulation	Διαμόρφωση φάσης
tension	Τάση
impose	Θέτω
fluctuating p.d.	κυμαινόμενη διαφορά δυναμικού
alter	Αλλάζω
amplitude	μήκος
aerial circuit	κύκλωμα κεραίας
remain	παραμένω
constant	σταθερός
translate	μεταφράζω
nominal value	ονομαστική αξία
correspond	αντιστοιχώ
magnitude	μέγεθος
phase angle	γωνία φάσεως

amount	ποσό
proportional	ανάλογος
instantaneous	στιγμιαίος
demodulation	αποδιαμόρφωση
separation	διαχωρισμός
extraction	εξαγωγή, αφαίρεση
detector	καταγραφέας, ανιχνευτής
demodulator	αποδιαμορφωτής

Comprehension

1. What does the term modulation mean?
 2. What characteristics does the carrier wave have, superimposed on it?
 3. Does a carrier wave transmit a radio signal by itself?
 4. What kind, of wave carries the signal?
 5. How many types of modulation are there?
 6. What does the microphone circuit impose on the control grid?
 7. What does the imposed fluctuating p.d. alter?
 8. How does the amplitude of the carrier wave remain in frequency modulation?
 9. What kind of waves can frequency modulation only be used with?
 10. What does the term demodulation mean?
 11. How is the circuit used for demodulation?
-

Pay attention to the following

apply to	correspond to
carry out	VHF=very high frequency
translate into	proportional to

Exercises

A. True or false? If false, correct it.

1. The term modulation is usually applied to a carrier wave, which has superimposed on it the characteristics of a frequency wave.
 2. There are (two types of modulation, amplitude modulation, frequency modulation and wave modulation.
 3. The number of fluctuations per second corresponds to the frequency of the carrier wave.
 4. The frequency of the fluctuation corresponds to the amplitude of the audiofrequency wave.
 5. Amplitude modulation can only be used with VHF radio carrier waves
 6. Phase modulation is the separation and extraction of audiofrequency waves from a modulated carrier wave
 7. The device used for modulation is called a detector.
 8. In frequency modulation the amplitude of the carrier wave remains constant.
 9. The frequency of the carrier wave fluctuates above and below its nominal value.
 10. A carrier wave does not transmit a radio signal by itself.
-

B. Complete the unfinished words in the following sentences.

1. Modulat.... is the process by which we make the ampli.... or frequency of a sine-wave volt.... to vary with time accord..... to the volt..... or current variat.... of another sign.....
 2. The carr.... is usual... of a high.... frequen..... than the modulat.... sign.....
 3. Because an AM wave ha... side bands on each side of the carrier, the transmis.... of inform..... by ampli..... modulat.... requir.... the use of a band of frequenc.....
-

C. Fill the bland spaces with the correct word.

1. order send ... message means ... radio waves is necessary vary some features these waves accordance information be transmitted.
 2. first wave, usually single frequency wave constant amplitude, known the carrier wave second the modulating wave.
-

D. The following words are used in the passage.

fluctuation tension frequency amplitude value

Complete each of these definitions with a word, taken from the above list.

1. is the highest value reached by voltage current, or power during a complete cycle.
 2. is the number of complete oscillations performed in a second.
 3. is a force which tends to stretch a string, a rope, a wire, a spring, a rod or a bar.
 4. is the numerical part of a measurement of a quantity.
 5. is one of a number of uneven and irregular variations above and below an expected value of a physical quantity as measured by an instrument.
-

E. Give in full the words for which the following abbreviations and symbols are used.

- | | |
|--------------|-----------|
| 1. FM and PM | 2. C |
| 3. dB or db | 4. d.c. |
| 5. VHF | 6. kVA |
| 7. a.c. | 8. r.m.s. |
| 9. R | 10. I |

F. Place the following words and phrases in their correct order to form sentences

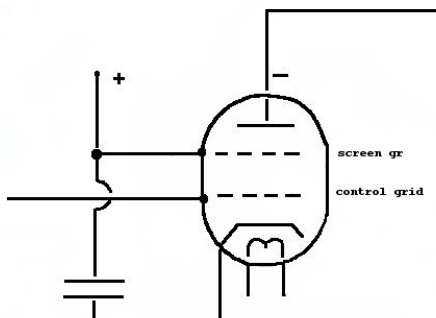
1. radio waves, the information to be transmitted, of these waves, In order to, by means of, in accordance with, it is necessary to, send a message , vary some feature
2. the signal, demodulation, information, The process, carrier wave, of extracting, from a modulated, is called detection or
3. amplitude of, the modulating signal, the carrier wave, the instantaneous, proportion to, In amplitude modulation, is varied in
4. proportional to the instantaneous, the phase angle, that its magnitude is the value of, amplitude of the modulating signal, is varied so, of the sine-wave carrier, In phase modulation

GRID

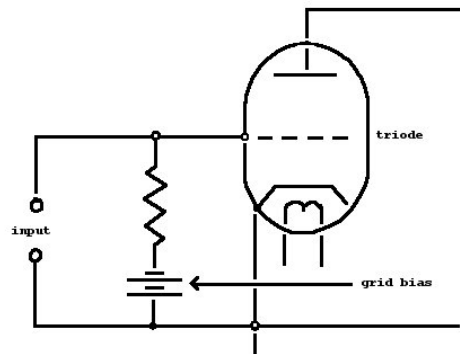
A grid is an electrode in a thermionic valve placed between the anode and the cathode. It is usually perforated, or made of wire, so that electrons can readily pass through it. The grid is used to control the flow of electrons.

A control grid is a grid in a thermionic valve that controls the passage of electrons between the cathode and the anode. The greater the negative potential of the grid, the greater the positive potential of the anode to maintain the same flow of electrons, i.e. to maintain the same anode current.

A screen grid, is a grid placed between the anode and the control grid. It is maintained at a fixed positive potential, slightly less than the positive potential of the anode. Its function is to reduce capacitance between the anode and the control grid. This makes it useful for amplification of radio-frequency a.c., i.e. more efficient for high-frequency applications. The grid is usually connected to earth by a capacitor



screen grid



gridbias

A suppressor grid is a grid placed between the anode and the screen grid in a pentode valve. It is often connected to the cathode. The suppressor grid reduces the secondary electrons emitted by the anode.

Grid bias. A fixed voltage applied to make the grid at a negative potential compared to the cathode. An alternating or fluctuating, p.d. applied at the input operates the valve under conditions determined by the grid bias, which ensures the average p.d. of the grid, with reference to the cathode, is negative. A grid bias is applied to a control grid.

Unknown words

grid	πλέγμα
place	τοποθετώ
perforate	διατρυνώ
readily	εύκολα, αμέσως
flow	ρέω
passage	πέρασμα
potential	δυναμικό
maintain	διατηρώ
screen grid	προστατευτικό πλέγμα
fixed	σταθερός, αμετάβλητος
slightly	ελαφρά
function	λειτουργία
reduce	μειώνω
control grid	πλέγμα ελέγχου
amplification	ενίσχυση
efficient	αποτελεσματικός
application	εφαρμογή
connect	συνδέω
capacitor	πυκνωτής
capacity/capacitance	χωρητικότητα
suppressor grid	πλέγμα αναστολής (εσχάρα φραγμού)
secondary	δευτερεύοντας
grid bias	δυναμικό πόλωσης πλέγματος
compare	συγκρίνω
operate	λειτουργώ
condition	κατάσταση
determine	καθορίζω, προσδιορίζω
ensure	εξασφαλίζω
average	μέσος όρος
reference	αναφορά

Comprehension

1. What is a grid?
 2. Where is the grid placed?
 3. What material is a grid usually made of?
 4. What can readily pass through a grid?
 5. What flow does the grid control?
 6. Where is a control grid found?
 7. What does the control grid control?
 8. What happens to the positive potential of the anode when the negative potential of the grid is greater?
 9. Where is the ' screen grid placed?
 10. At what potential is the screen grid maintained?
 11. What is its function?
 12. For what applications is a screen grid more efficient?
 13. How is the screen grid usually connected to earth?
 14. What is a suppressor grid?
 15. What is it often connected to?
 16. What does the suppressor grid reduce?
 17. What, is the grid bias applied to?
-

Exercises

A. True or false? If false, correct it.

1. A grid is an electron in a thermionic valve.
 2. A grid is usually made of wire.
 3. The screen grid controls the passage of electrons, between the cathode and the anode.
 4. The greater the positive potential of the grid, the greater the negative potential of the anode to maintain the same flow of electrons.
 5. The suppresses grid is placed between the anode and the control grid.
 6. The function of a screen grid is to increase the capacitance between the anode and the control grid
 7. The suppressor grid reduces the secondary electrons emitted by the anode.
-

B. Turn the following sentences into the Passive Voice.

1. A capacitor connects the grid to earth.
2. Does the suppressor grid reduce the secondary electrons emitted by the anode?
3. The frequency determines the properties and effects of electromagnetic waves
4. We use radio waves to communicate information by means of wireless telegraphy and telephony, broadcasting and radar
5. If the electrical lines are parallel to the earth we refer to the radio wave as horizontally polarized.
6. If we had -tested, the oscillator more completely we should have found the defect over two months ago

C. Complete the unfinished words in the .following sentences.

1. The effects of seconda... emis.... in the tetro... may be elimin..... by the addit.....of a third grid
2. Ampli.... modulat..... is the variat..... of the stren....of the rf output of a transmit.... accord..... to the audiofrequen.... .
3. The analog.... comput.... handle.. symbols and is use.. for scient.... and technic... problems.
4. Computer.. are responsib... for tremend.... time sav..... in such area.. as space technolo... .
5. This may be accompl..... by punc..... hole.. in a card or tape with a spec.... typewrit... .

D. Choose the correct word a ,b, c and d to each of the following sentences.

1. A grid is a electrode in a thermionic valve.
a. punched b. perforated c. pushed d. placed
2. We can use this to make, a grid.
a. rope b. wire c. string d.cable
3. The suppressor grid the secondary electrons emitted by the anode.
a. reduces b. increases c. controls d. determines
4. A grid bias is.....to a control grid.
a. connected b.applied c. joined d.used
5. A screen grid is veryfor high-frequency applications
a. constant b.simple c. important d. Effecient

E. The following verbs are used in the passage

apply, maintain, perforate, compare, determine, emit, reduce

Complete each of these definitions with a verb taken from the above list

1. To.....means to make a row of tiny holes (in paper) So that part may be torn easily.
 2. To.....means just to what extent persons or things are similar or not similar.
 3. To.....means to keep in a certain condition.
 4. To.....means to make smaller in size, appearance, price etc.
 5. To.....means to send out.
 6. To.....means to be the fact that decides.
 7. To.....means to put something into use or into position to serve its purpose.
-

F. Can you spell your science vocabulary?

Choose the correct word a, b, c and d

- | | | | | |
|----|--------------|---------------|---------------|--------------|
| 1. | a. supressor | b. suppressor | c. suppresser | d. suppresor |
| 2. | a. secondery | b. sekondary | c. secondary | d. sicondary |
| 3. | a. maintein | b. meintein | c. maintain | d. meintain |
| 4. | a. supplied | b. suplied | c. supplied | d. sepplied |
| 5. | a. potential | b. potensial | c. potencial | d. potentiel |

G. Contextual reference

1. In line 2 the verb made refers to
a. valve b. anode c. cathode d. Electrode
2. In line 4 the word that refers to
a. control b. passage c. control grid d. controls
3. In line 7 the verb maintain refers to
a. anode b. potential c .grid d flow
4. In line 10 the word function refers to
a. potential b.screen grid c. capacitance d. Anode
5. In line 16 the word emitted refers to
a. reduces b. electrons c. cathode d. suppressor grid

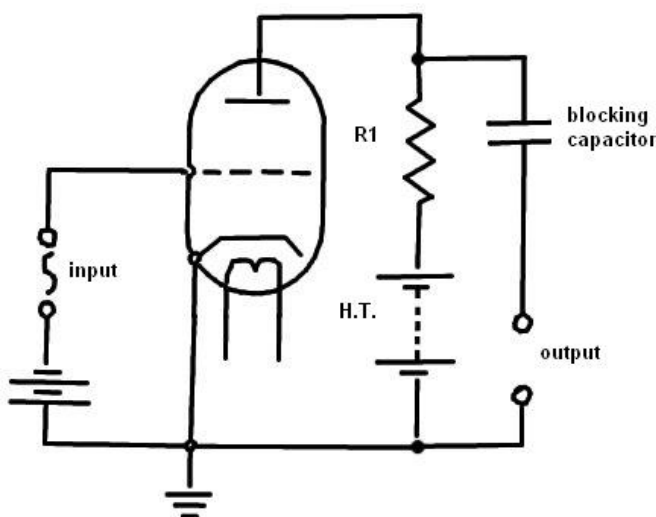
AMPLIFIER

An amplifier is an electronic circuit containing thermionic valves, or transistors, which increases the voltage of a signal fed into it by obtaining power from an external supply.

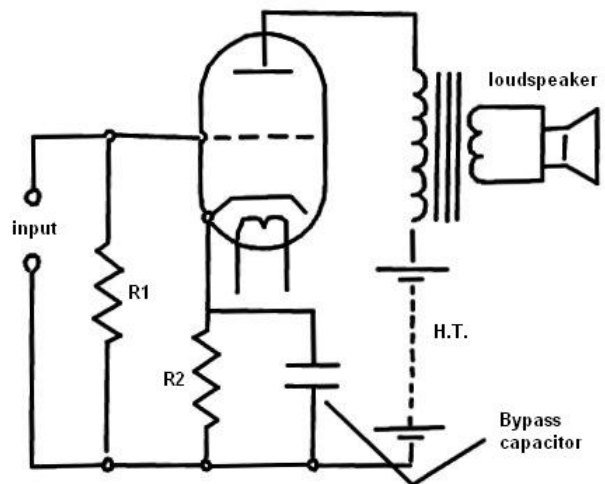
Voltage amplifier. A single stage voltage amplifier is shown in the diagram. The alternating p.d. fed in at the input changes the anode current.

The anode current passes through the anode load resistor (R_1) and the p.d. across the resistor changes.

Let an input signal increase the grid potential by 0.15 V (grid becomes more positive). Under the conditions of working this increases the anode current by 1 mA. If the anode load resistor has a resistance of $20\text{k}\Omega$, the p.d. across it increases by 20 V. The p.d. supplied to the output decreases by 20 V, i.e. the amplification is negative. The blocking capacitor filters out the d.c. from the H.T. supply



Voltage amplifier



power amplifier

Power amplifier A circuit for a power amplifier is shown in the diagram. The anode load is the primary of a transformer. The valve passes relatively large current. The grid bias is supplied by a bias resistor (R_2) through which the anode current flows. No current flows through R_1 when there is no input, so the bias resistor supplies the p.d. to the control grid. The by-pass capacitor prevents the grid bias fluctuating with the anode current, as the a.c. component of the anode current is by-passed through the capacitor. It has a large capacitance.

Unknown words

amplifier	ενισχυτής
contain	περιλαμβάνω
obtain	επιτυγχάνω
power	ισχύς
external	εξωτερικός
<u>single-stage</u>	μονοβάθμιος
<u>anode load</u>	αντιστατής ανοδικού φορτίου
<u>resistor condition</u>	κατάσταση
<u>blocking capacitor</u>	πυκνωτής αποκοπής
<u>filter</u>	φίλτρο, διυλίζω
<u>load</u>	φορτίο
<u>primary</u>	πρωτεύον
<u>relatively bias</u>	σχετικά
<u>resistor</u>	αντιστατής πόλωσης
<u>component</u>	συνιστώσα

Comprehension

- 1.What does an amplifier contain?
- 2.What changes the anode current in a voltage amplifier?
- 3.Through what does the anode current pass?
- 4.What does the blocking capacitor do?
- 5.What is the anode load?
- 6.What is the function of the valve?
- 7.What flows through the bias resistor?
- 8.What current flows through r_i when there is no input?
- 9.What do the by-pass capacitor do?
- 10.What capacitance does an amplifier have?

Pay attention to the following

filters out

Exercises

A. True or false? If false Correct it (look at the diagram carefully)

1. An amplifier increases the power, of a signal, fed into it.
 2. The alternating p.d. fed in at the output, changes the cathode current.
 3. The anode current passes through the anode load resistance (R_1).
 4. The blocking capacitor reduces the d.c. from the H.T. supply.
 5. In a power amplifier the anode load is the primary of a transformer.
 6. The valve passes relatively large power
 7. The grid bias is supplied by a bias resistor through which the anode current flows.
 8. No current flows through R_1 when there is no input, so the bias resistor supplies the p.d. to the screen grid.
-

B. Place the following words or phrases in their correct order to form sentences

1. of the input signal, the most, of an electron tube, is its ability, important function, to amplify, the amplitude, or increase.
 2. are, to whether, tuned, they are, amplifiers, or untuned, also classified.
 3. transmitters, are, of radio used as, the output stage, power amplifiers, receivers and.
 4. at the input, by a number of stages, in the receiver, is amplified, a loudspeaker, necessary, a very small, to operate, amount of power, of a broadcast, receiver to the level.
 5. the most important, voltmeter, one of, of a. d.c amplifier, is, its, use, applications, in a d.c. , electron tube
-

C. Can you spell your science vocabulary? Choose the correct word a, b ,c and d.

- | | | | |
|-----------------|----------------|-----------------|----------------|
| a. diagram | b. diagramme | c. diagram | d. diagrame |
| a. ressistor | b. resistor | c. resister | d. resistore |
| a. resistance | b. resistence | c. resictance | d. ressistance |
| a. primery | b. praimary | c. primary | d. primmary |
| a. transformmer | b. trensformer | c. transformmer | d. transformer |
-

D. Contextual reference.

1. In line 2 the word it refers to
a. voltage b. signal c. amplifier d. power
 2. In line 11 the word it refers to
a. anode b. resistor c. load d. p.d.
 3. In line 11 the word increases refers to
a. anode b. resistor c. load d. p.d.
 4. In line 16 the word which refers to
a. grid bias b. bias resistor c. is supplied d. anode current
 5. In line 21 the word has refers to
a. amplifier b. power amplifier c. current d. by-pass capacitor
-

E. The following word are used in the passage.

Amplification, input, capacitor, current, output

Complete each of these definitions with a word taken from the above list

1. is a general expression applied to the increase of the magnitude of any kind of signal by an electronic device.
 2. A of one or more pairs of conductors separated by insulators
 3. is the flow of electricity through something or along a wire or cable
 4. is the terminal where the power, voltage or current may be delivered.
 5. is the terminal where current, voltage or power may be applied to a circuit.
-

F. Give as many derived words as you can.

1. amplify
 2. alternate
 3. resist
 4. transform
 5. pass
 6. relative
-

G. Complete the unfinished words in the following sentences.

1. An amplif.... is a piece of electric... equipment for mak... sign... big.... .
2. In an out.... signal is perfect.... reproduc... at the out..... of the amplif... ,change... only by be.... big.... in some way, then the amplif..... is "linear"
3. A volt..... amplifier is an amplifier design... to amplif... volt... waveforms in applicat... where very little pow... is tak... from the load.
4. The rat... of the ampli..... of the output sign.... to that of the in..... sign.... is call.... the gain.
5. Demodulat.... is the separat.... and extract.... of audiofrequen.... waves from a modulat.... carrier wave.

H. Choose the correct synonym a,b,c and d'to each of the following underlined words.

1. A thermionic valve is a device that uses thermionic amession.
a. invention b. Design c. Type d. plan
2. The electrodes are sealed in a glass container.
a. fastened b. Closed c. Left d. Pressed
3. It must be given the correct information in an appropriate sequence
a. order b. Way c. Manner d. arrangement
4. The two principal parts of a radio system are.....
a. first b. Main c. Usual d. Important
5. In FM the amplitude of the carrier wave remains constant.
a. stays b. Rests c. Stands d. tend to be

I. Find the opposite words.

- | | |
|-------------|--------------------|
| 1. anode | 7. sequence |
| 2. negative | 8. correct |
| 3. connect | 9. input |
| 4. complex | 10. useful |
| 5. reduce | 11. usually |
| 6. able | 12. high-frequency |

AUTOMATIC CONTROL

Control can be as simple as flicking the switch which turns the electric light on or off, or it can be as complex as the inertial guidance systems which keep the large satellite rockets on their predetermined course.

In the driveway of a home, a light on a pole operated by a time clock in the basement is analogous to what is called open-loop control. Here on and off is the only process one may wish to exercise with a control. One of the most important advantages of the open-loop system is that the control itself, which in the case of the pole light was the time clock, may be placed at a great distance from the object or machine which it controls.

There are, however, many disadvantages to the open-loop system which make the exclusive use of this system difficult in most applications of automation. Since the open-loop system has no methods of correcting errors which have been made in control, a system which could correct errors, had to be devised. There is, in automation, a system called closed-loop control that extends far beyond the limitations of the open-loop control. An example of the closed-loop control is a thermostat, used to regulate temperatures.

When a very efficient system of control is desired, both the open-loop and the close-loop systems must be employed, in the complete system of control. The entire process of steering an AUTOMOBILE can be considered a combination of the two systems.

The principles of control by automation are extended to automatic control operations and processes in many of our largest industries, such as iron and steel, and automobile manufacturing.

In the textile mills, hundreds of operations are now performed by fully automated machines, directed by complicated, automatic and electronic controls.

There is also a wide use of automation in agriculture, railroad, communications and printing.

Unknown words

flick	χιτυπώ ελαφρά
switch	διακόπτης
inertial	αδρανής
guidance	καθοδήγηση
satellite	δορυφόρος
predefined	προκαθορισμένος
course	πορεία κατεύθυνση
driveway	σύντομος ιδιωτικός δρόμος
pole	στύλος
basement	υπόγειο
open loop control	έλεγχος ανοιχτού βρόχου
wish	επιθυμώ
exercise	ασκώ
case	περίπτωση
distance	απόσταση
object	αντικείμενο
exclusive	αποκλειστικότητα
error	σφάλμα
devise	συσσκευή
closed loop control	έλεγχος κλειστού βρόγχου
limitation	περιορισμός
regulate	ρυθμίζω
temperature	θερμοκρασία
desire	επιθυμώ
employ	χρησιμοποιώ
entire	ολόκληρος
steer	διευθύνω
consider	λαμβάνω υπόψη
combination	συνδυασμός
principles	αρχές
extend	εκτείνω
industry	βιομηχανία
manufacture	κατασκευάζω
textile	υφαντικός
perform	εκτελώ
direct	διευθύνω
complicated	σύνθετος
agriculture	γεωργία
communication	επικοινωνία
printing	τυπογραφία

Comprehension

1. How can satellite rockets be kept on the predetermined course?
2. How is called the control of a light operated by a time clock?
3. What is one of the most important advantages of the open-loop system?
4. Why is the exclusive use of the open-loop control system difficult, in most applications of automation?
5. What is the advantage of the closed-loop control system?
6. Give an example of the close-loop control system.
7. What is the use of a thermostat?
8. What system must be employed, when a very efficient system of control is desired?
9. Which of the two systems of automatic control must be used in the process of steering an automobile?
10. Mention some areas in which automation is widely used

Pay attention to the following.

turn on
turn off } a switch, the radio, the light
extend to

Exercises

A. True or false? If false, correct it.

1. It is very dark here, Could you turn the switch off please?
2. Simple automatic control guidance systems keep the large satellite rockets on their course.
3. An open-loop control system is a complicated system.
4. An open-loop control system can be placed at a great distance from the object it controls.
5. The open-loop system cannot be used in all applications of automation.
6. The open-loop system can/correct errors which have been made in control
7. The closed-loop control system is much more convenient than the open loop control.
8. A thermostat is used to raise the temperature.
9. A combination of both systems is ideal for best results
10. Fully automatic machines are directed by electronic controls

B. Supply the correct tense.

3. If you turn the switch, the light (be) on.
4. Satellite rockets would be kept on their course, if automatic control systems (use)
5. Had they adopted the open-loop control system, they (meet) many difficulties.
6. If a very efficient system (desire) both systems must (employ)
7. What device you (use), if you wanted to regulate that temperature?
8. Lately there (be) a very wide use of automation.
9. He can (tell) them some methods - of (correct) errors.
10. The pentode usually (connect) directly to the cathode.
11. The processes (include) mathematical operations?
12. Information (feed) into the computer (know) as input.

C. Give the nouns of the following.

1. Guide	6. regulate	11. correct
2. Simple	7. employ	12. extend
3. Complex	8. place	13. desire
4. efficient	9. control	14. direct
5. combine	10. turn	15. make

D. Contextual reference.

In line 2 the word complex refers to

- a. switch b. Control c. Light d. turns

In line 4 the word operated refers to

- a. driveway b. Flight c. pole d. house

In line 9 the word it refers to

- a. control b. distance c. object d. machine

In line 16 the word regulate refers to

- a. example b. control c. thermostat d. temperatures

In line 25 the word directed refers to

- a. mills b. operations c. machines d. controls

E. The following words are used in the passage.

satellite, switch, pole, basement, thermostat

1. A is a device for making or breaking an electric circuits
 2. A is a spacecraft which travels in an orbit round the earth.
 3. A is device for automatically regulating and maintaining a constant temperature.
 4. A is the lowest part of a building, partly or wholly below ground level
 5. A is a long slender rounded piece of wood or metal.
-

G. Complete the unfinished words in the following sentences.

1. If the thermo.... has be... set, a fall in tempera..... causes it to activa.... the heat..... source
 2. Electron.... has be... defin.... as the scien... deal... with the contr.... of electr... flow, especial... by mean.. of electr... or vacu... tubes.
 3. The oscillat... is an electron... circ.... which generat.... radi... frequen... energ... at the desir... frequen....
 4. One sect..... of a radio transmit.... generate... radio frequen... waves and amplif..... these wav.... so that they give sufficie.... out... pow... and the oth... modulat... the radio-frequen... waves with the desir... inform..... to be transmit.... .
-

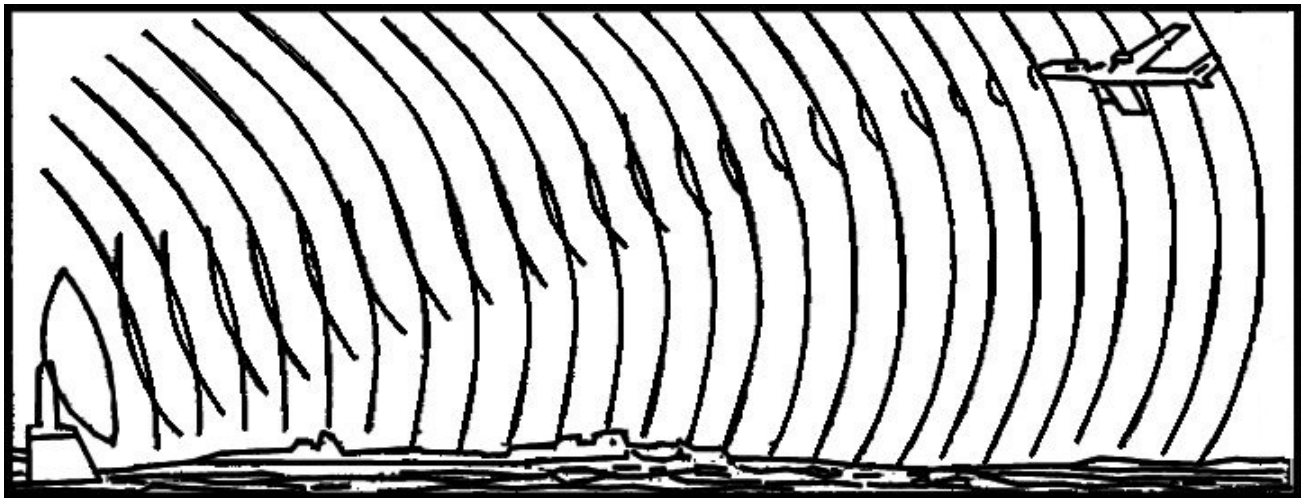
RADAR

A radar is an electronic system that permits man to see objects at great distances, regardless of darkness or bad weather.

The word radar is an acronym for Radio Detection and Ranging.

Microwaves, of wavelengths in the range of centimetres, are generated and emitted in pulses modulated at a radio frequency.

A movable aerial radiates a beam of the microwaves. An object, at a distance, in the path of the beam, reflects the waves. The transmitter also acts as a receiver and detects the reflected beam. The received signal is displayed on a cathode-ray tube, which is in the correct time sequence so that the time is measured between emission and reception. The distance of the object is thus known, and its direction is determined from the direction of the aerial.



locating an airplane in flight.

The system allows objects to be located accurately, whatever the weather conditions. It is used extensively for air and sea navigation, for detection and identification of unknown ships and aircrafts, for tracking satellites and missiles, and is now used for automatic guidance whereby the received signal is not displayed, but used to control an aircraft.

Most radar sets have six important parts,

The modulator, which turns the transmitter on to send a pulse and off to receive an echo.

The transmitter, which sends the very short, or microwave pulses.

The antenna, which focuses the pulses into a narrow beam and also receives the echoing signals

The duplexer, which, as a switching device, connects first the transmitter then the receiver to the antenna.

The receiver, which is a listening and amplifying device to strengthen weak echoes so, that they will show on the radar screen and

The indicator, which displays the blips to the operator on this screen.

Unknown words

permit	επιτρέπω
distance	απόσταση
regardless	άσχετα
acronym	ακρονυμία
detection	καταγραφή, ανίχνευση
ranging	προσδιορισμός απόστασης
wavelength	μήκος κύματος
generate	παράγω
radiate	ακτινοβολώ
reflect	αντανακλώ
display	αποτυπώνω
locate	εντοπίζω
accurately	ακριβώς
extensively	εκτεταμένα
navigation	ναυσιπλοΐα
identification	αναγνώριση
aircraft	αεροσκάφος
track	εντοπίζω
satellite	δορυφόρος
missiles	βλήμα
guidance	καθοδήγηση
whereby	όπου
focus	εστιάζω
narrow	στενός
Duplexer	μίκτης
strengthen	ενισχύω
blip	στίγμα (επί οθόνης ραντάρ)
Operator	χειριστής
cathode ray tube	καθοδικός σωλήνας
Time sequence	χρονική συνέχεια

Comprehension

1. What is a radar?
 2. What words are hidden under the acronym "radar"?
 3. How are microwaves emitted?
 4. What does a movable aerial radiate?
 5. What does the transmitter detect?
 6. What part of the radar acts also, as a receiver?
 7. Where is the received signal displayed?
 8. Do the weather conditions influence the objects to be located accurately?
 9. What is the radar used extensively for?
 10. What are the six important parts of a radar?
 11. Why does the modulator turn the transmitter off?
 12. What pulses does the transmitter send?
 - 13.- Where does the antenna focus the pulses?
 14. What does the duplexer connect to the antenna?
 15. What is the device used to strengthen weak echoes, so that they will show on the radar screen?
 16. What does the indicator do?
-

Exercises

A. True or false? If false, correct it.

1. A radar permits man to see objects only during the day.
 2. Radar is the acronym for Radio Deflection and Ranging.
 3. The direction of the object is determined from the length of the aerial.
 4. Radar is used extensively for air and sea navigation.
 5. The modulator turns the transmitter on to receive an echo and off to send a pulse.
 6. The duplexer connects the transmitter to the receiver.
 7. The antenna receives the echoing signals.
 8. The six important parts of a radar set are the aerial, the modulator, the duplexer, the receiver, the transmitter and the antenna.
 9. The indicator is a switching device.
 10. The receiver is a listening and amplifying device.
-

AERIALS

An aerial is the portion of a radio system that emits electromagnetic (radiofrequency) waves into space, or receives these waves from space.

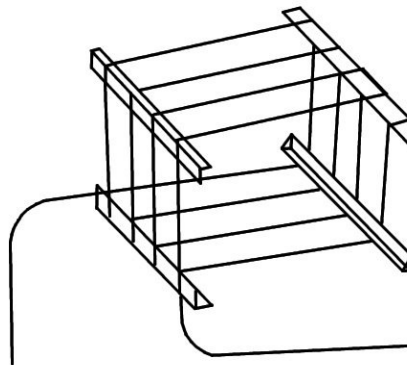
The word antenna is an alternative term for the word aerial.

When an antenna is used for wave radiation, energy is fed into it by a transmission line connected to a transmitter.

When it is used as a receiver, the antenna is placed so as to intercept a portion of the energy radiated by the transmitting antenna, which is then fed into a transmission line leading to a receiver.

To be an efficient radiator, an antenna must have physical dimensions comparable with the signal wavelength. So many types of antenna are in use. The most popular type is the vertical radiator. For low frequencies inverted L or T antennas may be used.

Frame aerial, is a wire wound round a frame (see diagram). It forms a directional aerial. When the horizontal wires on the frame point to the direction of the transmitting station, reception is stronger. At right angles to this position, reception is weaker. When used to find direction, the position of minimum strength of reception is used.



frame aerial

Bipole aerial, is an aerial that consists of two rods of wire in a straight line with a gap in the middle. Leads from the two rods go straight to the demodulator circuit. The greatest flow of current occurs in the middle, especially when the aerial has a total length of one half of the wavelength of the incoming carrier wave.

Unknown words

portion	Μέρος, τμήμα, κομμάτι
space	διάστημα, χώρος
intercept	Σταματώ/διακόπτω φυσική ροή
lead	οδηγώ
efficient	αποτελεσματικός
Radiator	εκπομπός
dimension	διάσταση
comparable	ανάλογος
signal wavelength	μήκος κύματος σήματος
popular	δημοφιλής
vertical	κατακόρυφος
invert	αναστρέφω
frame aerial	κεραία πλαισίου
wind	τυλίγω
round	γύρω από
frame	πλαίσιο
directional aerial	κεραία κατευθυντικότητας
point	δείχνω
right angle	ορθή γωνία
minimum	ελάχιστο
strength	αντοχή
reception	λήψη
consist	αποτελούμαι
rod	ράβδος
straight	ευθύς
gap	κενό
middle	μέσον
lead	καλώδιο, αγωγός ρεύματος
occur	συμβαίνω
especially	ειδικά
total	συνολικός
incoming carrier wave	προσπίπτον φέρον κύμα

Antenna: (latin term) nautical term for yard

and common term for pole, of unknown origin. plural: Antennae

Comprehension

1. What waves does an aerial emit?
 2. Where does an aerial receive waves from?
 3. Give an alternative term for the term aerial.
 4. What radiation can an antenna be used for?
 5. Why is a transmission line connected to a transmitter?
 6. What is the most popular type of antenna?
 7. What types of antennas are used for low frequencies?
 8. What is a frame aerial?
 9. When is reception stronger?
 10. When is reception weaker?
 11. What is a dipole aerial?
 12. In what part of the aerial does the greatest flow occur?
-

Exercises

A. True or false? If false, correct it.

1. An aerial emits radio frequency electromagnetic waves from space.
 2. An antenna must have physical dimensions comparable with the transmitted wavelength signal.
 3. The number of types of antenna is restricted.
 4. The most popular type is the frame aerial.
 5. For high frequencies T antennas can be used.
 6. The vertical radiator is a wire wound round a frame.
 7. A frame aerial forms a directional aerial.
 8. Reception is weaker when the horizontal wires, on the frame point to the direction of the transmitting station.
 9. A frame aerial consists of two rods of wire in a straight line with a gap in the middle.
 10. Leads from the two rods of a dipole aerial go straight to the demodulator circuit.
-

B. In each space, put in one of the verbs from the list below. Use each verb once only.

*amplify, allow, be, connect, cost, damage,
disturb, exist, operate separate, take*

1. The receiving aerials for radio signals canmany different forms.
2. When you listen to a radio through an earphone,
you do not other people
3. Stereohponic loudspeakers can a lot of money.
4. Stereophonic loudspeakers people to listen to sound broadcasts
which more real than those from a single loudspeaker
5. So that we do not the diaphragm, the front of a loudspeaker is
covered with a piece of strong material.
6. In order to the components for amplifiers and other electronic
circuits,a printed circuit board is used.
7. Some very simple radio sets can without amplifiers.
8. Amplifiers the strength of a radio signal.
9. Demodulators are used to the intermediate frequency part of a
IF signal.
10. We the pointer in a radio set to the tuning knob by means of
a cord and pulley wheels.








C. Rewrite the following sentences using the Passive.
Begin each answer with the underlined item.

1. We can sent messages over long distances by radio.
2. With television,we broadcast information in the form of a picture.
3. Newspapers have used the telegraph for many purposes.
4. Broadcasting companies often record programmes.
5. They sold many programmes.abroad last year.
6. Ships at sea use radio so that they know exactly where they are.
7. Can you send electrical signals along metal wires,in a telegraph
system?
8. We cannot.broadcast information over very long distances, without using
radio.
9. Do we use radio as a means of communication?
10. What devices will you use to send a code over distances of several
hundred kilometers?

V E R B A L I S I N G O F E X P R E S S I O N S A N D S Y M B O L S

SYMBOL	HOW TO SAY IT	NAME
+	plus; and	plus sign; positive sign
-	a) minus b) divided by	a) minus sign; negative sign b) fraction bar
+ -	plus or minus	plus or minus sign; positive or negative sign
x ; .	multiplied by; times	multiplication sign
÷ ; :	divided by	division sign
/	a) per b) divided by	a) slash sign; slant sign; diagonal stroke; oblique stroke b) division sign; slash sign; slant sign; diagonal stroke; oblique stroke
a/b	a slant b; a slash b; a stroke b	
=	equal(s); equal to	equals sign; equality sign
≈ ; ≅	approximately equal to	approximation sign
≡	identical with	sign of identity
:	is to; the ratio of	colon
a : b :: c : d	a is to b as c is to d	
∴	therefore	
∵	since; because	
...	and so on	
∞	infinity	infinity sign
>	greater than	greater than sign
<	less than	less than sign
≥	greater than or equal to	
≤	less than or equal to	
≠	not equal to; do(es) not equal	inequality sign
∠	angle	angle sign
⊥ ; ⊞	right angle	
√	(square) root	radical sign; root sign
∛	cube root	radical sign with index
√ ⁿ	fourth root of n	

SYMBOL	HOW TO SAY IT	NAME
$ n $	the absolute value of n	
\perp	perpendicular to	
\parallel	parallel to	
n_2	n sub two	2 = subscript
$n!$	n factorial	
$\frac{1}{2}$	a half; one half	fraction
$\frac{1}{3}$	a third; one third	
$\frac{1}{4}$	a quarter; one quarter; a fourth; one fourth	
$\frac{1}{8}$	an eighth; one eighth	
$\frac{3}{4}$	three quarters; three fourths	3 = numerator 4 = denominator
$\frac{5}{6}$	five-sixths; five sixths; five over six	
$\frac{a+b+c}{d}$	a plus b plus c all over d	
d	derivative of	differentiation sign
$\frac{dy}{dz}$	derivative of y with respect to z	
,	comma	comma
"	quotation	quotation mark
" "	quote ... unquote	
&	and	ampersand
#	number	number sign
\propto	directly proportional to	
\propto^*	inversely proportional to	
Σ	sum of	summation sign
$\vee; +$	logical OR	
$\wedge; \cdot$	logical AND	
$\sim; /$	logical NOT	
————	a solid line	
-----	a dashed line	
.....	a dotted line	
~~~~~	a wavy line	
□□□□	a square wave	
▲▲▲▲	a sawtooth wave	
△△△△	a triangular wave	
~	a sine wave	

SYMBOL	HOW TO SAY IT	NAME
$n^2$	n squared	2 exponent; superscript
$n^3$	n cubed; n to the power (of) three	
$n^4$	n to the power (of) four; n to the fourth; n raised to the power of four; n to the fourth power	
$n^5$	n to the minus fifth power; n to minus five	
$n^{\frac{1}{2}}$	n to half power	
$n^{\frac{2}{3}}$	n to the power two thirds	
%	per cent	percentage sign
$\int$	the integral of	integral sign
$^\circ$	degree(s)	degree sign
'	a) minutes of an arc b) foot; feet	minute sign foot sign
$n'$	n dash; n prime	
"	a) seconds of an arc b) inch(es)	second sign inch sign
$n''$	n double dash; n double prime	
	triangle	
	square	
	rectangle	
	parallelogram	
	a) circle b) circumference	
	diameter	
	ellipse	
( )	parentheses	
(n)	n in parentheses	
$\left(\frac{n}{a}\right)$	binomial n over a	
$f(x)$	f of x; function of x	
$\lim f(x)$	limit of the function of x	
[ ]	brackets	
[a+b]	a plus b in brackets; bracket open a plus b bracket close	
{ }	braces	
< >	angle brackets	

## CURRICULUM VITAE

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Sept. 2003	Cambridge First Certificate

### EXPERIENCE

June 2007 - April 2008	AIR - FAR Co. (Airplane electronics components department).
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