PVKN GOVT. COLLEGE (AUTONOMOUS), CHITTOOR

TITLE OF THE COURSE: BASIC ELECTRONIC COMPONENTS

CONDUCTED BY: DEPARTMENT OF PHYSICS & ELECTRONICS

(A.Y 2021-2022)

FROM: 11-11-2021 to 31-12-2021

TITLE OF THE COURSE: BASIC ELECTRONIC COMPONENTS

CONDUCTED BY: DEPARTMENT OF PHYSICS & ELECTRONICS

DEPT. INCHARGE : Dr. GUDI SUDHAKAR

CONVENER/RESOURCE PERSONS: Dr. G. Udaya Bhaskara Reddy,
Lecturer in Physics.

Sri B. Rama Sagar,
Lecturer in Physics.

PERIOD: 11-11-2021 to 31-12-2021 (A.Y.: 2021-2022)

INAUGURATION DATE: 11-11-2021

NO OF STUDENTS ENROLLED: 25

S.No.	RESOURCE PERSONS	DESIGNATION
1	**Dr. G. Udaya Bhaskara Reddy**	**Lecturer In Physics & Electronics**
2	**Sri B. Rama Sagar**	**Lecturer In Physics & Electronics**

Permission letter

To
The Principal
PVKN Govt. Degree College (A) ,
Chittoor-517 002.

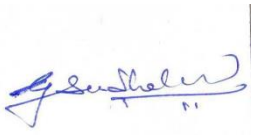
Respected Sir,

Sub: Requesting you to give permission for the Department of Physics & Electronics to Conduct a certificate course-Regarding.

With reference to the subject cited above, the Department of Physics will organize a certificate course on “Basic Electronic Components” from 11-11-2021 to 31-12-2021. In this regard, we request you to give the permission.

Thanking you Sir,

Yours faithfully



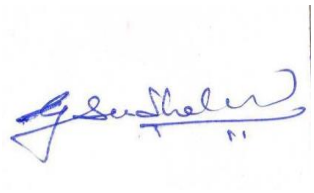
Lecturer in charge

P.V.K.N.GOVT.DEGREE COLLEGE(A):: CHITTOOR
DEPARTMENT OF PHYSICS& ELECTRONICS

Circular

Dear Students,

The Department of Physics will organize a certificate course on "Renewable Energy" from 11-11-2021 to31-12-2021. All the BSc Students have to register in this course on or before 10-11-2021.



Lecturer In-charge
Department of Physics & Electronics

P.V.K.N. GOVT. DEGREE COLLEGE(A): CHITTOOR.

IQAC -Resolution Copy

The IQAC committee along with Chairperson and Coordinator, convened a meeting on 06-11-2021 and resolved to conduct "Certificate/ Value Add-on courses" in the month of November -2021 according to the feasibility of the departments.

It is also resolved to submit the details as per the checklist well in advance by the departments who had given their consents.

Check list:

1. **IQAC Resolution**
2. **Department Wise Resolution**
3. **Course structure and planning**
    a. **Date and timing schedule**
    b. **Course out comes, Syllabus and model question papers**
    c. **Testing procedure**
    d. **Feedback form**
    e. **Model Certificate**
4. **Students' enrolment list**
5. **Attendance register for 30 hours and more (Online/ Offline)**
6. **Audio visual Aids (if available), PPTs, Handouts/ Printed material**
7. **Test(Exam) and Certificate distribution**
8. **Submission of Critical Analysis Report to IQAC**

Department Resolution Copy

Department of Physics & Electronics

As per the circular issued by the IQAC dated 06-11-2021 the department of Physics & has conducted a meeting on 08-11-2021 and unanimously resolved to conduct a "Basic Electronic Components" Certificate course in the month of November-2021 with the duration of a minimum of 30 hours.

Notice Board

The department of Physics & Electronics is going to conduct a certificate course on Electronics: "Basic Electronic Components", from 11-11-2021 with min 30 working hours.

Interested students should come and register your names in the department of Physics & Electronics on or before 10-11-2021.

DEPARTMENT OF PHYSICS & ELECTRONICS:: PVKNGDC(A), CHITTOOR.

A Certificate Course in "Physics & Electronics: Basic Electronic Components"

Syllabus

- **Unit I : Passive Components :**
  Resistors, Capacitors and Inductors, Definitions, Symbols, Series and Parallel combinations, Applications of Passive Components – Ohm's law & Kirchhoff's laws.
- **Unit II : Active Components :**
  Diode – PN Junction & Zener diodes, Triode, Transistors – BJT, FET & UJT, Applications of Active components.
- **Unit III : Power Supplies :**
  DC & AC Power supplies, Battery, Eliminator, Regulated and Unregulated Power Supplies, Transformers – Step up & Step down types.

Outline of the course in periods:

1. Theory hours : 25
2. Hands on experiment : 05

Total hours allotted : 30

Objective:

This course will give you an in-depth understanding of the fundamentals, design, fabrication, operation and performance of Basic Electronic Components for a variety of applications in Science, Industry and Technology.

The department's certificate course modules are aimed at those studying B.Sc. They are particularly suited to under graduates in Physics who want to improve further their knowledge on particular topics, or work towards a Master's degree or an Industry.

You don't need to have any pre-requisite qualifications to take this course.

Curriculum design:

- The total workload of the course work is 30 hours.
- It contains three modules. Each module consists of 8 hours, in which few sessions are theory and remaining 4 hours for hands on experiments.
- Two (2) hours are allotted to rectification and doubts clarification on the examination.

Assessment and Evaluation:

- Student is evaluated through the examination at the end of the course work.
- Certificates will be issued based on the performance.

Department of Physics & Electronics
Students Registration for Certificate Course
AY: 2021-2022

Department of Physics & Electronics
Students Registration for Certificate Course
AY: 2021-2022

S. No.	Regd. Number	Name of the Student	Group	Signature of the Student
1	210303501	BHUMA MUNITEJA	II B.Sc.,M.P.Cs	B. MuniteJA
2	210303502	BODIGUTTA BHANUPRAKASH	II B.Sc.,M.P.Cs	Bhanuprakash
3	210303504	G MIDHUN	II B.Sc.,M.P.Cs	G. Midhun
4	210303506	K S MADHUMITHA	II B.Sc.,M.P.Cs	KS. Madhumitha
5	210303507	KADIRI REDDI SEKHARA	II B.Sc.,M.P.Cs	Kadi sekhara
6	210303508	MALA MURALI	II B.Sc.,M.P.Cs	MALA MURALI
7	210303509	MALLARAPU VENU	II B.Sc.,M.P.Cs	N. Mukesh
8	210303510	N MUKESH	II B.Sc.,M.P.Cs	N. Mukesh
9	210303511	N R CALEB RENSWICK	II B.Sc.,M.P.Cs	NR. Roopeshick
10	210303513	PALYAM ROOPESH	II B.Sc.,M.P.Cs	Roopesh
11	210303516	S PUSHPA	II B.Sc.,M.P.Cs	Pushpa
12	210303517	S SANDEEP	II B.Sc.,M.P.Cs	SANdeep
13	210303519	SHAIK SIMRAN	II B.Sc.,M.P.Cs	SIMRAN
14	210303520	THRISHA K	II B.Sc.,M.P.Cs	Thrisha
15	210303522	V MOHITH	II B.Sc.,M.P.Cs	MoHith
16	210301502	K GANESH	II B.Sc.,M.P.C	Ganesh.
17	210301503	V CHARAN	II B.Sc.,M.P.C	V. Charan
18	210301505	THUNGAMITTA SOWMYA	II B.Sc.,M.P.C	Sowmya
19	210301506	K GOVARDHAN SAI	II B.Sc.,M.P.C	Govardhan sai
20	210301507	UPPUTHOLLA BHUDEVI	II B.Sc.,M.P.C	Bhudevi.
21	210301508	V SUVARNA	II B.Sc.,M.P.C	V SUVARNA
22	210301509	G ABITHA	II B.Sc.,M.P.C	G Abitha
23	210301510	R NANDHINI	II B.Sc.,M.P.C	R. Nandhini
24	210301512	S RAMYA	II B.Sc.,M.P.C	S. RAMYA
25	210301513	R SONIYA	II B.Sc.,M.P.C	Soniya.

Department of Physics & Electronics
Students Attendance for Certificate Course-AY-2021-22

Department of Physics & Electronics
Students Attendance for Certificate Course-AY-2020-21

BASIC ELECTRONIC COMPONENTS

S. No.	Name of the Student	Date of the Class-November/December-2021									
		11	12	13	15	16	17	18	19	20	22
1	BHUMA MUNITEJA	/	/	/	/	/	/	/	/	/	/
2	BODIGUTTA BHANUPRAKASH	/	/	/	/	/	/	/	/	/	/
3	G MIDHUN	a	/	/	/	/	/	/	/	/	/
4	K S MADHUMITHA	/	/	/	/	/	/	/	/	a	/
5	KADIRI REDDI SEKHARA	/	/	/	/	/	/	/	/	/	a
6	MALA MURALI	/	a	/	/	/	/	/	/	/	/
7	MALLARAPU VENU	/	/	/	a	/	/	/	/	/	/
8	N MUKESH	/	/	/	/	/	/	a	/	/	/
9	N R CALEB RENSWICK	/	/	/	/	/	/	/	/	a	/
10	PALYAM ROOPESH	/	/	/	/	/	/	/	/	/	/
11	S PUSHPA	/	/	/	/	/	/	a	/	/	/
12	S SANDEEP	/	/	/	/	/	/	/	/	/	/
13	SHAIK SIMRAN	/	/	/	/	/	/	/	a	/	/
14	THRISHA K	/	a	/	/	/	/	/	/	/	/
15	V MOHITH	/	/	/	/	/	/	/	/	/	/
16	K GANESH	/	/	/	/	a	/	/	/	/	/
17	V CHARAN	/	/	/	/	/	/	/	a	/	/
18	THUNGAMITTA SOWMYA	a	/	/	/	/	/	/	/	/	/
19	K GOVARDHAN SAI	/	/	/	/	/	/	/	/	/	/
20	UPPUTHOLLA BHUDEVI	/	/	/	/	/	/	/	/	a	/
21	V SUVARNA	/	/	/	/	/	a	/	/	/	/
22	G ABITHA	/	/	/	/	/	/	/	/	/	/
23	R NANDHINI	/	/	/	/	/	/	/	/	/	/
24	S RAMYA	/	/	/	/	/	a	/	/	/	/
25	R SONIYA	/	/	/	/	a	/	/	/	/	/

Department of Physics & Electronics

Students Attendance for Certificate Course-AY-2021-22

Department of Physics & Electronics
Students Attendance for Certificate Course-AY-2021-22

BASIC ELECTRONIC COMPONENTS

S. No.	Name of the Student	Date of the Class-November/December-2021									
		23	24	26	27	29	30	01	02	03	04
1	BHUMA MUNITEJA	/	a	/	/	/	/	/	/	/	/
2	BODIGUTTA BHANUPRAKASH	/	/	/	/	/	/	/	/	a	/
3	G MIDHUN	/	/	/	/	a	/	/	/	/	/
4	K S MADHUMITHA	/	/	/	/	/	/	/	/	a	/
5	KADIRI REDDI SEKHARA	/	/	/	a	/	/	/	/	/	/
6	MALA MURALI	/	/	/	/	/	a	/	/	/	/
7	MALLARAPU VENU	/	a	/	/	/	/	/	/	/	/
8	N MUKESH	/	/	a	/	/	/	/	/	/	/
9	N R CALEB RENSWICK	/	/	/	a	/	/	/	/	/	/
10	PALYAM ROOPESH	/	/	/	/	/	/	a	/	/	/
11	S PUSHPA	/	/	/	/	/	a	/	/	/	/
12	S SANDEEP	a	/	/	/	/	/	/	/	/	/
13	SHAIK SIMRAN	/	/	/	/	a	/	/	/	/	/
14	THRISHA K	/	/	/	/	/	/	/	/	a	/
15	V MOHITH	/	/	/	a	/	/	/	/	/	/
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22	G ABITHA	/	/	/	/	/	/	/	/	/	/
23	R NANDHINI	/	/	/	/	/	/	/	a	/	/
24	S RAMYA	a	/	/	/	/	/	/	/	/	/
25	R SONIYA	/	/	/	/	/	/	/	/	/	/

Department of Physics & Electronics

Students Attendance for Certificate Course-AY-2021-22

Department of Physics & Electronics

Students Attendance for Certificate Course-AY-2021-22

BASIC ELECTRONIC COMPONENTS

S. No.	Name of the Student	Date of the Class-November/December-2021									
		06	07	08	09	10	13	14	15	16	Signature
1	BHUMA MUNITEJA	/	/	/	/	/	/	/	/	/	B.Munitejo
2	BODIGUTTA BHANUPRAKASH	/	/	/	/	/	a	/	/	/	Bhanu Prakash
3	G MIDHUN	/	/	/	/	/	/	/	/	/	G.Midhun
4	K S MADHUMITHA	/	/	/	/	/	a	/	/	/	K S madhumitha
5	KADIRI REDDI SEKHARA	/	/	a	/	/	/	/	/	/	Kadi Sekhara
6	MALA MURALI	/	/	/	/	/	/	/	/	/	MALA MURALI
7	MALLARAPU VENU	/	/	/	/	/	/	/	/	/	N. Mukesh, Venu
8	N MUKESH	/	/	/	/	/	/	/	/	/	N.Mukesh
9	N R CALEB RENSWICK	/	/	/	a	/	/	/	/	/	R.Roopesh Wick.
10	PALYAM ROOPESH	/	/	/	/	/	/	/	/	/	Roopesh
11	S PUSHPA	/	/	/	/	a	/	/	/	/	Pushpa
12	S SANDEEP	/	/	/	/	/	/	/	a	/	SAndeep
13	SHAIK SIMRAN	/	/	/	/	/	/	/	/	/	Simran
14	THRISHA K	/	/	/	/	/	/	/	/	/	Thrisha
15	V MOHITH	/	/	/	/	/	/	a	/	/	MOHITH
16	K GANESH	/	/	/	/	/	/	/	/	/	Ganesh
17	V CHARAN	/	/	/	/	/	/	/	/	/	V. charan
18	THUNGAMITTA SOWMYA	/	/	/	/	/	/	a	/	/	Thungamitta SOWMYA
19	K GOVARDHAN SAI	/	/	/	/	/	/	/	/	/	K. Govardhan sai
20	UPPUTHOLLA BHUDEVI	/	/	/	/	/	/	/	/	/	Upputholla Bhudevi
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22	G ABITHA	/	/	/	/	/	/	/	/	/	G. Abitha
23	R NANDHINI	a	/	/	/	/	/	/	/	/	R. Nandhini
24	S RAMYA	/	/	/	/	/	/	/	/	/	S.RAMYA
25	R SONIYA	/	/	/	/	/	/	/	/	/	

STUSTUDY MATERIAL

- **Unit I : Passive Components :**
  Resistors, Capacitors and Inductors, Definitions, Symbols, Series and Parallel combinations, Applications of Passive Components – Ohm's law & Kirchhoff's laws.
- **Unit II : Active Components :**
  Diode – PN Junction & Zener diodes, Triode, Transistors – BJT, FET & UJT, Applications of Active components.
- **Unit III : Power Supplies :**
  DC & AC Power supplies, Battery, Eliminator, Regulated and

  Unregulated Power Supplies, Transformers – Step up & Step down types.

Passive Components: Those devices or components which store or maintain Energy in the form of Voltage or Current are known as Passive Component
Examples: Resistor, Capacitor, Inductor etc.

Active Components: Those devices or components which produce energy in the form of Voltage or Current are called Active Components
Examples: Diodes, Transistors SCR etc…

Comparison between Active and Passive Elements and Devices

Active Elements	Passive Elements
1. Active Device transforms and injects power or energy into a circuit.	1. Passive Device utilizes power or energy into a circuit.
2. Examples: Diode, Transistor, ICs, DC generator, Current & Voltage sources etc.	2. Examples: Resistors, Capacitors, Inductors, Transformer, Motors etc.
3. Active element produces energy in the form of voltage or current.	3. Passive element stores energy in the form of voltage or current.
4. They multiply or amplify power.	4. They do not amplify power.
5. Active components require an external & conditional source to operate in the circuit.	5. Passive Components do not require any external source to operate in the circuit.
6.They can amplify the signal.	6. They can't amplify the signal.
7. They are energy donor.	7. They are energy acceptor.

What is Electrical Resistance?

The property of a substance which opposes the flow of electric current (or electricity) through it is called Resistance OR Resistance is the ability of a circuit which opposes current.

Mica, Glass, Rubber, Wood etc. are the examples of resistive materials. The unit of resistance: Ohm (Ω)

Types of resistors

Generally, there are two types of resistors which have linear properties.

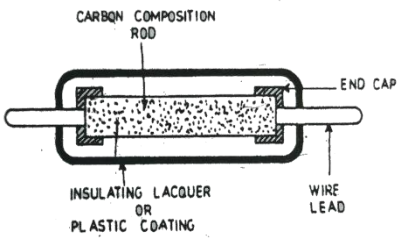
- **Fixed Resistors**
- **Variable Resistors**

Fixed Resistors

As the name tells everything, fixed resistor is a resistor which has a specific value and we can't change the value of fixed resistors.

Types of Fixed resistors:

- **Carbon Composition Resistors**
- **Wire Wound Resistors**
- **Thin Film Resistors**
- **Tick Film Resistors**
- **Carbon Composition Resistors**



A typical fixed resistor is made from the mixture of granulated or powdered carbon or graphite, insulation filler, or a resin binder. The ratio of the insulation material determines the actual resistance of the resistor. The insulating powder (binder) made in the shape of rods and there are two metal caps on the both ends of the rod.

There are two conductor wires on the both ends of the resistor for easy connectivity in the circuit via soldering. A plastic coat covers the rods

with different color codes (printed) which denote the resistance value. They are available in 1 ohm to 25 mega ohms and in power rating from ¼ watt to up to 5 Watts.

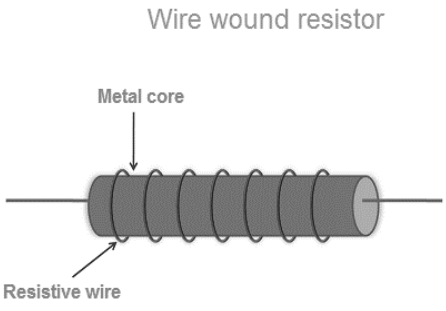
Wire wound Resistors

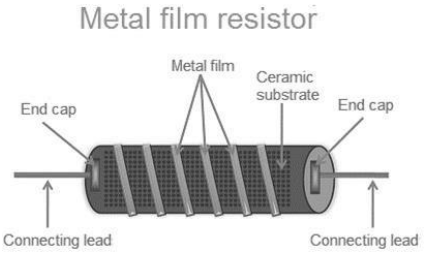
Wire wound resistor is a type of passive component in which metal wires are used to reduce or restrict the flow of electric current to a certain level.

Wire wound resistor is made from the insulating core or rod by wrapping around a resistive wire. The resistance wire is generally Tungsten, manganin, Nichrome or nickel or nickel chromium alloy and the insulating core is made of porcelain,

Bakelite, press bond paper or ceramic clay material.

Resistance of the wire wound resistor is depends on three factors: resistivity of the metal wire, length of the metal wire and cross sectional area of the metal wire





Advantages of wire wound resistor:

These are 1. Low cost 2.High accuracy 3.High stability 4.Wide resistance range

Disadvantages of wire wound resistor

The wire wound resistors are used only for low frequencies, it is not suitable for high frequencies. At high frequencies, it acts as inductor. Hence, for high frequencies non-inductive wire wound resistors are used.

Metal Film Resistors: The resistor which uses metal film to limit the flow of electric current to certain level is called metal film resistor.

Construction

The metal film resistor construction is similar to the carbon film resistor except that the material used for constructing the film is different.

In carbon film resistors, carbon is used to construct the film whereas in metal film resistors, tin and antimony or nickel chromium is used to construct the film.

The metal film resistor is made by placing the metal film on a ceramic substrate. The metal film resists the electric current flowing through it. Hence, it acts as resistive element to the electric current.

The ceramic substrate does not allow heat through it. Hence, it acts as insulating material to heat.

Metal film resistors are very tiny, cheap and reliable in operation. Their temperature coefficient is very low (±2 ppm/°C) and used where stability and low noise level is important

Carbon Film Resistors

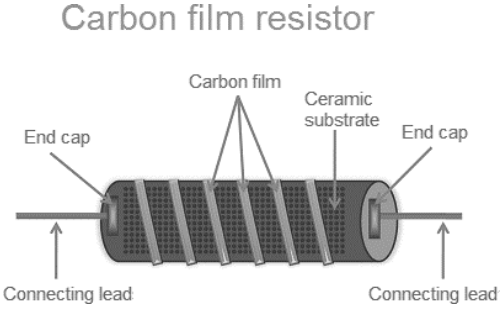
The carbon film resistor is a type of fixed resistor that uses carbon film to restrict the electric current to certain level. These types of resistors are widely used in the electronic circuits.

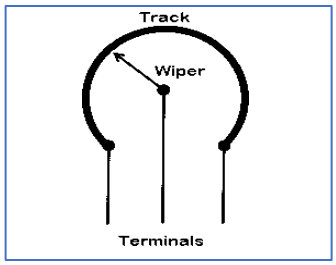
construction

The carbon film resistor is made by placing the carbon film or carbon layer on a ceramic substrate. The carbon film acts as the resistive material to the electric current. Hence, the carbon film blocks some amount of electric current. The ceramic substrate acts as the insulating material to the heat or electricity. Hence, the ceramic substrate does not allow heat through them. Therefore, these resistors can withstand at higher temperatures without any damage.

The carbon film resistors are more preferred over carbon composition resistors because the carbon film resistors produce less noise than the carbon composition resistors.

The carbon film resistors have low tolerance value than the carbon composition resistors.





Advantages of Fixed Resistors

1. Generally, they are very cheap and small in size, hence, occupy less space.
2. They are reliable and available in different ohmic and power ratings.
3. Fixed resistor can be easily connected to the circuit and withstand for more voltage.

Disadvantages of Fixed Resistors

1. Their temperature coefficient is very high. They are less stable.
2. They make a slight noise as compared to other types of resistors.

Variable Resistors

As the name indicates, those resistors which values can be changed through a dial, knob, and screw or manually by a proper method. In these types of resistors, there is a sliding arm, which is connected to the shaft and the value of resistance can be changed by rotating the arm. They are used in the radio receiver for volume control and tone control resistance.

- Ex: **Potentiometers Rheostats, Trimmers**

Potentiometer

A potentiometer is a three terminal resistor in which the resistance is manually varied to control the flow of electric current.

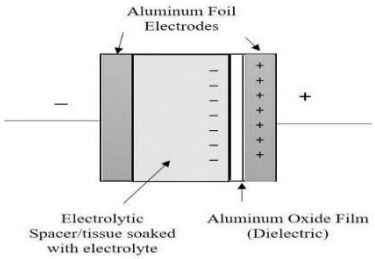
Construction : Potentiometer consists of three terminals among which two are fixed and one is variable. The two fixed terminals of the potentiometer are connected to both ends of the resistive element called track and third terminal is connected to the sliding wiper. The wiper that moves along the resistive element varies the resistance of the potentiometer. The resistance of the potentiometer is changed when the wiper is moved over the resistive path.

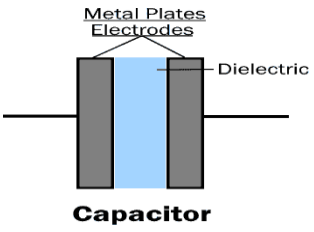
Rheostat :

Rheostat is a variable resistor, which is used to control the flow of electric current by manually increasing or decreasing the resistance.

Construction of rheostat

The construction of rheostat is almost similar to the potentiometer. Like the potentiometer, the rheostat also consists of three terminals: terminal A, terminal B and terminal C. However, we use only two terminals: either A and B or B and C. Terminal A and terminal C are the two fixed terminals connected to both ends of the resistive element called track and terminal B is the variable terminal connected to the sliding wiper or slider.





Capacitor:

A capacitor is a two-terminal passive electronic component that stores charge in an electric field between its metal plates. it is made up of two metal plates (electrodes) separated by an insulator known as the **dielectric** The **capacitance** is the ability of a capacitor to store charge in its metal plates (Electrodes). Its unit is **Farad (F)**.

Types Of Capacitors

There are different types of Capacitors classified on the basis of their sizes, shapes & materials. Different types of capacitors are given below with details

1) Electrolytic Capacitors:

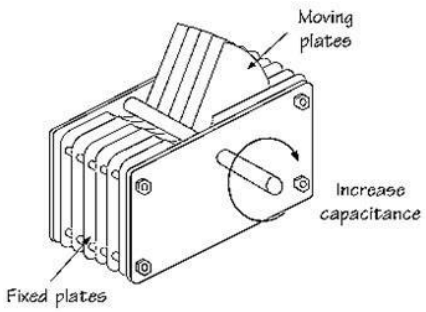
It consists of two sheets of aluminum foils separated by electrolyte such as Ammonium Borate. When direct current (DC) is passed between two aluminum foils then electrolysis takes place and very thin film of oxide layer of thickness 10^{-6} cm is formed on the anode (positive) plate. It acts like a dielectric. Since the is a good conductor it itself acts as a cathode. Since thickness of the dielectric film is less capacity is high. This capacitor has to be connected with proper polarity in the circuit.

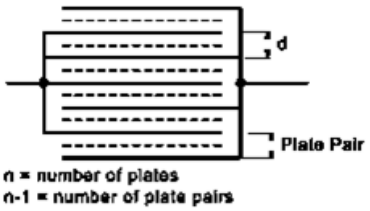
These capacitors are small in size and have high capacitance. So these are used in to store large large amount of charge. They are only used in **DC** circuits.

2). Variable Capacitor:

The capacitance of this capacitor can be varied gradually. It consists of two sets of semicircular plates made of brass or aluminium. One set of plates are fixed to a stator. Another set of plates are connected to a shaft. It is called rotor. When the rotor is rotated the common area between plates is changed, so the capacity is varied.

It is used in radio and TV recievers.





3. Multiple plate capacitor :

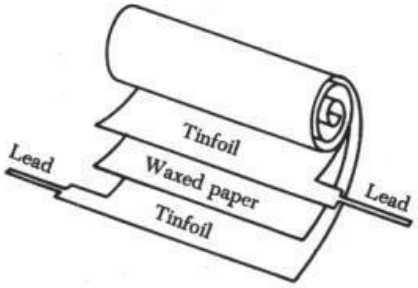
It consists of number of plates parallel to each other. These are made of Tin foils. Alternate set of plates are connected together. To increase the capacitance the space between plates is filled with mica sheets that act as dielectric. The entire arrangement is kept in plastic case. The capacity of this capacitor is fixed because dielectric constant of mica does not change with temperature. These are used as standard capacitors in laboratory and in high frequency oscillating circuits.

4. **Paper capacitor:** In this capacitor a paper soaked in oil or wax is used as dielectric. It is placed between two Tin foils and rolled. This arrangement in a cylinder to increase stability. To increase the capacitance number of sheets are rolled parallel to each other. These are low cost and occupy less space. These are used in radio circuits and laboratories.

Applications of Capacitors

There are some of the general application for all types of capacitors.

1. For tuning radios and TV
2. To convert AC into DC
3. To reduce voltage fluctuations
4. Smoothing power supply's output.
5. Frequency filters, high pass, lowpass filters.
6. Coupling & Decoupling of signals.
7. Motor Starter.
8. Oscillators



Derive expression for energy stored in the capacitor?

The work done while charging the capacitor is stored as energy between plates of the capacitor. Let C be the capacity, V be the potential and Q be the charge in the capacitor.

The work done to transfer a charge dq between plates is, dw = Vdq

Total work done to store charge o to q is, $w = \int^{q} V dq$, but $V = \frac{q}{c}$

$$W = \int_0^q \frac{q}{c} dq = -\int_0^q q\, dq$$

$$W = \frac{q^2}{2c}$$

but q=cv

This is stored as potential energy. $U = \frac{1}{2}\frac{q^2}{c}$

Explain the effect of dielectric on 1) Charge 2) potential 3) Energy stored in the capacitor?

1) **Charge:-** Let two identical capacitors each of capacity C are connected in parallel. Then their potential differences (V) are equal. Since they are identical their capacities are equal. So charge on them is also equal. $Q = C_1V = C_2V$

$Q = CV = CV$

Now if a dielectric material of constant K is introduced between plates of one of the capacitor then its capacity becomes C'= KC

So, $Q' = (KC)V = K(CV) = KQ$

The charge increases K times.

2) **Potential:- :-** Let two identical capacitors each of capacity C are connected in series. Then their charge(Q) are equal. Since they are identical their capacities are equal. So potential on them is also equal.

$$V = \frac{Q}{C1} = \frac{Q}{C2} = \frac{Q}{C}$$

Now if a dielectric material of constant K is introduced between plates of one of the capacitor then its capacity becomes C'= KC

So, potential $V' = \frac{Q}{C'} = \frac{Q}{KC} = \frac{V}{K}$

The potential decreases K times.

3) **Energy stored:- a)** Let a capacitor of capacity C is connected to a battery of voltage V and charged.

Then energy stored in the capacitor is, $U_0 = \frac{1}{2} CV^2$

Without disconnecting the capacitor from the battery , if a dielectric material having constant K is introduced between the plates of capacitor , then its potential remain as V , but the capacity becomes KC

$$\therefore \text{Energy stored } U_o' = \frac{1}{2} KCV^2$$

$$= K\left(\frac{1}{2} CV^2\right)$$

$$U_o' = K\, U_o$$

$\therefore$ The energy stored increases K times.

b) Let a capacitor of capacity C is charged to a charge q and disconnected from the battery .

Then energy stored in the capacitor is, $U = \frac{1}{2}\frac{q^2}{c}$

Now a dielectric material having constant K is introduced between the plates of capacitor , then its charge remain as q , but the capacity becomes KC

$\therefore$ Energy stored U_o'

$= \qquad\qquad U_o' = U_o$

$\frac{1}{2}\frac{q^2}{C}$)

∴ The energy stored decreases K times.

Explain application of capacitor in motor or fans?

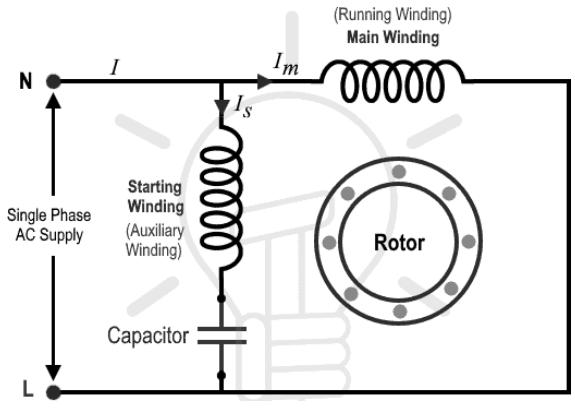
To start a single phase AC induction motor, two phases are needed to produce the rotating magnetomotive force (MMF) but we have only one phase due to single phase AC supply in our homes. Therefore, we need an additional phase to start these kind of motors. We obtain the second phase by adding a capacitor in series with the starting wind of a ceiling fan motor.

We also know that current and voltage are in phase (same phase) in case of pure resistive circuit. But this is not the case in case of capacitive or inductive circuits. In other words in case of a pure inductive circuit, current is lagging 90° behind the voltage (or voltage is leading 90° from current) while in case of a pure capacitive circuit, current is leading 90° behind

the voltage (or Voltage is lagging 90° from current). This way, to involve capacitor and inductor, we may product phase shift in a circuit.

As mentioned above and shown in fig below, there are two winding in a ceiling fan motor which known as Main Winding (Running) and Auxiliary (Starting) Winding. We need to connect the capacitor to the starting winding (auxiliary) in series. If the capacitor is connected in the main winding instead of starting wind, the fan blades will rotate in the

$\frac{1}{2}\frac{q^2}{KC}$

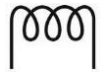


Inductor Definition: The inductor is a passive component which stores the electrical energy in the magnetic field when the electric current passes through it.

The inductor is an electrical device used for storing the electrical energy in the form of the magnetic field. It is constructed by wounding the wire on the core. The cores are made of ceramic material, iron or by the air. The core may be toroidal or E- shaped

The electric current I flows through the coil generates the magnetic field around it. Consider the magnetic field generates the flux Φ when current flows through it. The ratio of the flux and the current

gives inductances. $\mathbf{L = \frac{\Phi}{I}}$



The inductor is an electrical device used for storing the electrical energy in the form of the magnetic field. It is constructed by wounding the wire on the core. The cores are made of ceramic material, iron or by the air. The core may be toroidal or E-shaped

Types of Inductors

There are many types of Inductors according to the core material used.

Air-core Inductor: The commonly seen inductor, with a simple winding is this air-Core Inductor. This has nothing but **air as the core** material. The non-magnetic materials like plastic and ceramic are also used as core materials and they also come under this air-core Inductors. The following image shows various air-core inductors.

These Inductors offer a minimum signal loss at the applications having a very high magnetic field strength. Also, there exists no core losses as there is no solid core material.

Iron-Core Inductor: These Inductors have Ferromagnetic materials, such as ferrite or iron, as the core material. The usage of such core materials helps in the increase of inductance, due to their high magnetic permeability. **Permeability** measures the ability of supporting the formation of magnetic fields within the materials. The inductors that have ferromagnetic core materials just like these, suffer from core losses and energy losses at high frequencies. These Inductors are used in the manufacture of few types of transformers.

Toroidal Inductors: These Inductors have a magnetic material as the core substance to which the wire is wound. These are in circular ring shape.The main advantage of this type of inductors is that, due to the circular shape, symmetry is achieved in the whole shape of the inductor, due to which there are minimum losses in the magnetic flux. These inductors are mostly used in AC circuit applications.

Powdered Iron Core Inductors: As the name implies, the core of these inductors have magnetic materials with some air gaps in it. But this kind of construction provides an advantage to the core, to store high level of energy compared with the other types. The following figure shows an image of a Powdered Iron core Inductor.These inductors provide very low eddy current losses and hysteresis losses. These are available at lowest prices and have very good inductance stability.

Derive expression for induced Emf in an inductor?

Let a current i is passed into a coil , then magnetic flux $\emptyset$ is produced in it. The magnetic flux produced in the coil is directly proportional to the current (i) passing into it.

$$\emptyset \alpha i$$

$$\emptyset = Li, \qquad \text{Where L is self inductance}$$

Induced Emf, $$E = -\frac{d\emptyset}{dt} = -\frac{d}{dt}(Li) = -L\left(\frac{di}{dt}\right)$$

Explain application of Inductance (Choke) ?

Inductors are also called as chokes. An Inductor blocks AC components and sends DC components through it. Hence as it chokes or stops AC, an inductor can simply be termed as a **Choke**. A coil of insulated wire is often wound on a magnetic core to form a choke. As the signal frequency increases, the impedance of the choke increases. Due to its reactance, it can limit the amount AC through it. Even though, practically some amount of AC passes through it due to its low electrical resistance. These are mostly used in tube lights and in transformers in electronic applications.

What is the purpose of a choke in a radio?

A choke's primary purpose is **to remove AC current and pass DC current**. Radiofrequency (RF) chokes rely on increasingly larger inductor sizes to block low-frequency signals.

What is application of choke in radio tuning circuits?

The function of the choke coil used in this type is to resist the radio frequencies and allow the audio frequency and direct currents to pass through it. This is a novel form in the choke coils which is invented to reduce the radio frequency noises in the core. These are often used in wires of electronic devices in our daily life.

Explain function of series resonance circuit in radio tuning circuit?

In series resonance, **the inductive reactance (X_L) and the capacitive reactance (X_C) become equal**,

Impedance $Z = R + X_L - X_C$ Where $X_L = 2\pi fL$ and $Xc = \frac{1}{2\pi fc}$

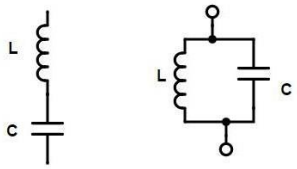
When inductive reactance is equal to capacitive reactance, $X_L = X_C$,

then total impedance of the series resonating circuit is minimum and power transmission of signals becomes maximum . Hence, at the series resonance condition, the circuit offers minimum impedance. The series resonance circuits are used in many electronic circuits like television, radio tuning circuits and filters to vary the frequency and selecting the various frequency channels. At resonance,

$X_L = Xc$

$$2\pi fL = \frac{1}{2\pi fc}$$

$$f = \frac{1}{2\pi\sqrt{LC}}$$



power sources :- Sources that produces electric power are called power sources.

Types of power sources:-There are two types of power sources.

1.D.C. power sources 2. AC power sources

D.C. power sources:- Sources that produces DC current are called DC sources**.**

Ex: batteries, solar cells, fuel cells etc

A.C. power sources:- Sources that produces AC current are called AC sources**. Ex:** Generators (turbine generators, diesel generators)

Types of batteries:- There are two basic types of batteries: 1) primary and 2) secondary.

Primary batteries:- Batteries that are "single use" and cannot be recharged are called primary batteries. Ex: Dry cells and alkaline batteries

Secondary batteries:- Batteries that can be recharged are called secondary batteries. Ex: lithium batteries, lead acid batteries etc

Lead-acid Batteries: It is a type of rechargeable battery containing lead acid that is much cheaper and is seen in most cars and vehicles to power the lighting system. Lead-acid batteries have a relatively low energy density compared to modern rechargeable batteries.

Despite this, their ability to supply high currents means that the cells have a relatively large power-to- weight ratio. Lead-acid battery capacity is 2V to 24V and is commonly seen as 2V, 6V, 12V, and 24V batteries. Its power density is 7 Wh/kg.

Since they are available at a low cost, providing the high current required by starter motors makes them perfect for use in motor vehicles.

Nickel-Metal Hybrid Batteries (Ni-MH)

It is a rechargeable battery used in everyday electronic devices such as smartphones, laptop computers, and portable power tools. In this type, the chemical reaction at the positive electrode is similar to that of a nickel-cadmium cell, with both using nickel oxide hydroxide.

Nevertheless, the negative electrodes use a hydrogen-absorbing alloy instead of the cadmium that is used in NiCd batteries. This battery finds application in high-drain devices due to its high capacity and energy density. They are generally used as an alternative because they have a slightly lower but generally compatible cell voltage.

Lithium-ion Batteries (Li-ion)

These types of batteries are composed of cells in which lithium ions move from the negative electrode through the electrolyte to the positive electrode during discharge and back when it's charging. Lithium- ion batteries are used in heavy electrical current usage devices such as remote car fobs.These are widely used batteries that are commonly found in laptops, mobile phones, cameras, etc. Lithium-ion batteries typically have a higher energy density, little or no memory effect, and lower self-discharge than other battery types. They have a longevity of 300 to 500 charge cycles or about two to three years.

1. Lithium Polymer Battery (LiPo Battery):Or lithium-ion polymer battery:

A lithium-polymer (LiPo, LIP or Li-Poly) battery is a type of rechargeable battery that uses a soft polymer casing so that the lithium-ion battery inside it rests in a soft external "pouch." It may also refer to a lithium-ion battery that uses a gelled polymer as an electrolyte. However, the term commonly refers to a type of lithium-ion battery in a pouch format.

Lithium-polymer batteries are lighter and more flexible than other kinds of lithium-ion batteries because of their soft shells, allowing them to be used in mobile and other electronic devices, as well as in remote control vehicles.

Explain series combination of cells?

l'kc cclls aíc said to bc co→ı→cctcd i→ı scíics ir tkc positi:c tcími→al or tkc o→c ccll is co→ı→cctcd to tkc →cgati:c tcími→al or tkc otkcí. I→ı scíics tkc samc c"íic→t rlows tkío"gk cack ccll.

Let 'n' idc→ı tical cclls cack or cmr E a→ı d i→ı tcí→ı al ícsista→ı cc í aíc co→ı →ı cctcd i→ı scíics to cxtcí→ı al ícsista→ı cc R .

l'kc cq"i:alc→t EMI or tkc ccll is gi:c→ı bQ Ecq = E1 : E2 :E« ———-E→ı = →E

l'kc cq"i:alc→t i→tcí→al ícsista→cc is gi:c→ı bQ ícq = í1 : í2 : í« ———-í→ı = →í

l'otal ícsista→cc , Rcq = →í : R

l'kc c"íic→t rlowi→g tkío"gk tkc load will bc I = Ecq/Rcq I = →E/(R :→ í)

Casc 1: If →í < < R tkc→ı I = →E/R

Ir tkc :al"c or tkc i→tcí→al ícsista→cc is m"ck lcsscí tka→ı tkc cxtcí→al ícsista→cc tkc→ı tkc c"íic→t i→ı tkc ciíc"it will bc →ı timcs tkc ciíc"it c"íic→t d"c to tkc si→glc ccll.

Casc 2: If →í > > R tkc→ı I = E/í

Ir tkc :al"c or tkc i→tcí→al ícsista→cc is m"ck gícatcí tka→ı tkc cxtcí→al ícsista→cc tkc→ı tkc c"íic→t i→ı tkc ciíc"it will bc cq"al to tkc skoít-ciíc"itcd c"íic→t obtai→cd ríom a si→glc ccll.

Iíom tkc gi:c→ı ciíc"it Ii→ı d

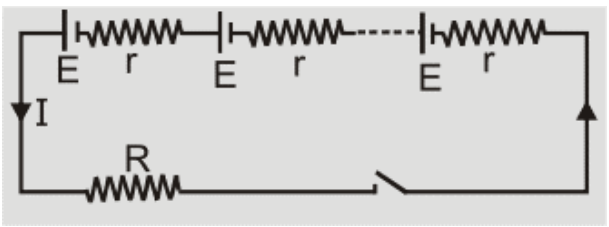
Eq"i:alc→t cmr or tkc combi→atio→ı

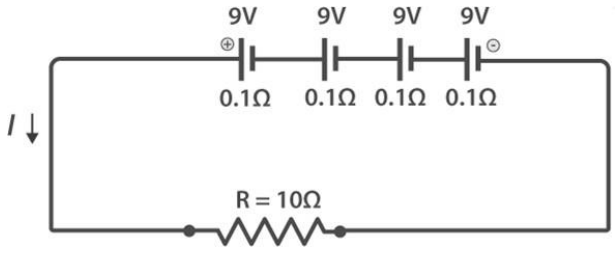
Eq"i:alc→t i→tcí→al ícsista→cc iii) l'otal c"íic→ı t i:) Potc→tial dirrcíc→cc acíoss tkc cxtcí→al ícsista→cc

Solutio→ı :

Eq"i:alc→t cmr or tkc combi→atio→ı Ecq = →E = 4 x 9 = «6 V

ícq = ní = 4 x 0.1 = 0.4 Ω





i) l'otal c"íic→t I = →E/(R : →í)

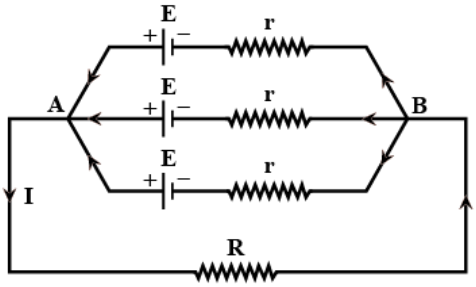
I = (4 x 9)/[10 : (4 x 0.1)] = «6/10.4 = «.46 A

(i:) Potctial dirrcíc→cc acíoss tkc cxtcí→al ícsista→cc V = IR =

«.46 x 10 = «4.6 V

Explai→ combi→atio→ of cclls i→ paíallcl?

l'kc cclls aíc said to bc co→→cctcd i→ paíallcl ir tkcQ aíc co→→cctcd bctwcc→ two commo→tcími→als.



When cells are connected in parallel, the EMF of the combination will be equal to the EMF of any one of the cells that are connected in parallel. Let us assume that n cells of emf E and internal resistance r are connected in parallel.

Then EMF of all the cells, $E_{eq} = E$,

The internal resistances will be in parallel ,

Net internal resistance, $r_{net} = \frac{r}{n}$

Total resistance, $R_{eq} = \frac{r}{n} + R$

Hence the he total current is given as, $I = \frac{\text{total Emf}}{\text{Total Resistance}} = \frac{E}{\frac{r}{n} + R}$

$$I = \frac{nE}{r+nR} \quad , \quad \text{If } r > nR,$$

then current is, $I = \frac{nE}{r}$

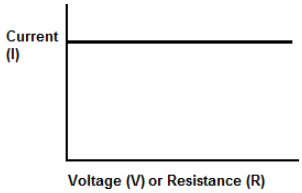
The current in the circuit is n times the current in the circuit if only one cell were present. This is advantageous to us in situations when the internal resistance of the cell is very high and if we want to reduce the internal resistance, we can attach these cells in parallel and hence reduce the internal resistance of the circuit.

constant current source :- A constant current source is a power source which provides a constant current to a load, even despite changes and variance in load resistance.

In other words, the current which a constant current source provides is steady, even if the resistance of the load varies.

A constant current source is, thus, a very valuable component because it can supply steady current even if there are changes in resistance, even a wide variance in the resistance. This comes in use when a circuit needs a steady current supply, without fluctuations.

The graph below represents the current which comes from a constant current source.



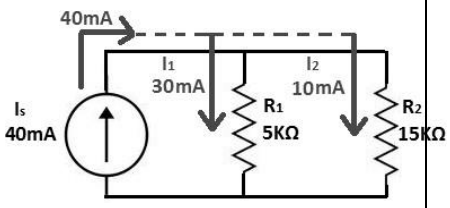
You can see that the current is constant all throughout despite changes in voltage or resistance.

Working Constant Current Source:-

A constant current source is a power generator whose internal resistance is very high compared with the load resistance it is giving power to. Because its internal resistance is so high, it can supply a constant current to a load whose resistance value varies, even over a wide range.

Thus, a constant current source follows the rules of current division. Being that it has very high internal resistance and the load resistance is much lower, current takes the path of least resistance, flowing out of the (high internal resistance) current source and into the load resistance, since it is of much lower resistance.

If you know current division, current takes the path of least resistance. Look at the following current divider circuit :



Constant-current power supplies are used to power LED lighting and charge rechargeable batteries.

(The brightness of LED lighting is determined by the current value; therefore, if the current value fluctuates, the brightness changes accordingly. So a stable current is therefore required).

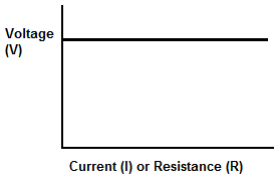
In rechargeable batteries, the voltage and current are not proportional due to the characteristics of rechargeable batteries. Therefore, a constant current power supply has to be applied to the battery

is employed so that the current is supplied regardless of the voltage applied to the battery. What

is a Constant Voltage Source?

A constant voltage source is a power source which provides a constant voltage to a load, even despite changes and variance in load resistance.

In other words, the voltage which a constant voltage source provides is steady, even if the resistance of the load varies.



A constant voltage source is, thus, a very valuable component because it can supply steady voltage even if there are changes in resistance, even a wide variance in the resistance. This comes in use when a circuit needs a steady voltage supply, without fluctuations.

The graph below represents the voltage which comes from a constant voltage source.

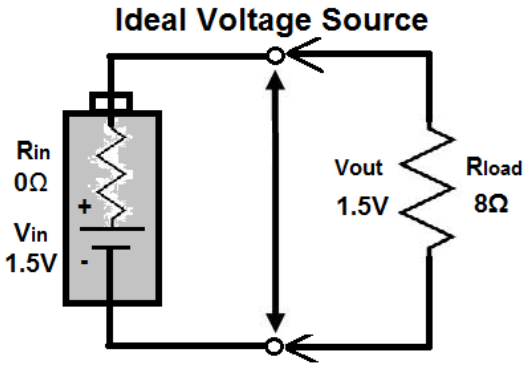
You can see that the voltage is constant all throughout despite changes in current or resistance.

Working of Constant Voltage Source :-

A constant voltage source is a power generator whose internal resistance is very low compared with the load resistance it is giving power to. Because its internal resistance is so low, it dumps most of its voltage across the higher resistance load. Remember that according to ohm's law, voltage is equal to current x resistance (V=IR). So voltage is dropped across the higher resistance component. If the resistance of the voltage source is practically zero, then instead of dropping its voltage across itself, it will drop it across the load entirely instead.

Thus, a constant voltage source follows the rules of voltage division. Being that it has very low internal resistance and the load resistance is much higher, the voltage will practically drop entirely across the load.

Look at the following voltage divider circuit below:



Notice how this voltage source, shown above, supplies 1.5V, in total, from out of it. The majority of this 1.5 volts drops across the resistor of greater resistance, which is 8Ω; 1.33V of the 1.5V drops across the load. The remaining 0.17V drops across the battery which has a resistance of 1Ω.

Now let's decrease the resistance of the voltage source so that now it has a resistance of 0Ω. The below voltage source represents a voltage source which has zero internal resistance.

Because the resistance is 0Ω and the load is 8Ω, all of the voltage drops across the 8Ω load resistor. Greater voltage will always drop across the component with the higher resistance.

SMPS:- SMPS is an abbreviation used for 'Switched Mode Power Supply'.

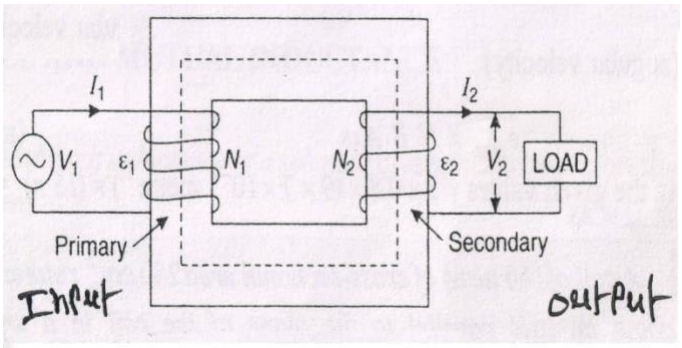
Working:- SMPS uses a switching regulator to regulate and stabilize the output voltage by turning on and off load-current. The mean voltage between the two states (on and off) is the appropriate power for the device. Unlike linear power supplies, SMPS pass-transistors switch between low dissipation, full-on & full-off states. Thus SMPS convert unregulated AC or DC voltage into the computer acceptable regulated DC voltage.

The main characteristics of SMPS include the followings:-

1. It is small in size.
2. It is light weight.
3. SMPS is highly power efficient. It provides an efficiency of around 65-70%.
4. SMPS is capable of handling temperature proficiently. The temperature may rise to a 20-40 degree Celsius maximum.
5. The magnetic material used in SMPS is known as Ferrite Core.

Application of SMPS in computers:-

SMPS is small in size, and hence it is also lightweight. that SMPS (stands for Switched-Mode Power Supply) is one of the most important parts of a computer system, and it is not possible to start a computer without SMPS. SMPS mainly helps the computer to convert the incoming voltage into an acceptable form in the computer.



Transformer: A transformer is an AC static device which transfers Electric power from one circuit to another. It can increase or decrease the voltage in a circuit but with a corresponding decrease or increase in current.

Construction: A transformer consists of two coils. One is known as primary coil (P) while the other is known as Secondary Coil (S). These two coils are wound on the same Ferromagnetic core. The two coils are electrically insulated. But they are connected magnetically. The energy from one coil is transferred to other coil by means of magnetic coupling. The coil which receives energy from an AC source is called Primary (P) and the coil which delivers the energy to load is called Secondary (S) as shown in the figure.

The no. of turns in primary is N_1 and the no. of turns in secondary are N_2. The ratio $\frac{N2}{N1}$ is called as Transformer Ratio. This is represented by a.

If $N_2 > N_1$, then the transformer is known as STEP–UP Transformer.

If $N_1 > N_2$, the n the transformer is known as STEP–DOWN Transformer.

Principle: A transformer operates on the principle of mutual induction when an alternating voltage is applied to the primary, an alternating current is set up in it. It induces an emf in secondary coil.

According to Faraday's Law of Electro Magnetic Induction, $e = -M \frac{dI}{dt}$. Due to this induced emf, the secondary coil is capable of supplying current and hence energy. Let an AC current i_1 will flow through primary coil. This causes magnetic flux through primary. This induces an emf and opposite to V_1. Let φ be the flux through the core.

We have $V_1 = -N1\frac{d\varphi}{dt}$ ... 1

The same flux is linked with the secondary coil. Therefore the secondary voltage V_2 is given by

$V_2 = -N2\frac{d\varphi}{dt}$ ... 2

Dividing 2 by 1, we get $\frac{V2}{V1} = \frac{N2}{N1} = a$ OR $\frac{V1}{V2} = \frac{N1}{N2}$ ... 3, where a is transformer ratio.

When a >1, the transformer is known as STEP–UP transformer. When a < 1, the transformer is known as STEP–DOWN transformer. For an ideal transformer, there is no loss of energy and

We have $V_1 I_1 = V_2 I_2$ $\frac{V1}{V2} = \frac{I2}{I1} = a$.

Applications of a Transformer: We know that the power is generated at around 11 KV in a power house. For transmission we utilize higher ratings around 110 KV/220 KV. We need Step-up transformer for this purpose again to supply voltage at load centers it has to be reduced to 6.6 KV and then to supply it to costumer at 220 V. For this purpose we need Step-down transformers. This is the major application of a transformer. The other applications are as follows.

For long distance transmission of electricity.

In the manufacture of radio transmitters, tape recorders etc.,

In welding.

In rectification of AC into DC.

Radio Communication, Electronic circuits etc.,

Note: The input and output voltages are also expressed as V_P or E_P and V_S or E_S respectively. Similarly, the input and output currents are also expressed by I_P and I_S respectively.

What is a Step-Down Transformer?

A **step-down transformer** is a type of transformer that converts the high voltage (HV) and low current from the primary side of the transformer to the low voltage (LV) and high current value on the secondary side of the transformer. The reverse of this is known as a step up transformer.

A transformer is a type of static electrical equipment that transforms electrical energy (from primary side windings) to magnetic energy (in transformer magnetic core) and again to the electrical energy (on the secondary transformer side). A step-down transformer has a wide variety of applications in electrical systems and transmission lines.

What is a Step-Up Transformer?

A **step-up transformer** is a type of transformer that converts the low voltage (LV) and high current from the primary side of the transformer to the high voltage (HV) and low current value on the secondary side of the transformer. The reverse of this is known as a step down transformer.

A transformer is a piece of static electrical equipment which transforms electrical energy (from primary side windings) to the magnetic energy (in the transformer's magnetic core) and again to the electrical energy (on the secondary transformer side). A step-up transformer has a wide variety of applications in electrical systems and transmission lines.

Relation between primary turns and secondary turns of the transformer with emf.:

If V1 is the voltage in the primary circuit and N1be the number of turns in the primary coil similarly If V2 is the voltage in the secondary circuit and N2be the number of turns in the secondary coil, then the relation between primary turns and secondary turns of the transformer is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Lat 13.20545° Long 79.097866°
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632V+FWJ, Pagadamanu Street, Greamspet, Chittoor, Andhra Pradesh 517002, India
Lat 13.201395° Long 79.094474°
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Department of Physics & Electronics

Model Question Paper

Basic Electronic Components

Certificate Course-AY-2021-22

Time: 2 Hours **Maximum Marks: 50**

Section –A

I. Answer all the following Questions. 10 x 1 = 10 Marks

1. Choose the passive elements. [ ]
   a) Resistor b) Capacitor c) Inductor d) All the above
2. What are the units of Resistor, Capacitor and Inductor.[ ]
   a) Fared, Ohm & Henry c) Ohm, Fared & Henry
   b) Ohm, Henry & Fared d) Fared, Ohm & Henry
3. Variable resistors examples. [ ]
   a) Rheostat b) Potentiometer c) Decade Resistance Box d) All the above
4. Fixed resistors examples. [ ]
   a) Wire wound Resistors c) Carbon Composition Resistors
   b) Carbon Film Resistors d) Metal Oxide Resistors
5. What are the applications of Resistors [ ]
   a) Acting as a heating element c) Electric fuse
   b) Both a & b d) None of the above
6. Non Electrolytic capacitors examples. [ ]
   a) Paper Capacitor c) Mica Capacitor
   b) Ceramic Capacitor d) Plastic Film Capacitor
7. Electrolytic capacitors examples [ ]
   a) Tantalum Capacitor c) Aluminium Capacitor
   b) Niobium Capacitor d) All the above
8. What are the applications of a capacitors. [ ]
   a) Used in Electric Motors c) For Energy Storage Devices
   b) Used in Power Supplies d) All the above
9. What is the unit of pico, nano and micro fared. [ ]
   a) 10^{-12}, 10^{-9}, 10^{-6} c) 10^{-15} & 10^{-12} & 10^{-9}
   b) 10^{-9}, 10^{-6} & 10^{-12} d) 10^{-9} , 10^{-6} & 10^{-15}
10. What is colour code of 100 Ω resistor [ ]
    a) Black, Brown, Black c) Black, Black, Brown
    b) Brown, Black, Brown d) Brown, Black, Black

11. Fixed inductors examples. [ ]
    a) Air-Core b) Iron-Core c) Ferrite Core d) All the Above
12. Find the net capacitance of 3 capacitors are connected parallel, their Capacitances are 1.0 µf, 5.0 µf, 8.0 µf. [ ]
    a) 10 µf b) 20 µf c) 14 µf d) 15 µf
13. Find the net capacitance of 3 capacitors are connected series, their Capacitances are 2.0 µf, 4.0 µf, 8.0 µf. [ ]
    a) 14 µf b) 1.143 µf c) 11.43 µf d) 2 µf

14. At Constant Temperature, the applied voltage is directly proportional to the current passed through the conductor.[ ]
    a) Kirchhoff's Voltage law c) Ohm's law
    b) Kirchhoff's Current law d) Ampere's law
15. Which is Ohm's law. [ ]
    a) V = IR b) I = $\frac{V}{R}$ c) R = $\frac{V}{I}$ d) All the above
16. The algebraic sum of currents meeting at a junction is equals to zero.[ ]
    c) Kirchhoff's Voltage law c) Kirchhoff's Currents law
    d) Kirchhoff's Resistance law d) Kirchhoff's Capacitance law
17. The sum of emf's in a closed circuit is equals to the sum of potential Differences in that closed circuit. [ ]
    a) Kirchhoff's Voltage law c) Kirchhoff's Currents law
    b) Kirchhoff's Resistance law d) Kirchhoff's Capacitance law
18. An_____ component is an electronic component which supplies energy to a circuit. [ ]
    a) Passive b) Active c) Both Passive & Active d) None of the above.
19. A_____ component is an electronic component which Can only receive energy, which it can either dissipate, absorb or store it in an electric field or magnetic field. [ ]
    a) Passive b) Active c) Both Passive & Active d) None of the above.
20. A P-N Junction diode will act as a [ ]
    a) Rectifier c) Clamping & Clipping Circuits
    b) Electronic switch d) All the above
21. Zener diode will act as a [ ]
    a) Voltage Stabilizer c) Both a & b
    b) Voltage Regulator d) None of the above
22. Transistor will act as a [ ]
    a) Rectifier b) Filter c) Amplifier d) Stabiliser

23. The ———————— Converts chemical energy into electrical energy. [ ]
    a) Battery/ Cell b) Resistor c) Capacitor d) Inductor
24. Applications of a Transformer. [ ]
    a) Welding & Rectification c) Radio &Telecommunication
    b) For long transmission d) All the above
25. Which type of transformer that converts high voltage (HV) and low current from the primary side of the transformer to Low Voltage (LV) and high current from secondary side of the current.
    a) Step-up Transformer c) Both a & b
    b) Step-down Transformer d) None of the above

E – Copies of the Certificates

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CERTIFICATE

This is to certify that Mr./Mrs. KADIRI REDDI SEKHARA Successfully completed Certificate Course on "Basic Electronic Components" organized by the Department of Physics & Electronics from 11.11.2021 to 31.12.2021.

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