Basavarajeshwari Group of Institutions

SANJAY GANDHI POLYTECHNIC, BALLARI

Inst. Code No. 459

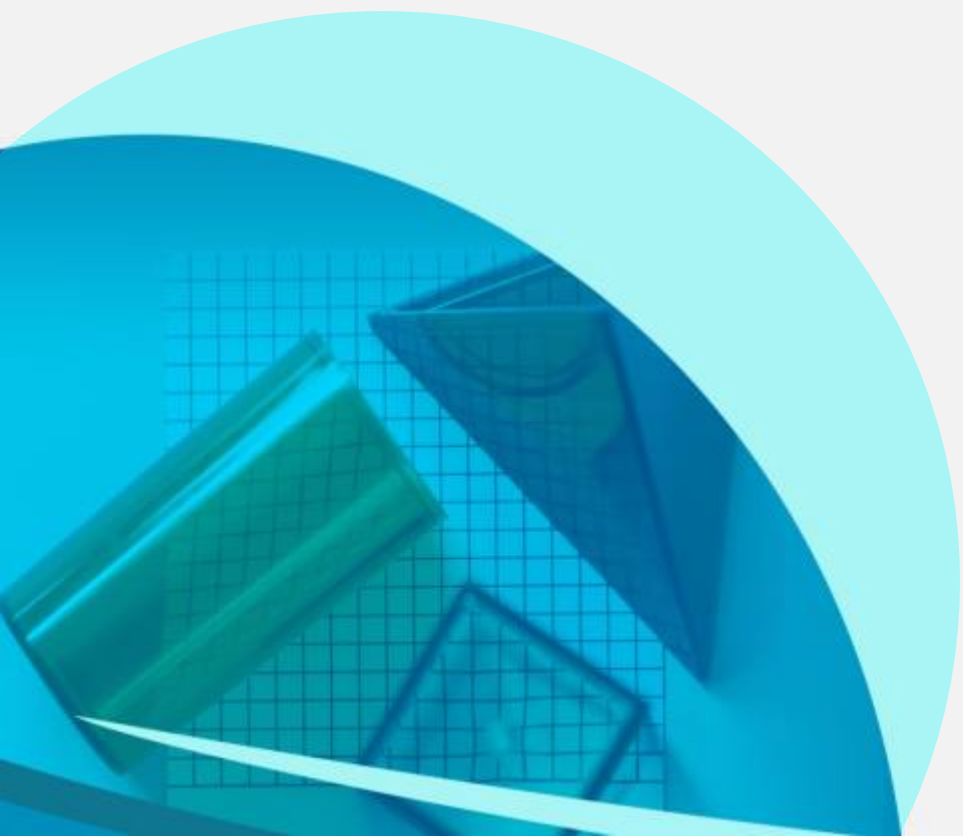
News letter

JOTHIRMAEEE

YEAR 2017-2018

Department of

Electrical & Electronics Engineering



Inst. Code No. 459

JOTHIRMAEEE

Department of Electrical and Electronics Engineering

VISION

To create globally competent Electrical & Electronics Engineers with sound technical knowledge and social responsibilities

MISSION

Mission 1: To impart quality technical education to Electrical and Electronics students by providing excellent teaching and learning environment by balancing both theoretical and practical aspects.

Mission 2: To encourage ethical values and leadership abilities in the Electrical and Electronics students so as to work towards growth of society

Mission 3: To provide industry oriented practical experience and skills necessary for employability, entrepreneurship and global competency.

DEPART MENT STUCTURE

HEAD OF THE DEPARTMENT

Mr. GURUPRASAD G B.E, M.Tech

Teaching staff

1) Miss. Shivarathnamma
2) Miss. Raziya Sultana C
3) Mr.shivaraja D M
4) Mrs. Sunitha S
5) Mrs. V Sri Teja Reddy
6) Mr. Irfan Basha
7) Mr. Shridhar M
8) Mrs. Thara G
9) Mr. Panduranga B
10) Mr. Chandra Shekar N
11) Mrs. Chandrakala B A
12) Mrs. Vasundhara D
13) Miss. Geetha P
14) Mrs. Rashmi B
15) Mr. Ranjith Rathod R
16) Mr. Dattatrya L Sawalker
17) Miss. Vanam pavani
18) Mrs. Savitha G G
19) Mrs. Priyanthica Paul
20) Mrs. Sapna S J
21) Miss. U priyanka
22) Mr. K Thippeswamy
23) Mrs. M Swarna Kamala
24) Mrs. Azizunnisa T K
25) Mr. Mahesh Kumar K
26) Miss. Ummi hani

Technical staff

1) Mr. Abdul Rawoof
2) Mr. Shrishilayya
3) Mr. Pampangouda
4) Mr. Abhishek H
5) Mrs. Umesh K N
6) Mr. Tulasi Ram
7) Miss. Swetha Kumari
8) Mr. Gabrial Raju
9) Mr. Shabir Basha
10) Mr. Lalith V
11) Mr. shaik johni
12) Mr. Rajashekhar
13) Miss. Yerramma .T
14) Mr. Somashekar. T

Toppers list

TOPPERS / RANKS (ODD SEM)					
SEM	Reg. No.	Student Name	Marks	Class	Results (%)
I	459EE17134	RIZWAN BASHA S	563	Distinction	90.08
	459EE17196	VASANTH KUMAR K	559	Distinction	89.44
III	459EE16016	ARUNA J	655	Distinction	90.34
	459EE16098	MD MOHSEEN S	649	Distinction	89.52
V	459EE15226	USHA RANI	670	Distinction	89.33
	459EE15039	CHARULATHA G M	657	Distinction	87.60

TOPPERS / RANKS (EVEN SEM)					
SEM	Reg. No.	Student Name	Marks	Class	Results (%)
II	459EE17196	VASANTH KUMAR K	595	Distinction	95.2
	459EE17134	RIZWAN BASHA S	582	Distinction	93.12
IV	459EE16109	MOHAMMED SOHAIL	640	Distinction	88.28
	459EE16014	ANJU KUMARI	632	Distinction	87.17
VI	459EE15243	ZEBA KAUSAR	568	Distinction	90.88
	459EE15039	CHARULATHA G M	560	Distinction	89.6

SL NO	Register Number	Names	I sem	II sem	III sem	IV sem	V sem	VI sem	Aggregate
1	459EE15226	USHA RANI	81.12	92.48	87.45	86.21	89.33	87.84	86.55
2	459EE15243	ZEBA KAUSAR	84.64	87.84	85.66	81.79	80.67	90.88	85.72
3	459EE15039	CHARULATHA G M	81.60	93.28	80.69	84.69	87.60	89.6	85.72

Guest Lecture

Guest lectures on **"power GRID and smart GRID"** was been organized by the department of Electrical and Electronics Engineering to upgrade the knowledge and skills of Students and Faculties. Which bridges the gap between industry and institution.

It is one of the best and most effective methods in Educational institutions. Students can learn from different perspective & more effectively. Only learning from classroom cannot provide complete knowledge and guidance about everything in the business world, Industry professionals varied perspectives give insights to students.

As inspiring guest lecture on the key technical aspects of **"Power GRID and Smart GRID"** was held for the budding Electrical and Electronics Engineering students under the DEEE department. **Mr. Gadilingappa K,** Assistant Engineering, GESCOM, BELLARY. During the lecturing he as discussed the all operations of Power GRID and smart GRID, operations with related theoretical and practical aspects for the students and emphasize the importance of Smart GRID along with the growing support for alternative energy source in India.

Technical paper

Solar street lighting

[1] SAVITHA G G [2] P LAKSHMI NARAYANA [3] N P LOKESH

[1]Lecturer [2], [3] Students

[1],[2], [3] Department of Electrical and Electronics, Sanjay Gandhi polytechnic. Ballari

INTRODUCTION

Solar street lighting is based on the conversion of sunlight into electricity, either directly using photovoltaic, or indirectly using concentrated solar thermal power plant. Photovoltaic converts light into electric current using the photoelectric effect. The concentrated solar thermal power plant first appeared in 1980's Concentrated solar power system use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam.

Solar energy

Green energy comes from natural sources such as sunlight wind, rain, tides, plants, algae and geothermal heat. These energy resources are renewable, meaning they are naturally replenished. In contrast, fossil fuels are finite resource that take millions of years to develop and will continue to diminish with use**.**

Renewable energy sources also have a much smaller impact on the environment than fossil fuels, which produces pollutants such as greenhouse gases as a byproduct contributing to climatic changes. Gaining access to fossil fuels typically requires either Mining or drilling deep into the earth often in ecologically sensitive locations

Green energy can replace fossil fuels in all major areas of use including electricity water and space heating and fuel for motor vehicles

Types of green energy

Research into renewable non polluting energy sources is advancing at such a fast pace it's hard to keep track of the many types of green energy that are now in development here are 4 most common types of green energy

- solar power
- Wind power
- Hydro power
- Geo-thermal power

Solar power – the most prevalent type of renewable energy solar power is typically produced using photovoltaic's cells which capture sunlight and turn it into electricity solar energy is also used to heat buildings and water provide natural lighting and cook food solar Technologies have become inexpensive enough 2 power everything from small handheld gadgets to entire neighborhood's

Wind power – air flow on the Earth surface can be used to push turbines with stronger winds producing more energy high altitude sides and areas just hop short tend to provide the best conditions for capturing the strongest winds according to 2009 study a network of land based 2.5 Megawatt wind turbines in rural areas operating at just 20% of their rated capacity could supply 40 times current world wide consumption of energy.

Hydro power –hydropower or water power is power derived from the energy of falling water or fast running water which maybe harnessed for useful process which converts water energy into electrical

Geothermal energy – Earth crust are having massive amounts of energy

Which originates from both the original formation of the planet and the radio active decay of minerals, geothermal energy in the form of hot springs has being used by humans for bathing and now it's being used to generate electricity. In North America alone, there is enough energy stored underground to produce 10 times as much electricity as coal currently does.

World wide growth of photovoltaic:

The worldwide growth of photovoltaic is extremely dynamic and various strongly by country by the end of 2016, cumulative photovoltaic capacity increased by more than 75 gigawatt(GW) and reached at least 303 GW, sufficient to supply 1.8% of the world's total electricity consumption.

The top installers of 2016 were china, the United States, and India. There are more than 24 countries around the world with a cumulative PVcapacity of more than one gigawatt Austria, Chile and South Africa all crossed the one gigawatt-mark in 2016 the available solar PV capacity in Honduras is now sufficient to supply 12.5% of the electrical power while Italy, Germany, and Greece can produce between 7% and 8% of their respective domestic electricity consumption

As of January 2017, the largest solar power plants in the world are 850MW solar park in China for PV and the 377MW Ivampah solar power facility in the United States for csp. Other large csp facilities include the 354 megawatt (MW) solar energy generating systems power installation's in the USA.

Working principle of photovoltaic Effect

When light falls on silicon Cristal. If the intensity of incident light is high enough, sufficient number of photos are absorbed by the crystal and these photons in turn excite some of the elections of the covalent bonds these excited electrons then get sufficient energy to migrate from valence band to conduction band. As the energy level of these electrons is in conduction bond. Leaving a hole in the bond behind each removed electron. These are called free electrons move randomly inside the crystal structure of the silicon.

These free electrons and holes have vital role in creating electricity in photovoltaic cell. These electrons and holes are hence called light generated electrons and holes respectively. These light generated electrons and holes cannot produce electricity in the silicon Cristal alone. There should be some additional mechanism to do that. When a pentavalent impurity such as phosphorousis added to silicon the four valence electrons of each pentavalent phosphorus Atom are shared through covalent bond with four neighbor silicon atoms and fifth valence electron dose not get any chance to create covalent bond.

The fifth election then relatively loosely bounded with its parent atom. Even in room temperature thermal energy available in the Crystal is large enough to disassociate these relative lose electrons from their parent Phosphorus atom. Creatively lose electrons is this associated from parent Phosphorus atom Phosphorus atom in mobile positive ions that said this associated electron becomes free but does not have any incomplete covalent bond or hole in the crystal to be re-associated

These free electrons come from pentavalent impurity are always ready to conduct current in semiconductor. Although there are number of free electrons but still the substance is electrically neutral as the number of positive phosphorous ions locked inside the crystal structure is exactly equal to the number of the free electrons come out from them. The process of inserting impurities in the semiconductor is known as doping and impurities are doped are known as dopants. The pentavalent dopants which donate their fifth free electron to the semiconductor crystal are known as Donor. The semiconductors doped by donor impurity are known as n type or negative type semiconductor as there are plenty of free electrons which are negatively charged by nature.

When instead pentavalent Phosphorus atoms trivalent impurity atoms like Boron are added semiconductor crystal totally opposite type of semiconductor will be created. In this case some Silicon atoms in the crystal lattice will be replaced by Boron atoms in other words the Boron atoms will occupy the positions of replacing Silicon atoms in lattice structure. Three valence electrons of Boron atom will pair with valence electron of three neighbour Silicon atoms to create 3 complete covalent bonds. For this configuration there will be a silicon atom for each Boron atom, forth valence electron of which will not find any neighbour Valence Electrons to complete its fourth covalent bond. So there will be a lack of one electron in the incomplete Bond. So there will be lack of one electron in the incomplete Bond and hence and incomplete Bond always attracts electron to fulfill this lack. As such there is a vacancy for electron to sit.

This vacancy is conceptually called positive hole. In a trivalent impurity doped semiconductor a significant number of covalent bonds are continually broken to complete other incomplete covalent bonds. When one bond is broken the hole is created in it. When one bond is completed the hole in it disappears. In this way one hole appears to disappear another neighbour hole. Assuch holes are having relative motion inside the semiconductor crystal in the view of that it can said that holes also can move freely as free electrons inside semiconductor crystal. As each of the holes can accept electron the trivalent impurities are known as acceptor dopants are known as P type or positive type semiconductor. In n type semiconductor mainly the free electrons carry negative charge and in p type semiconductor mainly the holes intern carry positive charge there for free electrons in n type semiconductor and free holes in p type semiconductor are called as mejority charge carriers In N type semiconductor and P type Indian type semiconductor and P type semiconductor respectively.

There is always a potential barrier between n type and P type material. This potential barrier is essential for working of a photovoltaic or solar cell. while n type semiconductor and P type semiconductor contact each other, the free electrons near to the contact surface of a n type semiconductor get plenty of adjacent holes of p-type material. Hence free electrons in n type semiconductor near to its contact surface jump to the adjacent holes of p-type material to recombine.

Not only free electrons, valence electrons of N-type material near the contact surface also come out from the covalent bond and recombine with more nearby holes in P-type semiconductor. As the covalent bonds are broken, there will be number of holes created in N-type material near the contact surface.

Hence near contact zone the holes in the p-type materials disappear due to recombination on the other hand holes appear in n type material near same contact zone. This is as such equivalent to Migration of holes from P type and n type semiconductor. So as soon as one n type and P type semiconductor comes into contact so as soon as one n type and P type semiconductor comes into contact the electrons from n type will transfer to p-type and the holes from P type file transfer to N type.

The process is very fast but does not continue forever. After some instant there will be layer of negative charge in the p-type semiconductor adjacent to the contact along the contact surface similarly there will be a layer of positive charge in the n-type semiconductor adjacent to contact along the contact surface the thickness of these negative and positive layer increases up to certain extend but It Act ii that no more electrons will migrate from n type semiconductor to P type semiconductor this is because while any electron of N type semiconductor try to migrate over P type semiconductor it faces a sufficiently thick layer of positive ions in the n-type semiconductor itself where it will drop without crossing Gate similarly hole will no more migrate to N type semiconductor from p type. The holes when try to cross the negative layer in p type semiconductor these will recombine with electrons and no more movement towards n type region.

In other words negative charge layer in p type side and a positive charge layer in n type side together form a barrier which opposes Migration of charge Carriers from its one side to other.

Photovoltaic applications

•PV has been routinely used for roadside emergency and many temporary sites.
•More than 100,000 homes in the United states, largely in rural sites. Now depend on PV,s as a primary power source and this figure Is growing rapidly as people begin to understand how clean and reliable this power source is, and how deeply our current energy practices are going to be bothering for our future generations.
•PV costs are now down to a level that makes them the clear choice not just for remote applications, but for those seeking environmentally safer solutions and Independence from the ever increasing utility power costs.

Photovoltaic benefits

•Solar power provided by photovoltaic systems lower your utility bills and insulate you from utility rate hikes and price volatility due to fluctuating energy prices.
•Installing a solar system increases Property value and homes resale opportunities
•Purchase of solar power system allows you to take advantage of available tax and financial incentives
•Because they don't really on miles of exposed wires residential PV systems are more reliable than utilities particularly when the weather gets nasty
•PV module have no moving parts degrade very slowly, and boost a lifespan that isn't fully known yet but will be measured in decades.
•Solar electric systems are quite, reliable, fossil fuels free.
•Unlike mobile power generators, avoids greenhouse gas emissions.

Equipment's used :-

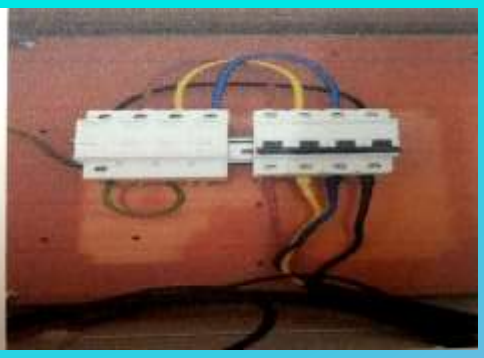
Lightning arrester:-

A lightning arrester is a device used on electrical power systems and telecommunications systems to protect the insulation and conductors of the systems from the damaging effects of lighting. The typical lightining arrester has a high voltage terminal and ground terminal.
Type:- "HORN GAP"
Horn Gap lightning arrester. It is consisting of two rods depends upon the supply voltage. The horns are so constructed that distance between two rods gradually increase towards the top. The horns are mounted on the insulators
Working:- under normal conditions, there are no conduction occurs between Gap. When over voltage surge occurs, spark-over takes place across the small Gap. And the surge current is transferred to the earth without effecting the system.
MC4 Connectors:
MC4 connectors are single-contact electrical connectors commonly used for connecting solar panels. The MC in MC4 stands for the manufacture Multi-contact(currently stubble Electrical Connectors) and the 4 for the 4mm diameter contact pin.

MC4s allow strings of panels to be easily constructed by pushing the connectors from adjacent panels together by hand, but require a tool to disconnect them to ensure they do not accidentally disconnect when the cables are pulled. The MC4 and compatible products are universal in the solar market today, equipping almost all solar panels produced since about 2011. Originally rated for 600V, newer versions are rated at 1000V, which allows longer strings to be created.

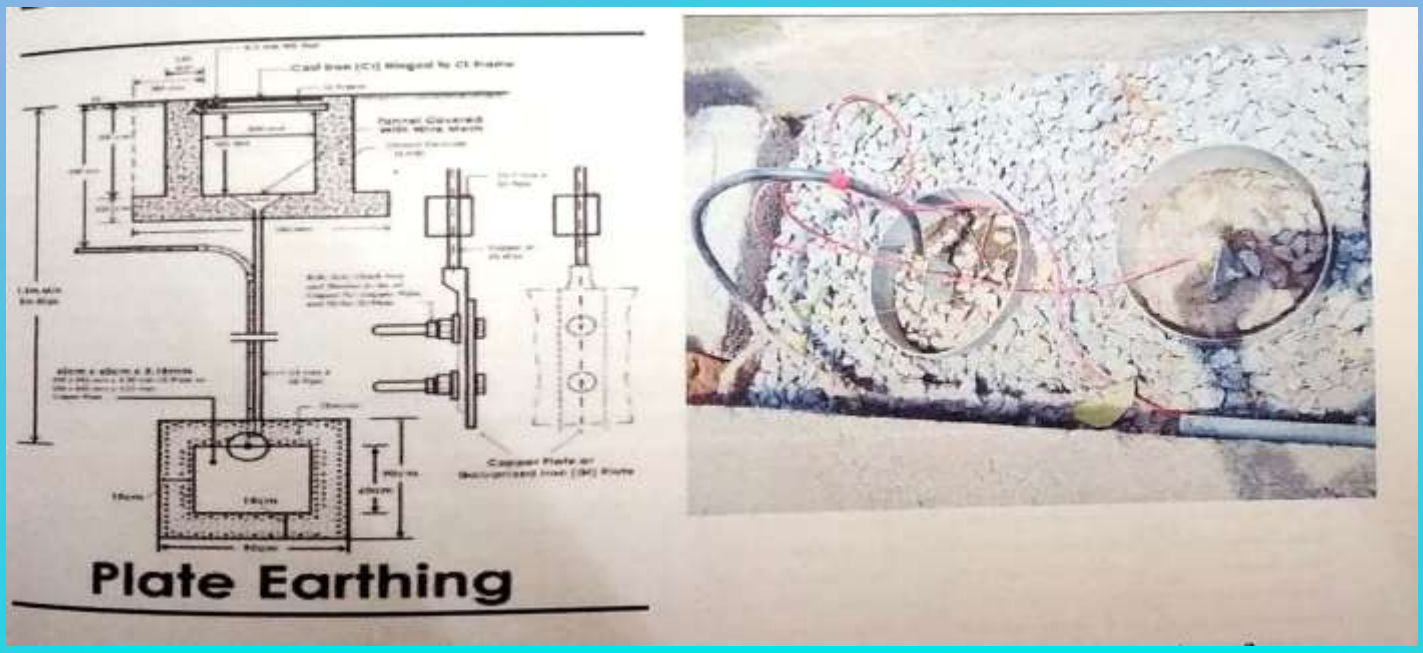
Control & Switch gear:

In an electric power system, switch gear is the combination of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate electrical equipment.
Switchgear is used both to de-energize equipment to allow work to be done and to clear faults downstream. This type of equipment is directly linked to the reliability of the electricity supply.



EARTHING:

Earthing is a series of connections into the ground for electrical safety. The earthing terminal is the main component in the system. The plate is connected via copper conductor, or GI conductor or concealed copper cable to the respective electrical set up. A funnel is attached to add water at regular interval.



Solar panels & Specifications:

Solar Panels(72 cell module):

It is important to note that although they are normally called Solar cells., they can respond to any type of light. A photovoltaic modules consist of multiple PV cells connected in series to provide higher voltage output. PV modules are manufactured in standard sizes such as 72 cell modules.

Calculation of solar panels:

- Each solar panel voltage = 36volts DC
- No. of cells in each panel = 72
- Voltage of each cell = 0.5 volts DC

Total voltage in each panel – 72*0.5 = 36volts DC

- Panels required = 12
- 12 panels are decided into 3 strings
- Each string consists of 4 panels
- As inverter capacity input voltage is 170volts DC

Technical data and specification

Rated power in STC	300Wp	305Wp	310Wp	315Wp	320Wp
Module efficiency in STC	15.8%	15.64%	15.89%	16.15%	16.41%
Open circuit voltage-Voc(volts)	45.35	45.59	44.90	45.10	45.30
Short circuit current- Isc(Amps)	8.93	9.02	9.08	9.18	9.26
Max power voltage – Vpm(volts)	35.87	36.06	36.40	36.60	36.80
Max power current- Ipm(Amps)	8.36	8.46	8.52	8.61	8.69
The measurement tolerance of the rated power is ± 3%. The modules delivered are sorted in a range of ± 2.5Wp. at low irradiance (200w / m,25°C and AM 1.5) the module yields at least 96% of the STC efficiency.					

Rated power (Pmax)	218.19	221.98	225	228	232
Open circuit voltage(Voc)	41.80	42.01	41.30	41.50	41.60
Short circuit current(Isc)	7.27	7.31	7.36	7.44	7.50
Rated voltage(Vmpp)	32.63	32.80	33.20	33.40	33.60
Rated current(Impp)	6.68	6.76	6.77	6.84	6.91

Temperature coefficient open- circuit voltage	-0.34%/k
Temperature coefficient short-circuit current	+0.5%/k
Temperature coefficient rated power	-0.4%/k
NOCT (normal operating cell temperature)	46 C±2 C(46°C±2°C
No. of cells and cell type	60 multi crystalline solar cells(156mm×156mm)
Dimensions : length × width× height	1640mm×990mm×35mm
Weight	17.7Kg
Front glass	3.2mm high transmission, tempered glass.
Embedding	EVA
Back sheet	Composite film , white.
Junction box	Protection class IP 65/67
No. of bypass diodes	3
Cables	4mm² solar cables, length 1000mm
Connectors	MC4 compatible
Operating temperature range	-40°C to 85°C-40°C to 85°C
Maximum system voltage	1000v dc
Maximum reverse current	20 amps
Maximum surface load capacity	5400 Pa
Resistance against hail	Maximum Ø 24mm with impact speed of 83 Km/hr

Electrical Characteristics of solar power panels:

Electrical characteristics of single module :-

Power (Pmax)	320W
Open circuit voltage(Voc)	45.00 V
Short circuit current(Isc)	9.17 A
Current at max power(Ipm)	8.84 A
Voltage at max power(Vpm)	36.20 V
Application class	A
Permissible system voltage	1000VDC
Max over current protection	20A
Module Weight	22KG
Module Size(L×W×H) in mm	1970×990×35
Standards	IEC 61215,61730 & 61701
Under standard test conditions: Irradiance=1000W/m^2, Temperature=25°CUnder standard test conditions : Irradiance=1000W/m^2, Temperature =25°C& AM=1.5	

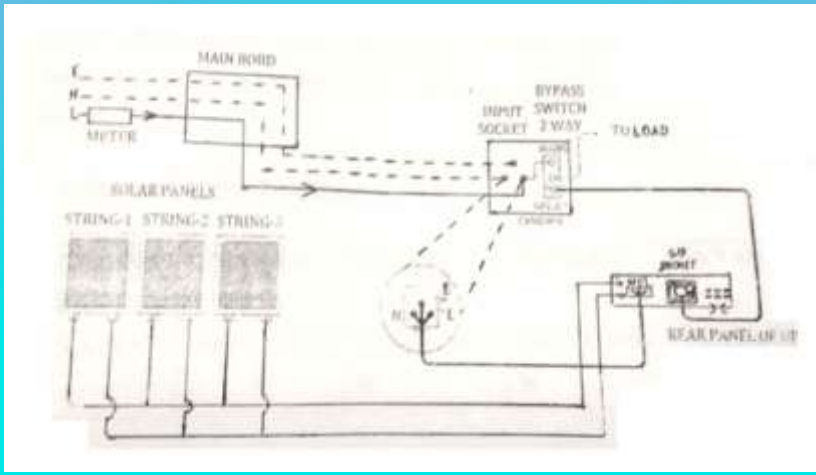
Electrical characteristics of single string :-

Power (Pmax)	1280W
Current at max power(Ipm)	8.84 A
Voltage at max power(Vpm)	36.20 V
Application class	A
Permissible system voltage	1000VDC
Max over current protection	20A
ARRAY Weight	88KG
ARRAY Size(L×W×H) in mm	673365×679030×678711

Electrical Characteristics of total plant :-

Power (Pmax)	3840 W
Current at max power(Ipm)	8.84 A
Voltage at max power(Vpm)	36.20 V
Application class	A
Permissible system voltage	1000VDC
Max over current protection	20A
Plant Weight	264KG

Block diagram of solar power system:



Conclusion: Thus the solar streetlights powered by suitable solar panels can be designed and installed to cope up with the power cuts and to cut the cost on power bills. The design and fabrication of solar panels as detailed in the above discussion is helpful in achieving the hassle free power generation and optimization of the power usage. The future is electrical power generation using renewable energy sources. And the future of renewable energy sources is solar energy.

Technical paper

Single phase AC Current Source 0-30AMPS

[1] GEETHA P [2] USHA RANI [3] CHARULATHA G M

[1]Lecturer [2], [3] Students

[1],[2], [3] Department of Electrical and Electronics, Sanjay Gandhi polytechnic. Ballari

Introduction:

The primary current injection method is usually the preferred test method because it includes the current sensors, wiring, and the current conduction path i the circuit breaker with the test. However, this method has one disadvantage in that it will not always detect sensor wiring and polarity problems.

This problem is due to the primary injection test being conducted on a single phase of the breaker at a time, whereas the solid-state trip logic of the circuit breaker functions by processing all of the signals from the three phase sensors at the same time. In order to identify sensor and wiring related problems in circuit breakers, the primary current injection test should be conducted on all three phases simultaneously when testing solid-state trip units.

If performing three phase primary injection is not feasible, the sensors and wiring of the circuit breaker should be tested separately to verify that they are working correctly. The proper functioning of the trip unit can be tested using primary current injection, one phase at a time. Two adjacent phases may also be connected in series and tested as three pairs to check for current sensor polarity issues.

Because primary current injection testing is a relatively expensive service, its usually performed only during the commissioning process to supplement a program of periodic secondary current testing. Circuit breakers that are part of critical process or engineered safety system are often maintenance tested using primary injection due to their high reliability requirements.

Circuit breakers that have thermal magnetic or electromechanical trip units can only be verified for correct functioning via the primary current injection test method. Circuit breakers equipped with solid state trip devices can be tested using secondary current injection, which requires less time and expense to perform the test.

Primary current testing is conducted by injecting a programmed sequence of overload and fault magnitude currents through a circuit breaker and documenting how long it takes the trip unit to activate. When these testes are performed at a factory or repair facility, current is injected into all three poles of a circuit breaker at the same time.

The test set has an integrated high-current transformer that supplies the simulated overload or fault current. Test sets are built with current ratings ranging from 500 to 1000000 amperes. Acceptance and maintenance tests are conducted in the field using a portable primary current injection test set that is specifically designed to be more compact than factory test equipment. These smaller test sets are generally not capable of injecting current into all three phases of a circuit breaker simultaneously.

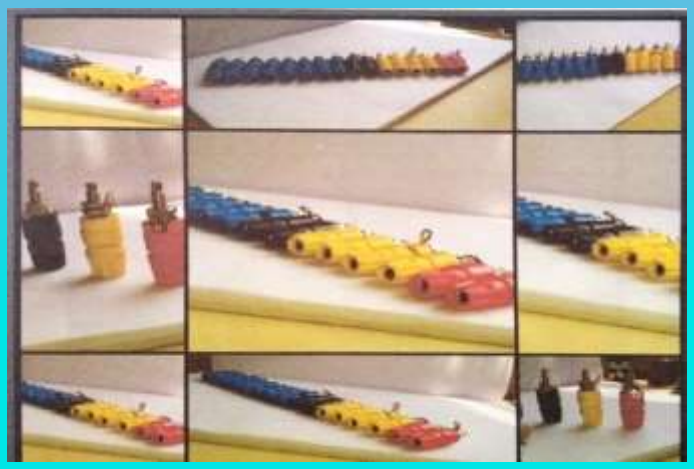
Primary current injection testing is utilized in high current/high voltage, scenarios found at large electrical installation such as substations a large current (between 100A and 20000A. Depending on system specifications and test requirements) is injected directly on the primary side of the electrical system such as a circuit breaker. The object of the test is to identify how the system operates under various levels of current load.

COMPONENT WITH SPECIFICTIONS:-

SLNO	ITEMS	RANGE	QUANTITY
01	Connecting wires	--------	Few
02	Banana pins	Red, Black, Blue	2,2,4,8
03	Rotary cam switch		2
04	Electromagnetic relay	240v/5Amps	1
05	contactor	--------	1
06	Push button switches	Green, Red(230v)	1,1
07	Auxiliary switch	--------	1
08	Count down timer	Vs=85-260v(1-99sec)	1
09	Time interval meter	Vs=85-260v(1-99sec)	1
10	Variable auto transformer	0-270v	1
11	Air break contactor	10A	1
12	lugs	0-type	Few
13	Rest button	3A, 250v	2
14	Cable tie	---------	Few
15	Bus bar supporter	---------	1
16	Current transformer	30/1A, 50/1A	1,1
17	Potential transformer	20VA, 10VA	1,1
18	Step down transformer	0-210v, 230v/0-3v, 60v	1
19	Renewable fuse	10A, 230v	1

Primary current injection kit is most reliable and effective kit for testing and commissioning of protection system in electrical substation.
It is designed with user friendly features to check operations of the component in protection system including CT, CB, current sensors etc.

BANANA PINS:



SPECIFICATONS:
Internal diameter: 4mm
External diameter: 16mm
Adjusting diameter: 10mm
Current: 19A
Voltage: 50v
Material: nickel

COMPONENET DETAILS:
The pin has one or more lengthwise springs that bulge outwards slightly, giving the appearance of banana. Individual banana plugs and jacks are commonly color-coded red, black, blue, and yellow but are available in a wide variety of colours. Dual banana plugs are often black with some physical feature such as molded ridge or thick tab, marked “gnd” indicating the relative polarity of the two plugs.

ROTARY CAM SWITCH:

SPECIFICATION:	AC3-5HP
Type-2S360	IEC/EN60947-5
AC21A-10A, 440V	IS-13947-5
AC23A-7.5A, 440V	UI-550V 1th-10A
AC/5-2.5A, 440V	Frequency-50HZ

COMPONENT DETAILS:

A rotary switch is a switch operated by rotation. These are often chosen when more than 2 positions are needed, such as a three speed fan or a CB radio with multiple frequencies of reception or chanels.

A rotary switch consists of a spindle or rotor that has a contact arm or spoke which projects from its surface like a cam. It has an array of terminals, arranged in a circle around the rotor, each of which serves as a contact for the spoke through which any one of a number of different electrical circuits can be connected to the rotor.

ELECTROMAGNETIC RELAY:

SPECIFICATION:

AC-240AC

COIL resistanc-9.5Kohms

Incoming coil terminal:7, 8, 1, 2

Outgoing terminal-3,4,5,6

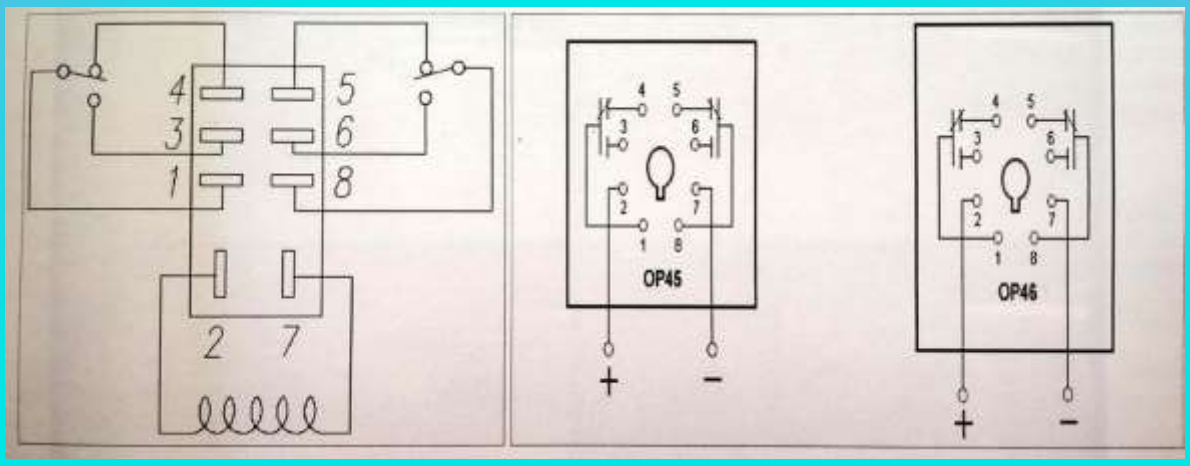
A model number-2-M4*2

COMPONENT DETAILS:

Electromagnetic relay operated by a relatively small electric current that can turn on or off a much larger electric current.

It has features like trouble free functionally, easy maintenance, long service life, low power consumption and durable in nature etc

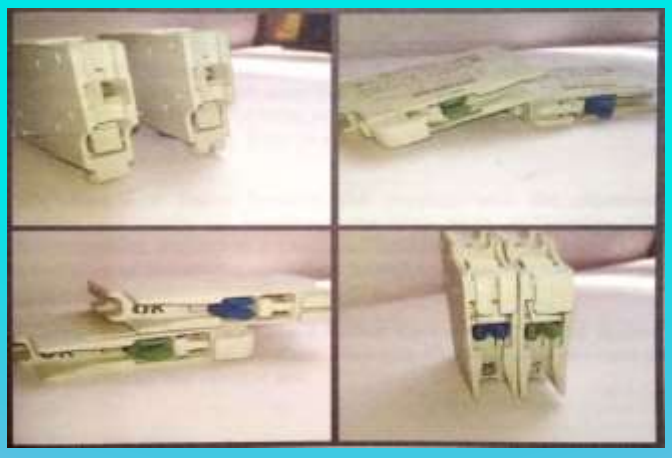
A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch , but other operating principles are also used, such as solid state relays.



Features:

- Longer service life
- Trouble free functionality
- Easy maintenance
- Precisely engineered
- Low power consumption

CONTRACTORS:



SPECIFICATONS
•I: 10A
•V: 400V
•MODEL: IEC6098-22

A contactor is an electrically-controlled switch used for switching an electrical power circuit. A contactor is typically controlled by a circuit which has a much lower power level than the switched circuit, such as a 24-volt coil electromagnet controlling a 230-volt motor switch.

Contactors come in many forms with varying capacities and features. Unlike a circuit breaker, a contactor is not intended to interrupt a short circuit current. Contactors range from those having a breaking current of several amperes to thousands of amperes and 24 V DC to many kilovolts. The physical size of contactors ranges from a device small enough to pick up with one hand, to large devices approximately a meter (yard) on a side.

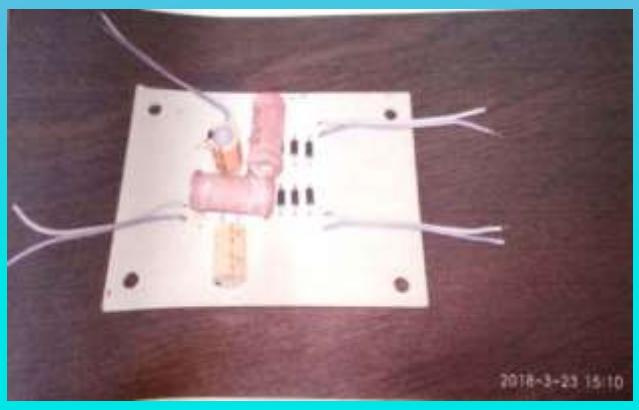
Contactors are used to control electric motors, lighting, heating, capacitor banks, thermal evaporators, and other electrical loads. A contactor has three components. The *contacts* are the current-carrying part of the contactor. This includes power contacts, auxiliary contacts, and contact springs. The *electromagnet* (or "*coil*") provides the driving force to close the contacts.

The *enclosure* is a frame housing the contacts and the electromagnet. Enclosures are made of insulating materials such as Bakelite, Nylon 6, and thermosetting plastics to protect and insulate the contacts and to provide some measure of protection against personnel touching the contacts
Open-frame contactors may have a further enclosure to protect against dust, oil, explosion hazards and weather.

APPLICATIONS:
· Lighting control
· Magnetic starter
· Vacuum contactor
· Mercury relay
· Mercury-wetted relay

PCB DESIGNING AND WORKING

INTRODUCTION OF PCB



A **printed circuit board** (**PCB**) mechanically supports and electrically connects electrical or electronic components using conductive tracks, pads and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate. Components are generally soldered onto the PCB to both electrically connect and mechanically fasten them to it.

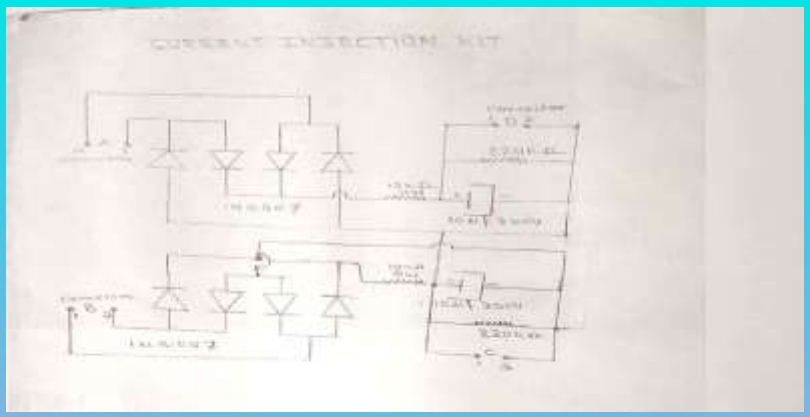
Printed circuit boards are used in all but the simplest electronic products. They are also used in some electrical products, such as passive switch boxes.

Alternatives to PCBs include wire wrap and point-to-point construction, both once popular but now rarely used. PCBs require additional design effort to lay out the circuit, but manufacturing and assembly can be automated. Electronic computer-aided design software is available to do much of the work of layout.

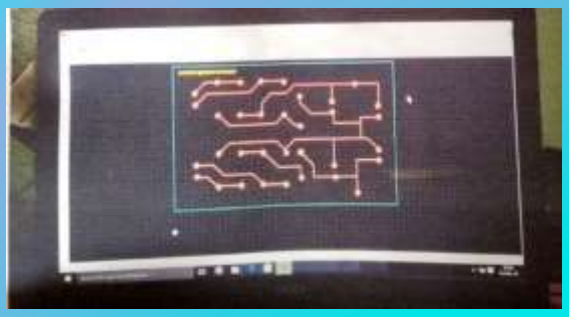
Mass-producing circuits with PCBs is cheaper and faster than with other wiring methods, as components are mounted and wired in one operation. Large numbers of PCBs can be fabricated at the same time, and the layout only has to be done once. PCBs can also be made manually in small quantities, with reduced benefits.

STEPS TO DESIGNING PCB:

STEP 1:

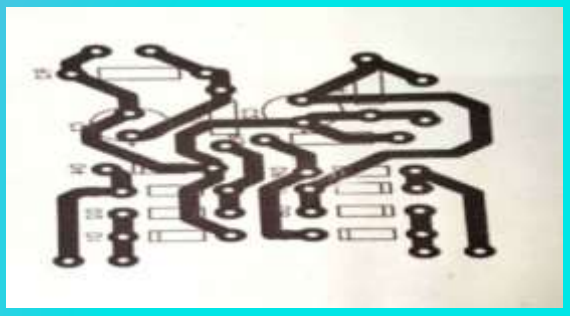


STEP 2:



STEP 3:

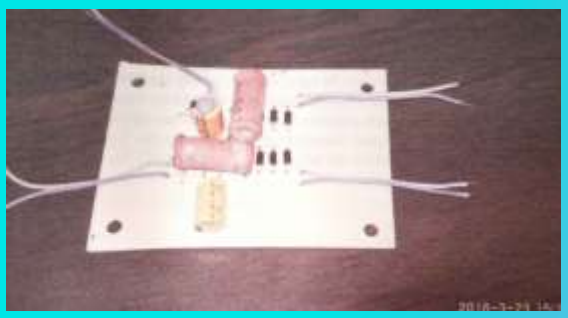
STEP 4:



STEP 5:

STEP 6:

STEP 7:



ETCHING PROCESS OF PCB:

The simplest method, use for small scale production and often by hobbyists, is immersion etching, n which the board is submerged in etching solution such as ferric chloride. Compared with methods used for mass production, the etching time is long. Heat and agitation can be applied to the bath to speed the etching rate.
In bubble etching air is passed through the etchant bath to agitate the solution and speed up etching. Splash etching uses a motor driven paddle to splash boards with etchant; the process has become commercially obsolete since it is not as fast as spray etching. In spray etching the etchant solution is distributed over the boards by nozzles, and recirculated by pumps. Adjustment of the nozzle pattern, flow rate, temperature, and etchant composition gives predictable control of etching rates and high production rates.

WORKING OF PCB:

It converts AC into DC, its input is 80V and its output is 100V .

A printed circuited board, or PCB," has several major advantages compared to older ways of building electronics. In the past, every component inside of an electronic device was connected with large wires and placed anywhere they could fit.

ADVANTAGES:

- Low labor costs.
- Design flexibility
- Essential maintenance
- High reliability
- Repairing is easy

DISADVANTAGES

- Cost is expensive
- Wiring related problem
- Simultaneously not injected for all three phases.