PRAGYAN

RANE POYTECHNIC TECHNICAL CAMPUS

LEARN AND GROW

AGRICULTURAL MOTOR PUMP RUNNING USING SOLAR POWER

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ABSTRACT:

Energy plays an important role in the material, social and cultural life of mankind. The energy needs are increasing day by day. This is the result of population growth and increase in the standard of living which is directly proportional to energy consumption. As we know that mankind will be never lacking in energy. Today, it is liquid fluid, tomorrow it may be uranium with an element of risk. Risk exists where ever there is human activity and production of energy. Just as the supply of fossil fuel is finite thus there will be the supply of uranium. Perhaps, uranium would be exhausted quickly if it is used on a large scale. It is therefore, harnessing the gigantic inexhaustible solar energy source reduces the dependence on fossil fuels.

INTRODUCTION

For the environmental concerned, the solar energy harnessing system offers advantages in that, it emits no pollutants in to the atmosphere as they are with the combustion of fossil fuels. Thus, as a long term option solar energy system can be considered as an alternate to all the finite fuel system. Therefore, there is no energy shortage today nor will there be in the near future. The lifting of water for drinking or irrigation purposes is of great importance in widely distributed villages with little or no rural electrification and where underground water is available. Solar energy is converted to mechanical energy to drive small water pumps it would be of great help to the rural inhibitions. In our project we use solar photo voltaic cells for pumping water. The photo voltaic modules convert sunlight direct to electricity which is used to run a dc motor pump for bailing of water. It consists of solar photo voltaic modules, power conditioner to protect storage batteries from over charging during non-sun shine and a dc water pump.
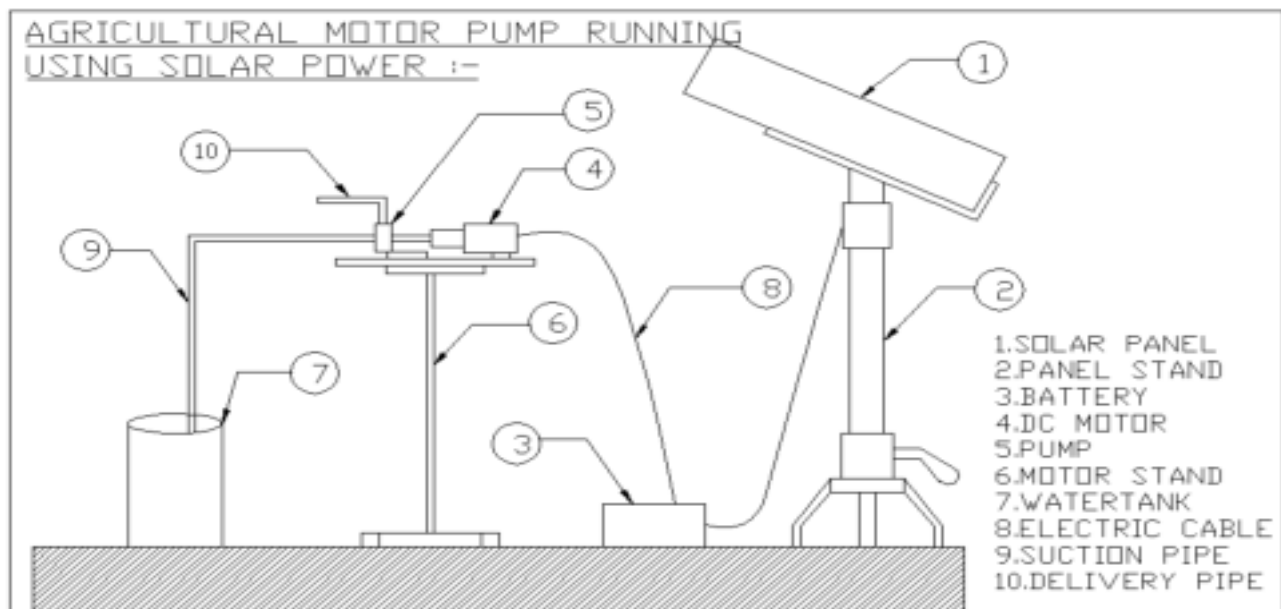
WORKING PRINCIPAL

The panel is kept under the sun for radiation. The photon energy from the sun lights that incident on the top metallic grid causes the electrons in the P-layer and holes in the N-layer to diffuse towards the junction. In this process the electrons collected on the N-side and holes collected on the P-side charge these two sides oppositely. This develops an open circuit voltage across the two terminals. The energy conversion process continues as long as light is incident on the active top surface of the cell. The power developed by these cells are collected and stored in a battery. The power from the battery is sent to the DC motor. It runs the pump coupled to it. The suction head is connected to the well and discharge head is directed towards the field. The

water from the well is pumped out and it is used for the domestic or agricultural purpose.

ADVANTAGE

- Least maintenance cost.
- No transportation from long distance
- No rent for electricity utilized
- No fuel required for operation
- No moving parts, thus long life
- Noiseless operation
- No person required to operate the system

BLOCK DIAGRAM

AGRICULTURAL MOTOR PUMP RUNNING USING SOLAR POWER :-

1. SOLAR PANEL
2. PANEL STAND
3. BATTERY
4. DC MOTOR
5. PUMP
6. MOTOR STAND
7. WATERTANK
8. ELECTRIC CABLE
9. SUCTION PIPE
10. DELIVERY PIPE

BLUETOOTH CONTROLLED ROBOT ARM

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ABSTRACT

In the vast electronic world, everything is expected to be easier, efficient and more importantly making mankind more comfortable and here comes the object picker that can be done from a place, to pick and replace them wherever they are needed. It is designed in such a way that no human error can be interrupted through this but it needs human control on more effective work.

PROBLEM DEFINITION

- The conventional arm is difficult to control since it uses buttons or joystick.
- The arm can be controlled only from a fixed place and cannot be controlled remotely or from long distance.
- The arm has precise control movements which makes it easier to grip and hold things

EXISTING METHOD

- The existing method uses a BO motors which does not give precise controls
- The existing method uses DPDT switched to control which makes the control movements difficult and it is wired control.

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PROPOSAL OF PROJECT

- The aim of the proposed system is to design a cost effective, user friendly pick and place robot.

- This robot uses Arduino Uno as the controlling unit of the robot and a Bluetooth module is interfaced with this controller to control the robot using MIT android application.

DIAGRAM

MAIN COMPONENTS OF THE ROBOT ARM

- Arduino Micro controller

- Servo Motors

- HC05 Bluetooth Module

- Power Supply

- Robot Arm Chassis

ARDUINO MICRO CONTROLLER

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

SERVO MOTORS

Servo motors have been around for a long time and are utilized in many applications. They are small in size but pack a big punch and are very energy-efficient. These features allow them to be used to operate remote-controlled or radio-controlled toy cars, [robots](#) and airplanes.

ROBOT ARM CHASSIS

They are used in robotic applications such as: Robotic Welding: Servo motors are mounted in every joint of a robotic welding arm, actuating movement and adding dexterity. Robotic Vehicles: Servos are used in the steering systems of the autonomous vehicles used to disarm and dispose of bombs.

ADVANTAGES

- Businesses can realize several benefits from industrial robotic arms: Improved safety.
- Robotic arms help keep workers safe by operating in environments that are hazardous and executing tasks that present high risk of injury to humans.

APPLICATION

- Arc Welding. Arc welding, or robot welding, became commonplace in the 1980s.
- Spot Welding.
- Materials Handling.
- Machine Tending.
- Painting.
- Picking, Packing and Palletizing.

BASICS ABOUT LITHIUM ION BATTERY

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A LITHIUM-ION OR LI-ION BATTERY is a type of rechargeable battery which uses the reversible reduction of lithium ions to store energy. The negative electrode of a conventional lithium-ion cell is typically graphite, a form of carbon. This negative electrode is sometimes called the anode as it acts as an anode *during discharge*. The positive electrode is typically a metal oxide; the positive electrode is sometimes called the cathode as it acts as a cathode *during discharge*. Positive and negative electrodes remain positive and negative in normal use whether charging or discharging and are therefore clearer terms to use than anode and cathode which are reversed during charging.

The electrolyte is typically a lithium salt in an organic solvent. It is the predominant battery type used in portable consumer electronics and electric vehicles. It also sees significant use for grid-scale energy storage and military and aerospace applications. Compared to other rechargeable battery technologies, Li-ion batteries have high energy densities, low self-discharge, and no memory effect (although a small memory effect reported in lithium iron phosphate batteries has been traced to poorly made cells).

The Li-ion battery has a voltage and power rating, as all batteries do. For all lithium cells, the nominal voltage level is 3.6V so that you need to combine two or more cells in series for higher voltage requirements. The default voltage is just ~3.6V for all lithium-ion cells. This stress can be down to 3.2V when fully loaded and up to 4.2V when fully loaded. Bear in mind that loading or charging the battery below 3.2V permanently kills the battery and may also become a fireworks formula. Let the vocabulary of a 18650 battery disintegrate so that we can better understand it. Note that these explanations only refer to a single 18650 cell, later we will get into Li-ion battery packs, in which more than one cell is connected to the voltage and current ratings in series or parallel.
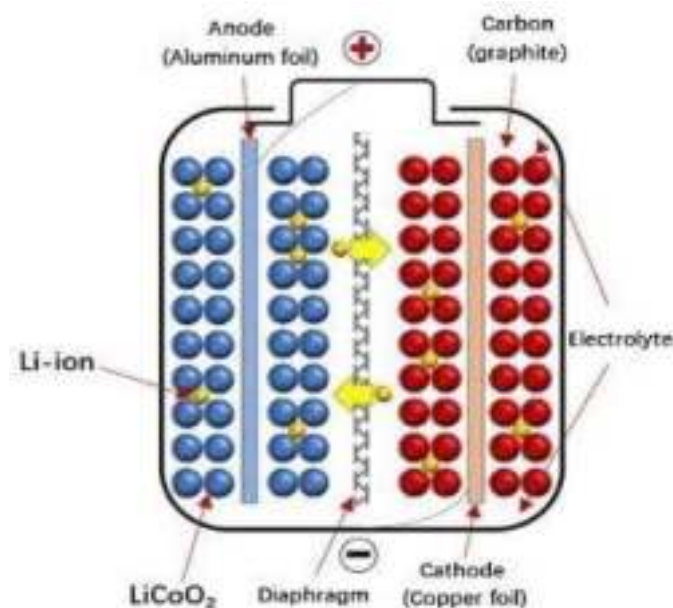
MAH RATING:

A cell's capacity is typically given as a Ah (Milli Ampere Hour). This value varies according to the cell type that you buy. Let's suppose, for instance, that our cell here is 2000mAh, which is only 2Ah. This means that if the battery draws 2A for 1 hour and similarly if the battery draws 1A for 2 hours. But you need to measure it using the mAh rating if you want to know how long the battery will power your project (run time).

Run Time (in hours) = Current drawn / mAh Rating.

C RATING:

You can find your response from the C rating of the battery if you've ever wondered what is the maximum volume you can draw from the battery. For each battery, we should say that the battery we have is a 2Ah battery with a 3C rating. The battery C rating changes again. The value 3C means the battery can produce 3 times the maximum current of the rated Ah rating. In this case, it can deliver a maximum current of up to 6A (3*2 = 6). 18650 cells normally only have a 1C grade.

Maximum current drawn from battery = C Rating * Ah Rating

INTERNAL RESISTANCE (IR):

By calculating the internal resistance of the battery the health and power of a battery can be predicted. This is essentially the resistance value between the battery endpoints (positive) and cathode (negative). A data sheet shows the standard IR value of a cell. The less powerful is the battery, the more it drifts from the real value. The IR value of an 18650 cell is within a milli ohms range and the IR value has been calculated with dedicated instruments.

CHARGING METHODS:

Many methods to load a li-ion cell are practiced. But 3 phase topology is the most widely used. CC, CV and trickle loading are three phases. The cell is charged by a steady charging current by changing the input voltage in CC (constant current). The mode is active until the battery is charged to a certain amount, and then the CV mode begins, where charge voltage is usually maintained at 4.2V. End mode is pulse charging or tricking, where the battery passes little current pulses to increase the battery life span. More complex chargers with 7-stage charging are also available.

STATE OF CHARGE (SOC) %:

The charge status, similar to the ones in our cell phone, is nothing but battery power. With a voltage valve, a battery's capacity cannot be clearly measured, usually, it is calculated with a current integration to assess the battery capacity shift over time.

DEPTH OF DISCHARGE (DOD) %:

The DOD demonstrates the degree to which the battery can be unloaded. There will be no 100% discharges because the battery will be fried as we know. For all batteries, usually, an 80 percent discharge depth is set.

Lithium-ion Battery	
Advantages	**Disadvantages**
Light-weight	Involves risk of bursting
Have higher energy density than other rechargeable batteries	Costly, compared to other batteries
Rate of charge loss is less	Complete discharge damage the battery
Have a greater number of charge and discharge cycles	Extremely sensitive to high temperatures (degrades very quickly, if exposed to heat)
Need not be discharged completely (due to absence of memory effect)	Very short lifespan (2 to 3 years from the date of manufacturing, even if not in use)
Operates at higher voltage than other rechargeable batteries (approx. 3.7 volt)	Not available in standard cells sizes (AA, C, and D) like others

Here is the problem:

1) How many SQUARES are in the 3x3 grid?
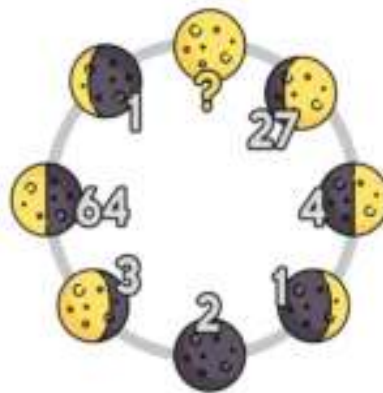

A)9   B) 10   C) 14

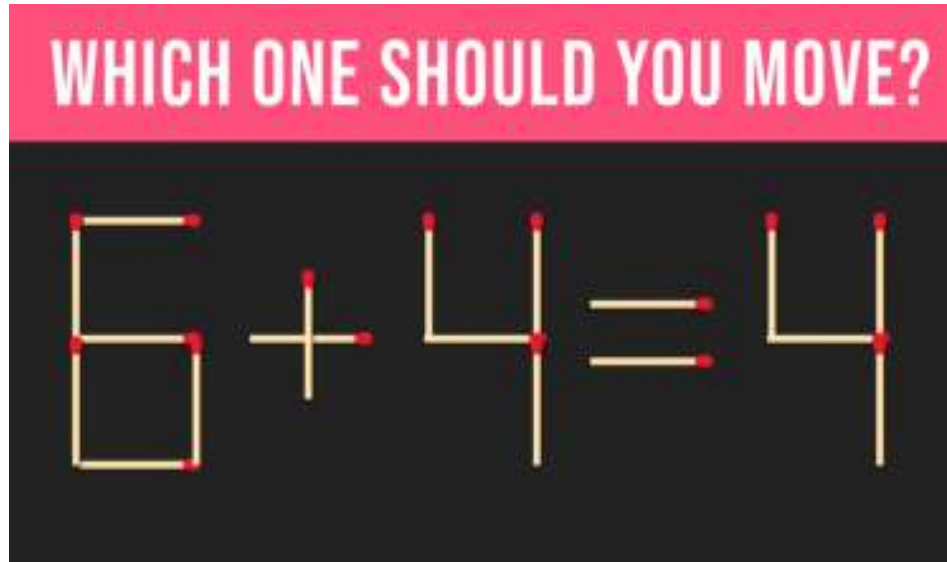*2) What is the value of the missing number "?" in the lunar diagram below?*

A)100   B)28   C)2

3) Make the Maths equation true by moving ONE AND ONLY ONE matchstick?

WHICH ONE SHOULD YOU MOVE?

6 + 4 = 4

4) If there are 20 people in a room and they shake every other person's hand once and only once, how many handshakes would take place?

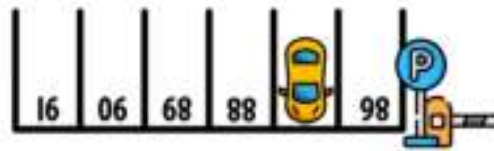There are 20 people in a room.

If they shake each other's hands once and only once, how many handshakes are there all together?

A)100   B) 190   C)20

5) In the diagram below, what is the number of the parking spot occupied by the car?

16 | 06 | 68 | 88 | | 98

What is the number of the parking spot occupied by the car in the diagram above?

   A)20   B) 90   C)97

6) To open this safe, you have to replace the question marks with the correct figures. You can find this figure by determining the pattern behind the numbers shown.

?72737
?75767

SAFE A08

   A) 1,4   B) 4,3   C) 8,8

7)Which number is missing on the bottom credit card?

BrainSnack BANK

EXPIRES END 08/2029 X

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EXPIRES END 08/2029 X

2346921843b?

   A)8   B)7   C)9

Scientist study the world as it is,

Engineers create the world that never has been.

- *Theodore Van Karmant*

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