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Faculty of Engineering

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Section:____L____ Group:____06____

PROJECT REPORT ON

WATER LEVEL INDICATOR WITH ALARM

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Assessment Materials and Marks Allocation:

COs	Assessment Materials	POIs	Marks
CO2	Course Project Report (*Analyze a combinational/sequential logic circuit through appropriate survey of research literature to provide valid conclusion acknowledging the limitations.*)	**P.d.2.C4**	**20**

COs	Excellent to Proficient [18-20]	Good [15-17]	Acceptable [10-14]	Unacceptable [1-9]	No Response [0]	Secured Marks
CO2 P.d.2.C4	The outcome of the project demonstrates a course project using logic ICs, transistors, switches, display devices, etc. that can solve a complex engineering problem in the electrical and electronic engineering discipline through appropriate research.	The outcome of the project somewhat demonstrates a course project using logic ICs, transistors, switches, display devices, etc., and also somewhat solves a complex engineering problem in the electrical and electronic engineering discipline through some research.	The outcome of the project demonstrates a course project using logic ICs, transistors, switches, display devices, etc. but cannot solve a complex engineering problem properly in the electrical and electronic engineering discipline through appropriate research.	The outcome of the project does not demonstrate a course project using logic ICs, transistors, switches, display devices, etc. also could not solve a complex engineering problem in the electrical and electronic engineering discipline through appropriate research.	No Response at all	
Comments					**Total Marks (20)**	

WATER LEVEL INDICATOR WITH ALARM

Abstract-The drinking water crisis in Asia is reaching alarming proportions. It might very soon attain the nature of global crisis. Hence, it is of utmost importance to preserve water for human beings. In many houses there is unnecessary wastage of water due to overflow in overhead tanks. Automatic Water Level Indicator and Controller can provide a solution to this problem. The operation of water level controller works upon the fact that water conducts electricity due to the presence of minerals within it. So, water can be used to open or close a circuit. As the water level rises or falls, different circuits in the controller send different signals. These signals are used to switch ON or switch OFF the motor pump as per our requirements. The "Water Level Indicator with Alarm Project" is an innovative electronic system designed to monitor and alert users about the water level in a tank or reservoir. This project aims to provide a cost-effective and user-friendly solution to address water level management in various applications, such as domestic water tanks, industrial storage tanks, and agricultural reservoirs.

The total amount of water available on Earth has been estimated at 1.4 billion cubic kilometers, enough to cover the planet with a layer of about 3 km. About 95% of the Earth's water is in the oceans, which is unfit for human consumption. About 4% is locked in the polar ice caps, and the rest 1% constitutes all fresh water found in rivers, streams and lakes which is suitable for our consumption. A study estimated that a person in India consumes on an average of 140 liters per day. This consumption would rise by 40% by the year 2025. This signifies the need to preserve our freshwater resources.

Keywords: Indicator, Alarm System, Monitoring Technology, Sustainability, Low-Cost

I.INTRODUCTION

A water level indicator with an alarm project is a practical and cost-effective solution for monitoring and maintaining water levels in various applications. It ensures the efficient use of water resources, prevents damage, and provides peace of mind by alerting users to potential issues in a timely manner. The core components of this system include water level sensors, basic logic gates (And /Or/Not), and an alarm mechanism. The water level sensors are strategically placed inside the tank at different height levels, and they generate signals based on the water's height. These signals are processed by the basic logic gates, which are programmed to interpret the data and trigger the alarm when the water level reaches predefined thresholds. Consequently, automatic control involves designing a control system to function with minimal or no human interference. The idea can be implicitly used to ascertain and control the level of water in overhead tanks and prevent wastage. In this Arduino based automatic water level indicator and controller project, the water level is being measured by using ultrasonic sensors.

II.OBJECTIVE

The primary objective of this project is to design and implement a water level indicator using logic gates. Specific objectives include:

1. To learn the working of a water indicator.

2. Measure the water level when the circuits indicate when the tank is half and full.

III. Literature Review

[1] In this paper we can use old concepts with adaptive technology. They have used a water level sensor which works on the principle of electrical conducting property of water. LEDs are used to indicate water level and Relay is used for monitoring of motor.

[2] This paper is used to make the automatic water level monitoring. The main aim of this project is to sense the level of the water in bucket and the tap turns on and off according to the condition and display it on the screen.

[3] This project checks the water level and uses a pump to switch off the water supply as and when required. It mainly focuses on minimizing the manpower and reducing time wastage.

[4] This paper deals with the same concept of checking the water level. The motor turns ON or OFF depending on the amount in the tank.

[5] This paper has an implemented Automatic water level control system consisting of Arduino to automate the process of water pumping in a

3. To learn how to build simple circuits.

4. To check the level of water in the tank. Depending on the water level, the motor switches ON when the water level goes below a predetermined level or the motor switches OFF when the tank is full.

tank and has the ability to detect the level of water in a tank and switches ON or OFF the pump accordingly and displays the status on the LCD screen. The system also monitors the level of water in the sump tank (source tank). If the level inside the sump tank is low, the pump will not be switched ON and this protects the motor from dry running. A beep sound is generated when the level in the sump tank is low or if there is any fault with the sensors.

[6] This paper deals with the process of development of a system for automation of fossil fuel pump for filling a container. Basically, the author is working on a petrol level indicator which has an automated audio alert system. With the help of magnetic sensors, the author has come up with a unique application. Water level controllers are not appropriate in this project due to the direct contact of liquid with the electrodes. The concept is very similar to water level indicator project but defined in different fashion.

IV. Methodology and Modeling

Introduction- A water level indicator may be defined as a system by which we can get information about water within the reservoir. Water level indicator systems are quite useful to reduce the wastage of water from any reservoir, while filling such reservoir. The wires with colors Green are adjusted to check the Level

respectively. In this project we have designed a sensor to measure water up to four levels. Four segments of insulated conducting wires are used and the naked ends within water are related to carbon rods. The length of the wire segments is adjusted according to the water levels within the reservoir.

Equipment's-

Input Voltage: 12-volt power supply is required.

Breadboard: A breadboard is required to build the circuit.

LED: A Green LED is required.

Buzzer: Any 6 V buzzer will work

Capacitor: 1 microfarad capacitor is required.

Resistor: A resistor is a passive two-terminal electrical component that produces electrical resistance as a circuit element.
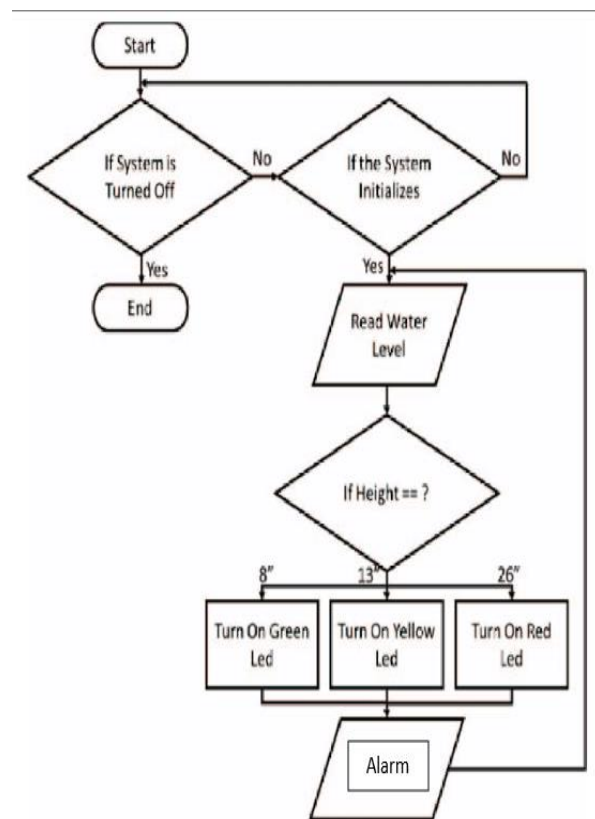
555Timer: The **555 timer IC** is an integrated circuit (chip) used in a variety of timers, delay, pulse generation, and oscillator applications.

Connecting Wires: In any electronic circuitry wires are the conductive connections between the elements in contact. Theoretically, they have zero resistance and provide perfect connections. On the breadboard, they look like nice colored jumper wires.
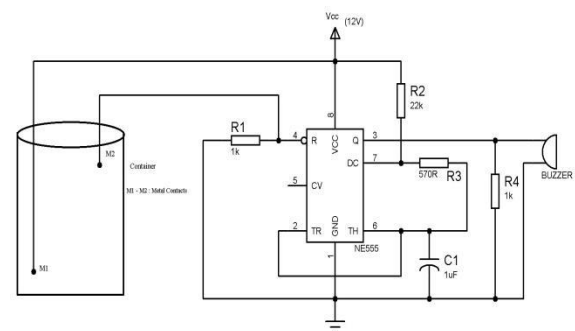
Flow Chart- A Data Flow Diagram (DFD) is a graphical representation of the "flow" of data through an information system. DFD can also be used for the visualization of data processing. Automatic water level indicator i.e. one at the higher level of the tank and the other at the lower level of the tank.

Working Principle-This circuit consists of 2 sensing metal probes which are dipped in water to sense the level of water. Probe M1 relates to pin 7, which should be at the bottom most part of the water tank, also it acts as a reference level. The probes M2maximum level respectively. To detect the water level, we are going to attach two wires in the tank at a height where the user wants the water level to be maintained. The other end of one wire is connected to VCC and the other end of the other wire is connected to pin 4 of the IC 555 timer. If the water level reaches the desired level, it will shorten both the wires. Current flows from VCC to pin 4, which resets the flip flop and triggers the buzzer.

Circuit diagram-

Test/Experimental Setup- The setup procedure for the water level indicator involves connecting the various components on bread board through wire. First the M1 metal probe connects with IC pin 7 with 22k resistor which is discharge pin. Pin 7 is shorted with threshold pin with 570-ohm resistor and also pin 2 which is trigger pin is connected with pin6. Metal probe M2 is connected with reset pin which is 4 no pin when the water touch the M2 pin 4 will reset the flipflop. the resistor R1 is connected with pin4, and ground also use a capacitor connecting to threshold pin and ground. PIN 3 is output pin and

to run the IC we need biasing voltage which is 12 v and pin 8 is for VCC and pin 1 is for ground. To acknowledge the water level is filled here used a buzzer which is connected between Pin 3 and ground and use a resistor of 1k ohm parallel with the buzzer.

Result and Discussion- This experiment indicates the water level by blinking the Led. When the water level is low the buzzer or alarm will not make a sound. After getting fill up blink the Green led, and the alarm makes sound.

The proposed mechanism of water control reduces the water wastage, ensures efficient use of available water resources and generates more precise and accurate results. There is no requirement of human laborer for monitoring the level, just one operator is sufficient for opening and closing the gate according to sensor output. Due to the number of sensors being more we can open or close the gate whenever necessary knowing the accurate level of water. Also, operation execution time is less. Because of its cost efficiency this system can be installed in various rural areas where water problems are on the rise.

V. Application

- Automatic Water level Controller can be used in Hotels, Factories, Homes Apartments, Commercial Complexes, Drainage, etc.
- It can be used to predict floods.
- Liquid level indicator in the huge containers in the companies.
- Low costs.
- Low power consumer.
- Fuel level indicator in vehicles.

Future scope- The basics need of human beings is water and it is one of the most important necessary for all living beings. But unfortunately, a huge amount of water is being wasted by uncontrolled use and due to our negligence. Some other automated water level monitoring systems are also offered so far but most of the methods have some shortness in practice. We tried to overcome these problems and implemented an efficient automated water level. monitoring and controlling system. Main intension of this research work is to establish a flexible, economical and easy configurable system which can solve water losing problems. In the near future as home automation web-based water level monitoring and controlling system can be designed, through which the system can be controlled from any place via internet through mobile phone. This could have a substantial benefit from this research work for efficient management of water.

VI. Cost Analysis

No.	Equipment name	Quantity	Price (BDT)
1.	Breadboard	1	150
2.	3.7V battery	3	315
3.	Battery Holder	1	50
4.	Resistor (1k, 220K, 570 ohm)	15	22.5
5.	Jumper Cable	10	30
6.	Buzzer	1	50
7.	Capacitor	2	14
8.	Led	4	8
9.	555 Timer	4	140
10.	Miscellaneous	-	100

Total cost -879.5 BDT

VII. Limitations

Limited Range: Most water level indicators are designed for specific depth ranges, and they may not work effectively if the water level exceeds this range. You may need different indicators for different water level ranges.

Accuracy: The accuracy of water level indicators can vary, and they may not provide precise measurements, especially in turbulent or fast-flowing water.

Maintenance: Water level indicators can require regular maintenance to ensure their accuracy and reliability. This includes cleaning, calibrating, and checking for damage, which can be time-consuming and costly.

Environmental Factors: Environmental factors such as temperature, humidity, and water quality can affect the performance of water level indicators. Extreme conditions can lead to sensor malfunctions or inaccuracies.

Sensor Interference: Other electronic devices and sources of electromagnetic interference in the vicinity can interfere with the signals sent by the water level indicator, leading to inaccurate readings.

VII. Conclusion

This paper was intended to design a simple and low-cost water level indicator. This is not only for water tank but also used for oil level and chemical lab. To design this system, we used transistor as a platform and local materials for low cost. We tried to design a system in such a way that its components will be able to prevent the wastage of water. The whole system operates automatically. So, it does not need any expert person to operate it. It was not so expensive. This design has much more scope for future research and development. Though it is a project, we hope some modification in this project will lead to a reasonable diversity of usage

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