Environment Monitoring System

Problem Statement :-

Assume you are an embedded engineer tasked with designing a smart environmental monitoring system. To ensure the project is well organized and all components are accounted for, prepare a table listing the components, their functions, estimated costs, and the microcontroller (MCU) to be used.

Proposed Solution:-

Designing a smart environmental monitoring system involves various components, each serving a specific function to ensure the system works effectively. Here's a table summarizing the essential components, their functions, estimated costs, and the choice of microcontroller (MCU):

Component	Function	Estimated Cost (per unit in Rs.)	Description
Microcontroller (MCU) **ESP32**	Central processing unit for data acquisition, processing, and communication	**10$ - 15$**	**ESP32** is a series of low-cost, low-power system on a chip microcontroller with integrated Wi-Fiand dual-mode Bluetooth
Temperature Sensor **DS18B20**	Measures temperature	**2$ - 5$**	DS18B20 is a **1-wire programmable Temperature sensor** from maxim integrated. It is widely used to measure temperature in hard environments like in chemical solutions, mines or soil etc.
Humidity Sensor **SHT31**	Measures humidity	**3$ - 5$**	The SHT31-D sensor has an excellent **±2% relative humidity** and ±0.3°C accuracy for most uses.
Light Sensor **BH1750**	Measures light levels	**$2 - $10**	The BH1750 is a **16-bit ambient light sensor** that can measure a minimum of 1 lux and a maximum of 65535 lux.

Air Quality Sensor **MQ-135**	Measures air quality (e.g., CO2, particulate matter)	**$10 - $50**	An **MQ135 air quality sensor** is one type of MQ gas sensor used to detect, measure, and monitor a wide range of gases present in air
Power Supply **12V PSU**	Provides power to the system		It converts the current from AC (alternating current) to DC (direct current), which is what the computer requires. It also regulates the voltage to an adequate amount, which allows the computer to run smoothly without overheating.
LED Indicators	Provides visual feedback (status, errors)	**$0.10 - $1**	compact illumination utilized for observing the operational or positional condition of circuits and electrical apparatus.
Button/Switch	Allows user interaction	**$0.50 - $2**	Used to complete the circuit
Real-Time Clock **(RTC)**	Keeps track of time for timestamping data	**$2 - $5**	It measures the passage of time.
Cable/Connectors	Connects different components	**$1 - $5**	an electrical **cable** is an assembly consisting of one or more conductor with their own insulations
LCD Display	Displays the information	3$ - 5$	Used to display gathered information.

Notes:

Costs: The costs are approximate and can vary based on suppliers and quantities purchased. Bulk purchasing or sourcing from specific suppliers might reduce the overall cost.

Optional Components: Some components like the display or advanced power supplies may not be necessary depending on the specific requirements of the monitoring system.