EXPERIMENT NO.:

➢ **Title:**
IoT based Web Controlled Home Automation using NodeMCU ESP 8266.

➢ **Objectives:**
1. To know about ESP 8266 MCU Board and its features.
2. To know Configuring account on Blynk Server.

➢ **Outcomes:**
1. Students will learn to interface various sensors with ESP 8266 Board.
2. Students will learn to interface various actuators with ESP 8266 Board.
3. Students will learn to program ESP 8266 Board.
4. Students will learn to create link using Blynk Server and Control board using Mobile phone.

➢ **Hardware Requirement :**
9v adaptor, USB cable, NodeMCU ESP 8266 Board, Breadboard. Mobile phone with Blynk app, Wifi Router.

➢ **Software Requirement :**
Arduino Ide 1.8.8, Windos XP OS.

**Theory:**

**Blynk:**
Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet.

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. It's really simple to set everything up and you'll start tinkering in less than 5 mins. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice. Whether your Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and ready for the Internet Of Your Things.

**How does it work?**
There are three major components in the platform:

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**Blynk App** - allows you to create amazing interfaces for your projects using various widgets we provide.

**Blynk Server** - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It’s open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.

**Blynk Libraries** - for all the popular hardware platforms - enable communication with the server and process all the incoming and outgoing commands.

**Its features:**
* Supports majority of development boards like Arduino, RPI, esp8266
* Easy to use
* Awesome widgets like LCD, push buttons, labelled value, graphs
* Not restricted to local Wifi network
* Direct pin manipulation with no code writing
* Easy to integrate and add new functionality using virtual pins

**Step 3: Materials Required**
Now that we have some insights about the hardware and the app, we require the following components
1. **Node MCU Esp8266 12E** development board
2. Smart Phone with Blynk App installed
Setting Up Blynk With Arduino IDE

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This blynk app has set of library files which have to be included in the Arduino IDE environment before the project is executed

1. Follow the link to install libraries
   http://www.blynk.cc/getting-started/

2. Once the Zip file is downloaded, extract it and individually copy all the folder to your libraries folder of your arduino

3. Once done just open Arduino IDE and go to Sketch-> Include libraries and you would see blynk in the menu

4. If you see that then libraries have been included successfully

*Now it is time to include the board configuration in the Arduino IDE
What is board configuration?

Lets start. In the Arduino IDE go to File->Preferences
Now Copy the below link and paste it in the Additional Boards Manager Url text box
http://arduino.esp8266.com/stable/package_esp8266core...
Restart the Arduino IDE after that.
Now after restarting the Arduino IDE, go to Tools->Boards and select Node MCU board, mine was version 0.9

Setting Up Blynk
1. First install the Blynk app from google play store and then sign in
2. After that Press on click on New Project and you will get a screen (Refer Screen shots)
   *Enter the name of your project, I have given it as led
   *Then Select the Board as ESP8266
   and then you will see below the authentication token no. If you want it in your email you
   can send it through email also
   *And then Finally click on to the create button
3. Now you will get your dashboard screen. Just click on the the top most button "+" on
   the right corner to add widgets to your project.
4. In this project we add a simple button and then configure its settings as Digital GP13
   pin.(Refer Screen Shots)
5. Its your choice you can either have the button set as push type or as a switch
6. Then label the Button as ON and OFF in the settings
Note that since Blynk is free only to an extend, you have to choose your widgets wisely

1. After uploading the code
2. Open the Blynk app in the Phone
3. Let it connect to the internet
4. Then you would see your dashboard with a button
5. Press Play button on the top most right corner of the app
6. Press the Button and you would see the LED Turn ON!!!:

Conclusion:

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Questions:

1. Explain Concept of Data Analytics in brief
2. Enlist Challenges faced by Industry related IoT applications.