

Name:- Nikhil Kumar
Branch:- CSE
Course Title :- IoT
Course Code :- CST401

Rollno:- 1806055

Program code:- VH-PS

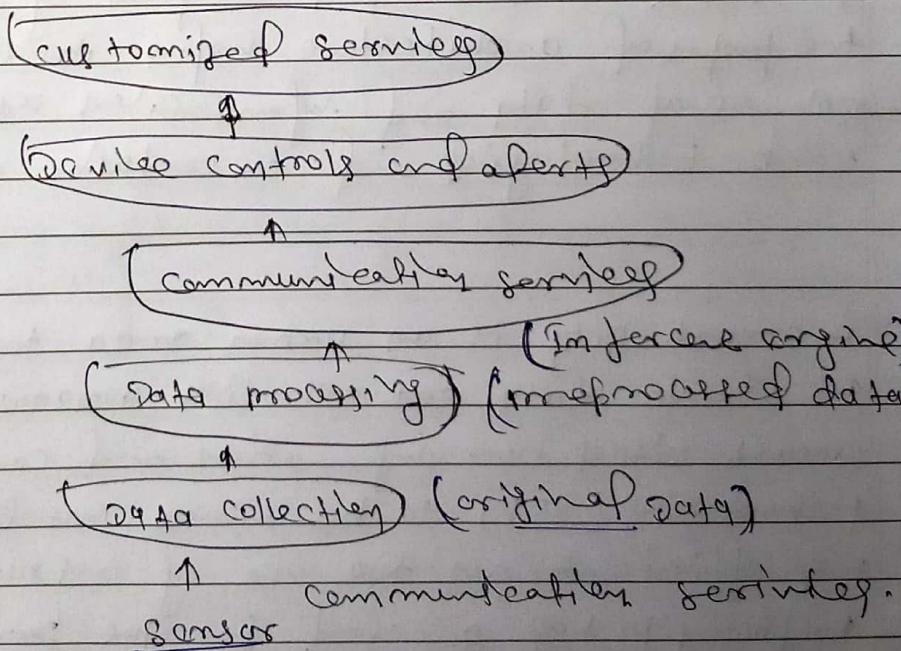
CLASSMATE

Date :

Page :

(Q1.9)

Ans:- The main elements of smart city or IoT architecture are smart health, smart environment, smart energy, smart security, smart office and residential buildings, smart administration, smart nodes deployed in all smart city domains provide the primary data source for heterogeneous information generation. Information generated through the sensor nodes are collected using the existing communication sources. The collected data are then processed and analyzed using ~~the~~ semantic web technologies. The focus is on deploying the architecture on a cloud platform for use as a software-as-a-service (SaaS).



The system will be also serve of an intelligent platform for people living in a smart society. by combining data from different smart domains this architecture will help in assisting people in an effective way.

Name:- Nikhil Kumar
Course Title :- IOT
Course code :- CS 7401
Exam date :- 20/12/21

Roll no :- 1806055
Program code :- UN-ES

CLASSMATE	
Date :	
Page :	

intelligent manners.

The implementability of the architecture will follow these steps. Firstly the raw data are collected and processed to make them web consumable. All the data are converted into a common format. They are then semantically enriched of with owl concepts based on knowledge of domain experts. The idea is to recognize actively and learn new rules to deal with activity and uncertainly. Uncertainty affects of semantic model. The new rules learned at this level will be used in defining knowledge of semantic model. The same approach will be used in defining custom samples that will provide feedback to end user in form of alert and manage the proposed architecture before in explainability using large volumes of data and information using semantic web technologies and uncertainty regarding rule.

1.(b)

Ans:- A smart city is an urban area where different types of electronic data are collected by sensors to supply information. Smart cities use information and communication technologies (ICT) to be more intelligent and efficient in the use of resources.

Raspberry pi has selected for the processing unit of system because of user friendly feature and economical benefit. It

Name :- Nikhil Kumar

Roll no :- 1806058 (CSE 1)

Course code :-

Course title :-

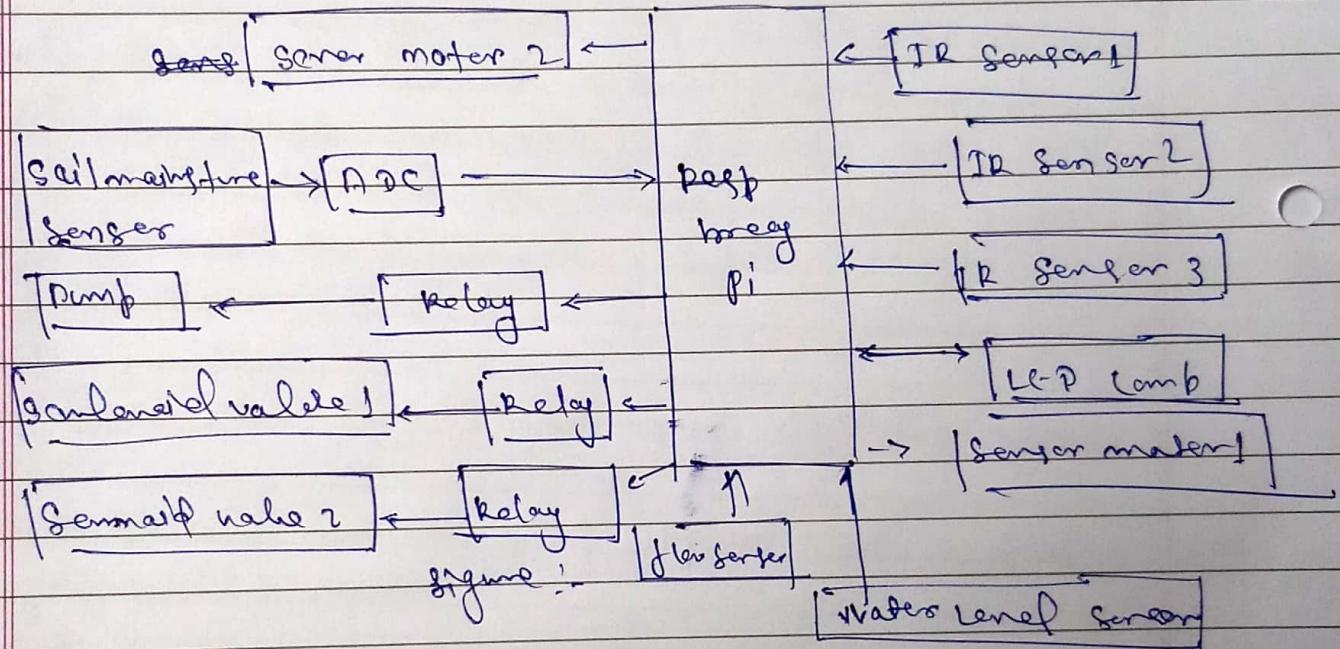
Examination :-

CLASSMATE

Date :

Page :

following system is designed to control Smart parking system, smart water management and smart public garden using raspberry pi.



Smart parking system:- In this first diagram shows if check availability of parking spot, from web VT.

Name:- Nikhil Kumar
Course Title:- IOT
Course code:- CS7401

Roll no:- 1806055
Program:- VHLS
Exam Date:- 20/12/21

CLASSMATE
Date :
Page :

Q 2 (a)

Ans:- The Arduino UNO is a standard board of Arduino here UNO means one in Italian. It was named as uno to label the first release of Arduino software. Arduino UNO is based on an ATmega 328P microcontroller. Arduino UNO includes 6 analog pins inbuilt, 14 digital pins, a USB connection, a power jack and an ICSP In-circuit-serial programming header. It is programmed based on IDE, which stands for Integrated and offline.

Technical specifications of Arduino UNO:

- 20 I/O pins consisting of 6 PWM pins, 6 analog pins, digital I/O pins.
- PWM pins are pins with modulation capability pins.
- crystal oscillator present in it comes with a frequency of 16MHz
- Input voltage of the UNO from 7V to 20V.
- Arduino UNO automatically draws power from power from the USB.

Q 2 (b)

wireless temperature monitoring system using Arduino UNO.

Temperature monitoring using Bluetooth module arduino uno and android cell phone application the temp value request can be sent to the arduino at any time just in a system table has a feedback system. the command is sent wireless to the arduino uno. the

Name:- Nikhil Kumar
course Title :- IOT
course code :- CS7401

Roll no:- 1806055

Program code: v6.cs

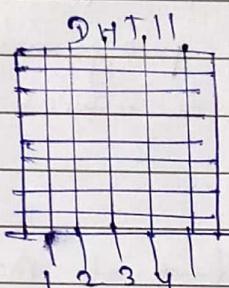
Exam Date :- 20/12/21

CLASSMATE	
Date :	
Page:	

Arduino once receive the command then reply back with the temperature and humidity value. The famous DHT11 temperature and humidity module are used for monitoring the temperature and humidity.

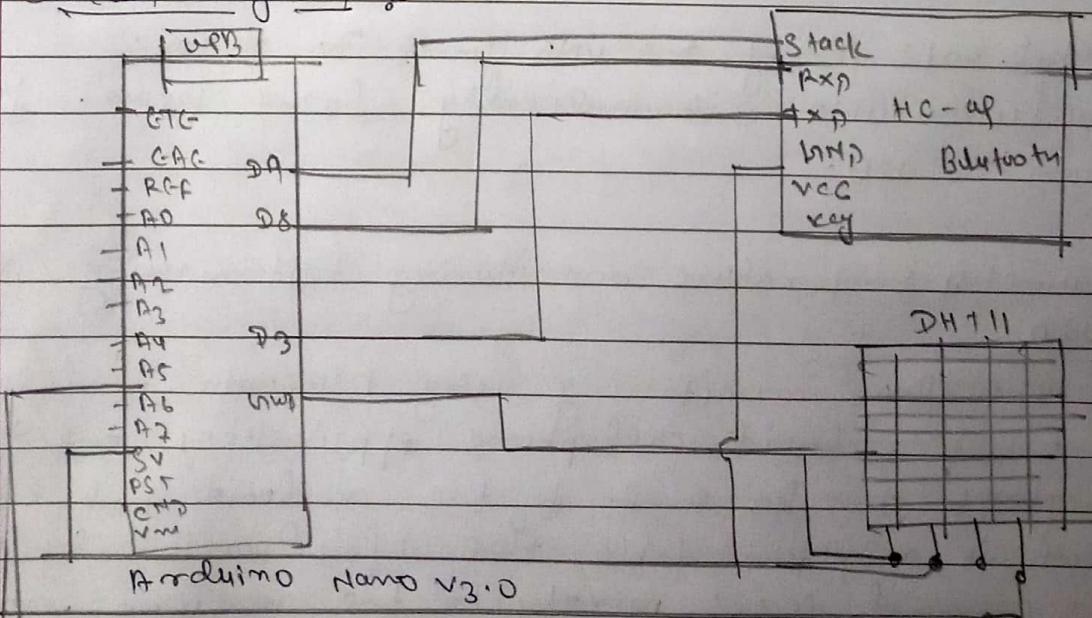
DHT11 temperature and Humidity sensor

- Pin
1 - VCC
2 - Data
3 - NC
4 - GND



The DHT11 temperature and Humidity module is one of the most commonly used sensor. The DHT11 temperature and humidity sensor has a total of 6 pins. Out of these 6 pins we will use only those pins from no 3 will not be used.

Circuit Diagram :



Name:- Nikhil Kumar
Course Title:- IoT
Course code:- CS7401
Exam date:- 20/12/21

Roll no:- 1806058

Branch:- CSE

Programme code:- MCA

CLASSTIME
Date:
Page:

3 a. Ans. Application protocols for IoT:-

One of the major aspect of the IoT is the data exchange between sensors, servers, databases, business engines and content consumers. While there are many protocols available to enable communication between different type of endpoints, there are some protocols which are designed keeping IoT specific requirements in mind. Let's explore some of such protocols which are becoming more and more popular in IoT application.

3.b

Ans:- At every layer of transportation, IoT provides improved communication, control and data distribution. These applications include personal vehicles, commercial vehicles, drones, UAVs and other equipment.

It extends throughout the entire system of all transportation elements such as traffic control, parking, fuel consumption, and more.

→ Commercial Transportation:-

Transportation benefit extend to business and manufacturing by optimizing the transport arm of organization.

Name:- Nikhil Kumar
course code:- 10T
Course Title:- CS7401

Roll no:- 1806055 (CS-1)
Program code:- UNES
CLASSMATE
Date:- 20/12/21
Page:

Q4. a) Ans:- IEEE 802.15.4 is low-cost, low-data-rate wireless access technology for devices that are operated or work on batteries. This describable has low-rate wireless personal area networks (WPANs) function.

Physical Layer:-

This standard enables a wide range of PHY options in ISM bands, ranging from 2.4 GHz to 866-915 GHz frequencies. IEEE 802.15.4 enables data transmission speeds of 20 kilobits per second, 40 kilobits per second, 100 kilobits per second and 250 kilobits per second. The fundamental structure assumes a 10-meter range and a data rate of 250 kilobits per second. To further reduce power usage, even lower data rates are possible. IEEE 802.15.4 regulates the RF transceiver and channel selection, and even some energy and single management features at the physical layer. Based on the frequency ranges and data performance needed, there are now six PHYs specified. Four of them employ frequency hopping techniques known as direct sequence spread spectrum (DSSS).

MAC layers:-

The MAC layer provides links to the PHY channel by determining that devices in the same region will share assigned frequencies. The scheduling and routing of data packets are also managed at this layer. The 802.15.4 MAC layer is responsible for a number functions like:

Name:- Nikhil Kumar
course Title :- IoT
course code :- CS7401

Roll no :- 1806055
Program :- VH-ES
Date :- 20/12/21

CLASSMATE
Date :
Page :

- Beaming for devices that operate as controllers in a network.
- used to associate and disassociate BSS with the help of devices.
- the safety of the devices.
- consistent communication between two MAC devices that are in a peer-to-peer relationship.

Several established frame types are used by the MAC layer to accomplish these functions. In 802.15.4, there are four different types of MAC frames.

- frame of data.
- frame of acknowledgement
- frame for a beacon
- frame for MAC commands.

Security :-

for data security, the IEEE 802.15.4 standard employs the advanced encryption standard and the advanced encryption standard (AES) with a 128-bit key length as the basic encryption technique. Activating such security measures for 802.15.4 is significant after the frame format and well after of the payload. the very first phase in activating AES encryption is to use the security enabled field in the frame control part of the 802.15.4 header. for safety, this field is a single bit which is assigned to 1 when this bit is set by 1's for certain types of frames its payload field a.

Name:- Nikhil Kumar
Course Title:- IoT
Course code:- CST401
Exam date:- 20/12/21

Roll no:- 1806055

Branch:- CSE

Programme:- B.Tech

CLASSMATE
Date:
Page:

field known as the auxiliary security header is formed following the source address field.

Zigbee:-

Zigbee is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power wireless IoT networks. The Zigbee standard operates on the IEEE 802.15.4 physical radio specification and operates in unlicensed bands including 2.4 GHz, 900 MHz and 868 MHz.

- It requires so little power that devices can last up to seven years on one set of batteries.
- It is ideal for technology experts upto venturing them to customize with their preferences and interests.
- Zigbee Alliance consists of nearly 400 member organizations that used, develop & improve Zigbee open-standard wireless connectivity.

4.(b) bLoWPAN :- bLoWPAN :-

- Ans :- bLoWPAN stands for IP-based low power personal Area Network.
- It is formulated by devices that are compatible with IEEE 802.15.4.
 - To moderate the effects of network mobility the IP devices calculate routes and it is left to a routing protocol which maintains routing table. bLoWPAN uses an adaptability layer (IEEE 802.15.4 MAC) to frequent and resemble IPv6 packets.
 - The routing in bLoWPAN is primarily divided in two types of routing decisions taken at adaptability layer or network layer.
 - The routing in bLoWPAN is primarily divided in two layers or network layers.
 - 3 main header in bLoWPAN :-
 - mesh addressing :- intermediate address
 - destination processing :- fragmentation,
 - It has 128-bit address formed by prefixing IEEE 802.15.4 MAC address.

RPL Routing :-

- RPL (Routing protocol for low power and lossy networks) is a routing protocol for wireless networks, with low power consumption and generally has shorter to packet loss.
- It is proactive protocol based on distance vector and

Name:- Nikhil Jeymarc
course title:- IoT
course code :- CS7401
Exam date :- 20/12/21

Roll no:- 1806055

program code!, vhes CLASSMATE

Date :

Page :

and operated on IEEE 802.15.4 optimized for multi-hop many-to-one communication but also supports one-to-one messages.

- this protocol is specified in RFC 6580 with special application in various other RFCs.
- RPL can support a wide variety of link layer including those with link layers with potential losses or that are used in devices with limited resources.
- this protocol can quickly create network routes spare routing knowledge & adapt the topology in an effective way.
- RPL Headers:-
 - IPv6 Hop-by-Hop header.
 - the purpose of this header is to bury "data plane protocol" layer details in a RPL message.