Printed page: 3 **Subject Code: ACSIOT0303**

Roll No: | | | | | | | | | | | | | |

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

(SEM: 3rd THEORY EXAMINATION (2021-2022)

Subject Name: Introduction to IoT

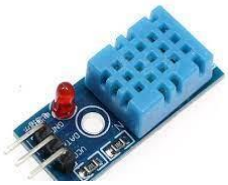
Time: 3 Hours **Max. Marks:100**

General Instructions:

- All questions are compulsory. It comprises of three Sections, A, B, and C.
- Section A -Question No- 1 is objective type questions carrying 1 mark each, Question No- 2 is very short answer type carrying 2 mark each.
- Section B - Question No-3 is Long answer type -I question with external choice carrying 6 marks each.
- Section C -Question No. 4-8 are Long answer type –II (within unit choice) questions carrying 10marks **each**.
- No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

		SECTION – A		
1.	**Answer all the parts-**		**[10×1=10]**	**CO**
	a.	The main function of IOT gateway can be summarized as _____.	**(1)**	**CO1**
	b.	The term M2M was introduced by _____.	**(1)**	**CO1**
	c.	Name the device which converts energy of one kind to another?	**(1)**	**CO2**
	d.	The _____ of a sensor is the smallest change it can detect in the quantity that it measures.	**(1)**	**CO2**
	e.	Which sensor is appropriate for detection of LPG/BUTANE gas.	**(1)**	**CO3**
	f.	How many GPIO Pins are available in NODEMCU?	**(1)**	**CO3**
	g.	Which standard is known as low data-rate WPAN?	**(1)**	**CO4**
	h.	What is the number of possible addresses that can be achieved with IPv6 addressing?	**(1)**	**CO4**
	i.	Is it true to say that network size is not a constraint in Human-centric sensing?	**(1)**	**CO5**
	j.	Which sensor can be used to measure the chemicals in soil?	**(1)**	**CO5**
2.	**Answer all the parts-**		**[5×2=10]**	**CO**
	a.	Why is an IDE required for developing a device platform for an IoT application?	**(2)**	**CO1**
	b.	Compare the sensors based on data types.	**(2)**	**CO2**

	c.	What is the output of code given below? Assume there is no syntax error in code.
		#include<servo.h>
		Servo myservo;
		int potpin=0; //potentiometer value initialization
		int val;
		void setup()
		{ myservo.attach(9);}
		void loop(){
		val=analogRead(potpin);
		myservo.write(val);
		delay(15);
		}
			(2)	**CO3**

	d.	In what kind of applications BLE is more suitable than classic Bluetooth technology?	**(2)**	**CO4**
	e.	What is Smart city? Name three use cases of smart cities?	**(2)**	**CO5**
		SECTION – B		
3.	**Answer any five of the following-**		**[5×6=30]**	**CO**
	a.	Compare and contrast M2M and IOT.	**(6)**	**CO1**
	b.	Identify the type of sensor given below and mention its components and characteristics. 	**(6)**	**CO2**
	c.	Being an expert, you are assigned the task to explain the steps to execute a program or script automatically as your Raspberry Pi boots.	**(6)**	**CO3**
	d.	Compare various low range protocols on the basis of their range of communication, IP header, applications, advantages and disadvantages.	**(6)**	**CO4**
	e.	At which layer Ipv6 protocol is used in layered architecture of IoT? Explain IPv6 header. Why IPv6 protocol is used in IoT?	**(1+3+2)**	**CO5**
	f.	Explain the connection diagram/architecture of smart street light. Suggest an improvement to the existing architecture considering the problems you face in your neighbourhood.	**(4+2)**	**CO5**
	g.	Why every hardware programming starts with LED blinking program? Compare and contrast various computational platforms- Arduino, NetArduino, Raspberry pi, Node MCU and ARM cortex	**(2+4)**	**CO3**
		SECTION – C		
4	**Answer any one of the following-**		**[5×10=50]**	**CO**
	a.	Describe IETF proposed six-layer model for IoT. How does the IoT model relate to the OSI seven-layer model for computer network? Discuss in detail.	**(5+5)**	**CO1**
	b.	Draw ETSI M2M domains and high level architecture. Discuss the capabilities and functions of each domain in detail. What domains and service capabilities are there in Internet of ATM machines?	**(3+4+3)**	**CO1**
5.	**Answer any one of the following-**			
	a.	What is a device? Discuss the various types of Sensors, Transducer and Actuators with their functions and applications.	**(2+8)**	**CO2**
	b.	With the help of a diagram, discuss the components needed in a system for RFID IoT applications and services? What are the issues associated it?	**(7+3)**	**CO2**

6.	**Answer any one of the following-**			
	a.	Small kids have a tendency to run towards the open doors, which is very unsafe. Design and develop an IoT device using Raspberry pi to alert the parents for kid's safety. The device works in such a way that whenever an obstacle is in front of it, the LED will glow or buzzer will start ringing. Precisely mention the components, circuit design and Arduino uno for the given requirement.	**(2+3+5)**	**CO3**
	b.	Plants are our best friends. Due to busy schedules, taking care of plants is a challenge in metro cities. Design and develop an automatic watering system such that they can water the plants at the tap of a button provided in the app. At the same time with the help of soil moisture sensor the device should start pumping automatically, if they ever forget to water the plant by themselves. Precisely mention the components, circuit design and Arduino code for the given system.	**(2+3+5)**	**CO3**
7.	**Answer any one of the following-**			
	a.	Draw and explain the architectures for connecting WSN nodes. Discuss the characteristics, limitations and applications of each architecture.	**(5+5)**	**CO4**
	b.	What is LoRa? On which layer it works and why? How do ZigBee end point devices form WPAN of embedded sensors, actuators, appliances, controllers or medical data systems, and how do they connect to application layer services, business processes and services?	**(2+2+6)**	**CO4**
8.	**Answer any one of the following-**			
	a.	Draw the data-flow diagram and domain architecture reference model for home automaton lightening, appliances and intrusion monitoring services. Explain the functions and implementation challenges.	**(4+6)**	**CO5**
	b.	Energy management is a biggest challenge in our country during summer season. With the help of diagram discuss the Smart Metering enabled multi-utility value added services for energy management. Is Smart metering an application of IoT or M2M? Highlight the implementation challenges of smart metering systems.	**(6+2+2)**	**CO5**