

6. (a) Design an automatic lightning system with LDR, Light and Arduino. **10**
- (b) Why IDE is required for prototyping the embedded device platform ? List the required IDE features which help in selecting right embedded hardware and software. **5**
7. Write short notes on the following : **15**
- (i) Addressing modes of IoT-Controller
- (ii) Interfacing of Actuators with Arduino
- (iii) Challenges in IoT with Cloud.

May 2024

B.Tech. (EEIOT) (Sixth Semester)

Embedded IoT (EE-IOT-602)

Time : 3 Hours

[Maximum Marks : 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) What are the software components required for connecting sensors and actuators to the internet ? **1.5**
- (b) Explain, how can timer overflows used to trigger events or generate periodic signals in an embedded system. **1.5**
- (c) If the speed of I/O devices does not match the speed of the microprocessor, what type of data transfer techniques is used ? **1.5**

- (d) What are the steps or levels of abstraction involved in the embedded system design process ? 1.5
- (e) List out the various building blocks of the hardware of an embedded system. 1.5
- (f) What are merits in Arduino boards for the IoT, M2M and IIoT applications and services ? 1.5
- (g) What are the roles of major components of IoT devices ? 1.5
- (h) What are the features of mBed that distinguish it from Arduino ? 1.5
- (i) How is cloud used as a data base in IoT applications ? 1.5
- (j) List the merits of participatory sensing. 1.5

Part B

- 2. (a) How does the hardware architecture of an embedded system influence its classification ? Discuss the advantages and disadvantages of each architecture for different types of embedded systems. 10

- (b) What does platform and integration tool mean ? What are the features of ThingSpeak ? 5
- 3. (a) How does Arduino Ethernet shield connect to the internet ? List the header files required from Arduino Ethernet Library. 5
- (b) Write an Arduino program to read temperature and humidity data from a sensor and display it on the serial monitor or an LCD. 10
- 4. Explain the architecture deploying the edge and cloud computing for IoT application. Explain SaaS, IaaS and DaaS service models of clouds. 15
- 5. (a) Analyze the trade-offs between pipeline depth and performance in resource-constrained IoT controllers. 5
- (b) Design a circuit using an Arduino and a relay to control a household appliance that operates on AC mains power. How can you implement pulse-width modulation to control the power delivered to a device connected through a relay ? 10