(Time: 2½ Hours) [Total Marks: 75]

N.B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any Three* of the following: **15**

a. Discuss the various professional roles involved in developing an IoT system and explain how collaboration among them ensures an effective and user-friendly product.
b. Analyze the positive and negative impacts of IoT on modern technology and society.
c. What does it mean by 'Graceful Degradation' of applications/devices?
d. Compare and contrast static and dynamic IP address.
e. Write a short note on Internet protocol suit with its diagram
f. Describe technological changes observed in IPv6? Explain.

2. Attempt *any Three* of the following: **15**

a. Analyze how the choice of prototyping platform can influence the overall project cost and development effort.
b. Discuss open-source hardware and software. Why should one has to think about open source technology?
c. Compare Raspberry Pi and Arduino based on cost, power supply, and storage options
d. How to choose the right platform for an Internet of Things device?
e. Illustrate how sensors and actuators work together to make an IoT system interactive.
f. Identify the features and write about 'The Good Night Lamp' IOT device built with Arduino.

3. Attempt *any Three* of the following: **15**

a. Elaborate various non-digital methods of prototyping used in physical design?
b. Write a short note on Message Queuing Telemetry Transport Protocol.
c. What is POLLING? Explain in brief.
d. Define an API. Explain the concepts of API Mashing and Screen Scraping with suitable IoT-based examples.
e. Compare 3D Printing and CNC Milling as physical prototyping techniques. Mention their processes, applications, and advantages in IoT prototyping.
f. Describe the working principle, software requirements, and key factors to consider while choosing a laser cutter.

4. Attempt *any Three* of the following: **15**

a. Discuss the limitations of memory in embedded devices. How is it managed?
b. With the help of example, compare stack and heap.

c. Write a short note on Libraries for embedded systems
d. Describe how *Key Activities* and *Key Resources* work together to support the *Value Proposition* in the Business Model Canvas.
e. How Venture Capital plays role in funding IOT projects?
f. Why are lean startups a good idea for an IoT startup?

5. Attempt *any Three* of the following: **15**

a. Illustrate the steps for manufacturing PCBs.
b. Explain the need of certification in IoT devices
c. Why is privacy important for Internet of Things?
d. What is 'sensor commons' project? What are the critical requirements for a sensor commons project.
e. Write short note on cautious optimism as solution for IoT.
f. How can IoT be a part of the Solution to reduce environmental waste?
