

(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. List and explain the roles of people making IoT.
 - b. Explain calm and ambient technology using example of Live wire.
 - c. What is manufactured normalcy field? Explain.
 - d. Explain the following concepts with respect to IoT:
 - i. Affordances
 - ii. Graceful degradation
 - e. "Data available through IOT device belongs to public or company which implements the IOT device". Discuss.
 - f. Differentiate between static IP address and Dynamic IP address.
2. **Attempt any three of the following:** 15
 - a. What factors should be considered when deciding between the cost and ease of prototyping?
 - b. Describe the difficulties encountered during the transition from a prototype to mass production?
 - c. "Open source has a competitive advantage". Discuss.
 - d. Describe Arduino with a focus on the following aspects: Integrated Development Environment (IDE), Pushing Code, Operating System, Programming Language and Openness.
 - e. Compare Raspberry pi and Beagle bone black.
 - f. Explain the following IOT devices built with Arduino.
 - (i) The Good Night Lamp
 - (ii) Botanicals
 - (iii) Baker Treat
3. **Attempt any three of the following:** 15
 - a. What are non-digital methods and materials commonly used in prototyping?
 - b. Explain the different methods used for 3D printing.
 - c. Explain the use of repurposing /recycling in prototyping IoT devices.
 - d. What is mashing up APIs? Also explain the term scraping.
 - e. What is comet? Explain.
 - f. Explain the following protocols suited to Internet of Things applications:
 - i. Message Queuing telemetry transport (MQTT),
 - ii. Constrained Application Protocol (CoAP)
4. **Attempt any three of the following:** 15
 - a. How can you maximize the utilization of available memory in embedded systems, especially when dealing with limited RAM?
 - b. What is debugging for Internet of Things device? Explain.
 - c. Explain different types of libraries for embedded systems which works with limited memory.

[Contd...]

- d Discuss the business model canvas for Internet of Things.
- e Explain the following business models:
 - i. Subscriptions
 - ii. Customization
 - iii. Be a Key Resource
- f Write a short note on Lean startups.

5. Attempt any three of the following:

15

- a. Discuss the phase of Testing in manufacturing of Internet of Things device.
 - b. What is the importance of Certification for IoT devices? Explain.
 - c. Write a short note on mass-producing the case and other fixtures.
 - d. Discuss different environmental issue in Internet of Things.
 - e. What do you mean by disrupting control?
 - f. Explain the five critical requirements for sensor commons project.
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