(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. What are enchanted objects? Give examples on how the technology has always been associated with magic.
b. Explain calm and ambient technology with the example of LiveWire.
c. What is manufactured normalcy field? Explain.
d. Discuss the issue of Privacy in Internet of Things.
e. Define protocol. Explain any three application layer protocols.
f. Explain the working of IP protocol.

2. **Attempt _any three_ of the following:**   15
a. List and explain the factors to be considered when building an Internet of Thing device.
b. How can one tap into the community for promoting IoT devices? Explain.
c. Describe Arduino with respect to the following parameters: Pushing Code, Programming Language, Integrated Development Environment (IDE), Operating system and Openness,
d. Compare Raspberry Pi and Arduino.
e. What are the demerits of open source? Explain "open source as a competitive advantage" and "open source as a strategic weapon".
f. Write a note on sensors and actuators.

3. **Attempt _any three_ of the following:**   15
a. Explain non-digital methods and materials used in prototyping.
b. What is CNC milling? Explain.
c. Elaborate any two techniques used in 3D printing
d. Explain the following terms with respect to APIs: (a) Scraping, (b) Legalities.
e. What is Polling? Explain in brief.
f. Explain the sketch, iterate and explore process in prototyping.

4. **Attempt _any three_ of the following:**   15
a Explain the following with respect to managing RAM: Stack versus Heap.
b Explain the different types of libraries available for embedded systems.
c With the help of a diagram explain the different components of Business Model Canvas.
d Write short note on long tail of the Internet.
e Explain any two business models.
f Explain government funding for IoT projects.

5.   **Attempt _any three_ of the following:**   15
a.   Discuss the environmental issues associated with IoT devices.
b.   Explain the phase of testing in manufacturing IoT devices.
c.   Explain the software choices for designing PCBs.
d.   What is the importance of Certification for IoT devices? Explain.
e.   Explain the terms "Disrupting Control" and "Crowdsourcing".
f.   Explain the five critical requirements for sensor commons project.

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