(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. Define and explain the Internet of Things with 2 examples.
b. Explain calm and ambient technology using example of Live wire.
c. What is manufactured normalcy field? Explain.
d. Discuss the issue of Privacy in Internet of Things.
e. What is TCP and UDP ports? Explain with examples.
f. Define protocol. Explain the following application layer protocols: HTTP, HTTPS, SMTP, FTP,POP3, IMAP.

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

a. Explain microcontrollers and system-on-chips with respect to embedded computing.
b. Describe the difficulties encountered during the transition from a prototype to mass production?
c. How can one tap into the community for promoting IOT devices? Explain.
d. Describe Beagle bone Black with a focus on the following aspects: Operating System, Programming Language, Debugging, Hardware and Openness.
e. Compare python characteristics with C++.
f. Write a short note on Electric Imp.

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

a. Explain the sketch, iterate and explore process in prototyping.
b. What are laser cutters? Explain the main features to consider while choosing a laser cutter.
c. What is CNC Milling? Explain.
d. Explain the following terms with respect to APIs: (a) Scraping, (b) Mashing up APIs.
e. What is comet? Explain.
f. Explain the following protocols suited to Internet of Things applications: Message Queying telemetry transport (MQTT), Extensible Messaging & Presence Protocol(XMPP), Constrained Application Protocol

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

a What are the concerns regarding performance and battery life while writing code for embedded systems?
b Write a short note on long tail of Internet.
c Explain different types of libraries for embedded systems which works with limited memory.
d Discuss the business model canvas for Internet of Things.

[*Contd…*

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e Explain the following business models:
   i. Provide infrastructure
   ii. Take a percentage
   iii. Be a Key Resource

f What is venture capital? How can one exit?

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

a. Explain the steps for manufacturing PCBs.
b. Discuss different environmental issues in Internet of Things.
c. Write a short note on mass-producing the case and other fixtures.
d. Explain in detail the process of designing kits.
e. Discuss the issues in scaling up the software for large scale IOT devices.
f. Explain the five critical requirements for sensor commons project.

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