(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. Describe the following design principles for connected devices:
(i) Affordance
(ii) Graceful Degradation

b. Explain the various layers of the TCP/IP protocol suite used in Internet communication. Discuss the role and functions of Transport layer protocols.

c. Define Internet of Things and explain various examples of IoT.

d. Explain the following application layer protocols with their key functions:
a) HTTPS b) SMTP c) FTP d) POP3 e) IMAP

e. Write a short note on DNS and IPv6 with respect to IoT.

f. What is a MAC address? Explain its role in data transmission at the Data link layer.

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

a. Describe the concept of "Mass Personalisation" enabled by digital fabrication tools.

b. Explain "Open Source as a competitive advantage" and "Open Source as Strategic Weapon."

c. Explain the various components of Raspberry Pi Board.

d. How do Python and C++ handle memory management differently?

e. Describe the following with respect to Arduino: IDE, Pushing Code, Languages, Code Routines, Debugging.

f. List and explain the factors that you need to consider while deciding to build an Internet of Things device.

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

a. List the various non-digital prototyping methods and describe how non-digital prototypes are developed.

b. Write a short note on Polling and Comet.

c. List the major types of 3D printers used in additive manufacturing. Explain any two types in detail.

d. Describe the subtractive manufacturing workflow of CNC milling in the context of IoT physical prototyping.

e. Explain the concept of a laser cutter. What are the main features that should be evaluated before purchasing a laser cutter?

f. List and explain the standards to consider for implementing an API.

muquestionpapers.com

Y980Y101EADY980Y101EADY980Y101EADY980Y101EAD

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

a. Describe strategies for maximizing battery life in IoT devices.

b. Describe the role of specialized software libraries in the development of Internet of Things devices.

c. Explain Venture Capital as a source of financing for startups. Describe the different funding stages involved in a startup.

d. What is debugging? Explain some tools for debugging.

e. What is stack memory and heap memory? Illustrate how memory is allocated in both during program execution.

f. How do the value proposition and the revenue streams within the Business Model Canvas act as the primary drivers for transforming a technical IoT prototype into a sustainable commercial reality?

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

a. What are Certification marks (CE, FCC, RoHS), and why are they necessary for selling electronic products?

b. Write a short note on cautious optimism.

c. List and explain five critical requirements identified in Fisher's original definition of sensors that are commonly applied in projects.

d. Explain the concept of a Bill of Materials (BOM) and how it is used to calculate the marginal cost of an IoT product.

e. Which things affect the Environment more and how to measure Environmental Cost?

f. Describe the process involved in the assembly and testing of a Printed Circuit Board.

****

muquestionpapers.com

Y980Y101EADY980Y101EADY980Y101EADY980Y101EAD