Ref. No. : Ex/PG/CSE/PC/T/112B/2025

M.E. COMPUTER SCIENCE AND ENGINEERING FIRST YEAR FIRST SEMESTER-2025

Subject: IOT SYSTEMS

Time: 3 Hours **Full Marks: 100**

Part – I (50 Marks)

Answer any two questions (from Q1 to Q3).

1. a) What are the different components of Internet of Things (IoT)? How do they work together?
b) Describe the enabling technologies of Industry 4.0? What are the limitations and how these are overcome in industry 5.0?
c) Highlight some challenges of IoT applications.

(5+2)+(5+3)+5=20

2. a) Describe the operations of Message Queuing Telemetry Transport (MQTT) protocol. Compare and contrast between HTTP, CoAP and MQTT.
c) Describe ThingsBoard Architecture.
d) What do you mean by Elastic Compute Cloud (EC2) ? Illustrate some of its features. What is Amazon glacier? (4+5)+ 4+(2+3+2)=20

3. a) What are the major air pollutants? Name some sensors to measure those.
b) Write the key benefits of IoT based air-pollution system over traditional system.
c) What do you mean by smart connected firm (SCF)? How LoRaWAN can be used in these type of firming?
d) How Association rules for data mining can be used in IoT based recommender system?

5+5+5+5=20

4. Write short notes on the following (any two): 5X2=10
a) Digital Twin
b) Arduino IoT cloud
c) Google cloud compute engine
d) Cobots

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Part-II (50 Marks)

Answer all the questions.

1.a) Write the advantages of IC. (2)
b) Write the architectural difference between ARM7, ARM9, ARM10. (3)
c) Write the selection criteria for PIC microcontroller. (2)
d) Write the difference between Microprocessor and Microcontroller. (3)

Answer any two questions.

2.a) Draw and explain the block diagram of 8051 microcontroller. (4+4)
b) Describe the function of UART. Write the limitation of ESP8266. Write the components of ESP-32. (3+2+3)
c) Write a program, digital output and display through LED using Arduino Uno. (4)

3.a) Write the features of Arduino and Raspberry Pi. (4)
b) Write the function of ARM7 CPSR flag register. (8)
c) Write short notes with a neat diagram about SPI, I2C. (4+4)

4. a) Draw and explain the architecture of PIC18F452. (5+5)
b) Write the architectural difference between Von-Neumann & Harvard Architecture. (5)
c) Write the types of RTOS. Describe the different functions of RTOS. (2+3)