BE1-R4: EMBEDDED SYSTEMS

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Briefly describe the need for security in Bluetooth system.
b) What are the necessary conditions for deadlock to occur in a system?
c) Define security modeling.
d) Briefly describe why an application developer may choose to run its application over UDP rather than TCP.
e) Discuss shared data problem in RTOS.
f) Differentiate between Bluetooth Wireless Protocol and IrDA.
g) We are given tasks T_1 and T_2. What does it mean to say that they execute concurrently?

(7x4)

2.

a) What do you mean by embedded system? How is it differentiated from a general-purpose computer?
b) What do you mean by embedded system design process? State its importance.
c) Specify the necessity of distinguishing the step system integration involved in embedded system design process.

(6+6+6)

3.

a) Explain architecture of UART.
b) Discuss features of PIC Microcontroller.

(9+9)

4.

a) Specify the requirements involved in embedded system design process.
b) Given a choice to select RISC or CISC microcontroller, which one is preferred for embedded applications and why?
c) Explain how Port-based I/O is different from Bus-based I/O.

(6+6+6)

5.

a) What are the benefits of using a general-purpose processor in the case of designing an embedded system? In this context, describe the benefits of using a standard single-purpose processor instead of using a general-purpose one.
b) Differentiate registers from memory. Compare Princeton architecture and Harvard architecture. How is Cache memory related to Embedded computing system?

([5+4]+[2+4+3])

6.

a) Explain Rate Monotonic Co-operative Scheduling.

b) Explain Priority inversion problem.

(9+9)

7. Write short notes on **any three** of the following:

a) CAN

b) Watchdog Timer

c) RTOS Scheduling

d) Pipelining

(3x6)