

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI EXAMINATION – SUMMER 2025

Subject Code: 3161009

Date: 30-05-2025

Subject Name: Embedded Systems

Time: 10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Write down skills Required for an Embedded System Designer. **03**
(b) What is and Embedded system? What are its characteristics? **04**
(c) Explain the working of the Secure Digital Input Output (SDIO) protocol. **07**
- Q.2** (a) What is watch dog Timer? Explain its function in brief. **03**
(b) How does Brown Out Reset work in microcontroller? **04**
(c) Explain the working of Spy-Bi-Wire serial communication protocol. **07**
- OR**
- (c) List down wireless communication protocol and explain any one in detail. **07**
- Q.3** (a) Describe Earliest Deadline First Mechanism with example. **03**
(b) Explain concept of interrupt service routine. **04**
(c) What is context switching? Explain context switching on interrupts. **07**
- OR**
- Q.3** (a) Describe MSP430 USCI module and its modes. **03**
(b) What do you mean by Mutex? Also explain P and V semaphore with appropriate example. **04**
(c) Describe the main problem with semaphores and its limitation. **07**
- Q.4** (a) Describe the four sources of clock in MSP430 processor. **03**
(b) MSP430 is having an orthogonal CPU architecture supported with RISC features. – Justify the statement. **04**
(c) What is inter process communication (IPC)? List down and explain methods of IPC in brief. **07**
- OR**
- Q.4** (a) Explain the special features associated with GPIO port pins in MSP430 other than simple digital input output port pin characteristics. **03**
(b) Sketch diagram to interface DMA with microprocessor or microcontroller **04**
(c) Give difference between Multiprocessing and Multithreading. **07**
- Q.5** (a) List down features of an operating system. **03**
(b) What is meant by benchmarking Real time operating system (RTOS)? Why it is required? **04**
(c) Draw interfacing diagram to interface 8 LEDs with MSP430. Turn-ON LEDs in ring counter fashion. **07**
- OR**
- Q.5** (a) Describe Round Robin with Interrupts. **03**
(b) Explain Rate-monotonic scheduling. **04**
(c) Differentiate between Clock-driven and Event-driven Scheduling. **07**