

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII(NEW) EXAMINATION – SUMMER 2019****Subject Code:2171005****Date:14/05/2019****Subject Name:Embedded Systems****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Enlist the criteria for choosing CPU for any embedded application. **03**
(b) What is RTOS ? Describe types of RTOS with two examples. **04**
(c) Describe I2C and CAN bus protocol. **07**

- Q.2** (a) Describe advantage and disadvantage of serial and parallel communication protocol. **03**
(b) Describe Watchdog timer and RTC needed for embedded application. **04**
(c) Describe Wi-Fi and Zigbee protocols. Discuss the application areas for both the protocols. **07**

OR

- (c) Explain classification of embedded system with examples. **07**

- Q.3** (a) Describe concept of interrupt service thread. **03**
(b) Describe interrupt latency and deadline with example. **04**
(c) Describe dead-lock condition. Write pseudo code for deadlock utilizing mutex M1 and M2 shared between two processes P1 and P2. **07**

OR

- Q.3** (a) Describe why atomic operation is needed in some of coding part of **03**
(b) Describe priority inversion with example. How to deal with such condition. **04**
(c) Describe counting and binary semaphore as a resource key. **07**

- Q.4** (a) Differentiate : Function and ISR **03**
(b) Describe co-operative and pre-emptive scheduling. **04**
(c) Why Inter Process Communication is needed in multi-process system ? **07**
Describe mailbox, lock and spin-lock methods for IPC.

OR

- Q.4** (a) What is Process Control Block? What are the fields included in PCB ? **03**
(b) Describe task/services to be performed by OS. **04**
(c) Describe memory and file management in RTOS. **07**

- Q.5** (a) Describe low power modes of MSP430. **03**
(b) Describe MSP430 GPIO registers associated with I/O port. **04**
(c) Describe MSP430 USCI module with different registers and operation. **07**

OR

- Q.5** (a) Describe POR, PUC and BOR for MSP430. **03**
(b) Describe clocking system of MSP430. **04**
(c) Sketch interfacing diagram to interface common anode seven-segment display with Port 1 and 8 push button switches with Port 2 with MSP430. When SW1(P2.0) pressed and it should display "1". Write C language program to display pressed switch number on seven segment display. **07**
