Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (OLD) - EXAMINATION – SUMMER 2018

Subject Code:171005 Date:28/04/2018

Subject Name:Embedded Systems (Department Elective - I)

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)** Answer the following questions. **07**

(1) What do you mean by hard real time system and soft real time system? Explain with appropriate example.

(2) State criterions for selection of RTOS.

(b) Do as directed. **07**

(1) Write instruction to configure P0.14 as output pin using left operator and reset rest of the pins.

(2) Write instruction to set first 12 pins of PORT 0.

(3) Identify output after execution of following instructions

```
MOV R1,#&32
CLZ R2,R1
```

(4) Which addressing mode is used in instruction LDR R0,[R1] ?

(5) List any 2 features of RISC architecture.

(6) Mention the applications of GPIO.

(7) Three tasks T1, T2, and T3 are having duration 25, 4, and 7 units respectively. If time slots are of 5 units then task T2 will be completed after which slot by using round robin scheduling?

Q.2 **(a)** Classify Embedded system and discuss the various components of embedded System design. **07**

(b) With the help of diagram, explain 3 stage pipeline of ARM processor. **07**

OR

(b) Explain the ARM programmer's model with appropriate diagram. **07**

Q.3 **(a)** How ARM handles exception? List all the steps. Also discuss various Exceptions and their priorities in ARM processor. **06**

(b) Explain following instructions with examples. **08**

(1) SMULL

(2) ASR

(3) BL

(4) TEQ

OR

Q.3 **(a)** Using ARM7 instruction write program to perform following task. **06**

(1) Eight - 32 bit numbers, are stored in two arrays a[i] and b[i]. Perform addition of numbers reading from individual array and store results in third array c[i].

(2) Write an instruction set to switch from supervisor mode to IRQ mode.

(b) Explain following instructions with examples. **08**

(1) SWP

(2) ADDEQ

(3) BNE

(4) MVN

Q.4	**(a)**	What do you mean task control block? Explain task and task states with appropriate example.	**07**
	(b)	With diagram explain three modes of serial communication, 'synchronous', 'isochronous' and 'asynchronous'.	**07**

OR

Q.4	**(a)**	Which are the wireless and mobile system protocols available for the embedded systems? Explain any two of the protocols in detail.	**07**
	(b)	Explain real time clock and watch dog timer related to embedded systems.	**07**
Q.5	**(a)**	Compare process, task and thread with appropriate example. Also explain multithreading mechanism in context of display process of mobile phone.	**07**
	(b)	What do you mean by Mutex. Also explain P and V semaphore with appropriate example.	**07**

OR

Q.5	**(a)**	Write short note on memory management and process management services of RTOS.	**07**
	(b)	Discuss use of a semaphore as an event signaling or notifying variable.	**07**

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