

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII(OLD) • EXAMINATION – WINTER 2016**

**Subject Code: 171005****Date: 18/11/2016****Subject Name: Embedded Systems (Department Elective - I)****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.

- Q.1 (a)** Answer the following questions **07**
- [1] Which assembly language instruction is used to return from subroutine to main program in ARM7TDMI ?
- [2] What will be content of R1 after executing following instructions:  
 MOV R2,#10h, MOV R1,R2,LSL #2
- [3] What is the main difference between general purpose microprocessor and ARM processor?
- [4] What is the difference between Von-Neumann and Harvard architecture?
- [5] What is zero stuffing? How it is useful in HDLC protocol?
- [6] List registers available while using Thumb mode in ARM processor
- [7] What are the constraints that designer has to keep in mind while designing embedded system.
- (b)** What features of RISC processor are rejected in ARM? Explain programming model of ARM7TDMI **07**
- Q.2 (a)** (1) What is post indexing and pre indexing? Explain with help of assembly language instructions for post indexing and pre-indexing **04**
- (2) What is the difference between instructions ASR and LSR? Explain with examples. **03**
- (b)** Write assembly language instructions with conditional code for following: **07**
- if R1==R2 then  
     R3=R4-R5  
 else if R1>R2  
     R3=R4+R5
- OR**
- (b)** Write assembly language subroutine to find value of  $y=16x+4$  assume register R1 holds y and register R2 holds x. **07**
- Q.3 (a)** Explain following instructions: **07**
- [1] RSC R1,R2 [2] ADD R1,R2,R2,LSL#1 [3] MLA R1,R2,R3,R4  
 [4] TEQ R1,R3 [5] TST R4,R5 [6] CMP R1,R2 [7] SUBEQ R1,R5,R6
- (b)** Explain SPI protocol and process of data transfer from master to slave device **07**
- OR**
- Q.3 (a)** Explain HDLC protocol with frame format **07**
- (b)** What is a Task? Discuss different task states with state diagram and explain parameters of TCB. **07**
- Q.4 (a)** (1) What is round-robin scheduling? Explain with help of example. Is it suitable for real time applications? **04**

- (2) What is priority inversion? How it occurs? How to solve priority inversion problem? **03**
- (b) What is semaphore? Explain concept of semaphore with help of example and how to apply it for shared data problem? **07**
- OR**
- Q.4** (a) List and explain different performance matrices of RTOS. **07**
- (b) Explain memory management in RTOS. **07**
- Q.5** (a) Explain synchronous, iso-synchronous and asynchronous serial communication modes with suitable example **07**
- (b) What is device driver? What care should be taken while writing device driver? **07**
- OR**
- Q.5** (a) List various wireless and mobile system protocols. Explain protocols used in Bluetooth and Zigbee technology. **07**
- (b) (1) Explain pre-fetch abort and undefined exceptions in ARM processor **04**
- (2) Explain why execution of FIQ is fast than IRQ ? What are the situations in which FIQ should be used? **03**

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