

FACULTY OF ENGINEERING**B.E. 4/4 (CSE) I – Semester (Main) Examination, Nov. / Dec. 2012****Subject : Principles and Applications of Embedded Systems****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

1. What are the 16 bit registers present in 8051 micro controller and explain their usage? (2)
2. List special function registers associated with processor registers and control and data registers associated with timers, serial port etc. where are they located in address space specified in an instruction? (3)
3. Explain the function performed by following instruction. How many bytes are required to encode this instruction? (3)

MOV A, @A+DPTR
4. What is the size of SP register in 8051 micro controller? What is the operation performed by instruction POP add? How many bytes are required to encode this and how many cycles it takes to execute? (3)
5. Illustrate with example use of semaphore for task synchronisation mutual exclusion of critical sections in tasks. (3)
6. What is a cross compiler? If an Integrated Development Environment (IDE) is available on a Intel Desktop for 8051 MC based embedded system on which processor the cross compiler executed on which processor the generated code is run? (2)
7. Describe a suitable format for generating application target code on host system. What is the function of Locater? (2)
8. What is a blocking system call? Give an example can such a call be part of an Interrupt Service Routine? (2)
9. List typical timer services provided by an RTOS. (3)
10. What is Harward architecture? Does 8051 employ this. (2)

PART – B (50 Marks)

- 11.a) How are I/O ports used for interfacing external memory in 8051?
b) To what I/O pins in 8051 do you connect external interrupts?
12. Describe the time / counters provided in 8051 micro controller and associated programmable registers. Describe a method to count external pulses using timer. Describe use of time in BAUD rate selection for serial transmission.
13. Give a schematic and a program to interface 7 segment display using 8051 MC.

14. Explain I2C protocol for transferring data in a connected embedded system. Differentiate this with UART for the same purpose.
15. What is a shared data problem? What are the mechanisms to solve this problem? Explain how a priority inversion problem can arise while using semaphores.
16. Describe typical time related services provided in an RTOS. What are the system calls associated with message queues and pipes?
17. Describe the architecture employed in ARM processor in respect of instruction sets addressing modes of operation and interface to other subsystems.
