

YMCA UNIVERSITY OF SCIENCE & TECHNOLOGY, FARIDABAD
M.TECH EXAMINATION (under CBCS)
Embedded System Design-1 (E 16V 607)

Time: 3hrs

M.Marks: 75

NOTE: Attempt any five questions, Q1 is compulsory.

Q1 (a)	Classify the instructions that read the port latches and port pins. Give reasons for classification	1.5
(b)	Which bits are required to be set for generation of serial port interrupt? Give location of these bits.	1.5
(c)	Explain the difference between the following instructions. JB 30H, 4EH JBC 30H, 4EH	1.5
(d)	Define interrupt priority. Write the vector addresses and the priority sequence of the 8051 interrupts.	1.5
(e)	Find the contents of A and carry flag after the execution of the following instructions. Assume [A]=25H and [C]=1 before the execution of instructions. ADD A, #25H, SUBB A, #50H, ADDC A, #0FCH.	1.5
(f)	Write an instruction that clears bit 3 of RAM location (23H) without affecting any other bits.	1.5
(g)	Discuss the alternate functions of all the ports of 8051	1.5
(h)	Describe branch and conditional branch instructions in 68HC11.	1.5
(i)	Discuss Interrupt routines in RTOS.	1.5
(j)	List and briefly discuss modes of working of 68HC11 microcontroller.	1.5
Q2 (a)	Find the address to which program execution is transferred after the execution of instruction SJMP F0H, if it is stored in the address 8811H. Give difference between LJMP and AJMP.	5
Q2 (b)	Write a program using interrupts to get data serially and send it to p2, while Timer0 is turning the LED connected to p1.6 on and off every second. Assume required parameters and show all calculations.	10
Q3 (a)	List the addressing modes used in 68HC11-MCU instruction set. Give five uses of each mode.	5
Q3 (b)	Why are the PC and DPTR registers of 8051 16-bit wide, whereas the 8051 stack pointer register is 8-bit wide only? Justify. Is it possible to address 8051 individual bits? What are the addresses of the bit addressable locations? How is bit addressing distinguished from the byte-wise addressing by the 8051 microcontroller?	10
Q4 (a)	When semaphores are preferred over signal to notify RTOS to let another task unblock? What are the uses of a semaphore?	5
Q4 (b)	Differentiate between: <ul style="list-style-type: none"> (i) Execution of the instructions ADD and ADDC. (ii) Program routine and interrupt service routine. (iii) Two types of reading operations in 8051 ports. (iv) Execution of instructions RET and RETI. (v) Jump and Call instructions. 	10
Q5 (a)	Write a routine using a timer of the 8051 to count the cars moving on a road and to give a signal when the count value reaches 100	5
Q5 (b)	Define real time operating system. List and explain different application areas for the same	5
Q5 (c)	What is an interrupt? Explain interrupt structure of the 8051 microcontroller. What are the various SFRs required to use 8051 interrupts?	5

Q6.(a)	Assume that the speed of a stepper motor has to be controlled using an 8051 microcontroller. Design the required hardware and explain the required software.	5
Q6.(b)	Describe 68HC11 architecture. List innovative features with respect to the 8051 architecture. How do the push and pops occur using S?	5
Q6.(c)	Write a program to add first 100 natural numbers using 8051 instructions and store the result at location 00 and 01.	5
Q7.(a)	Write an assembly language code to interface LCD with microcontroller. Draw and explain necessary interfacing diagram.	5
Q7.(b)	Describe all the signals at the 8051 pins. Explain meaning of each signal. Also indicate what are the signals multiplexed at different ports.	10