



FIFTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION NOV 2017

SUBJECT: MICROCONTROLLERS (ECE -3102)

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

- 1A. Draw a neat diagram of architecture of 8051. Explain the function of the following:
i. PSW ii. PC and DPTR iii. Register banks
- 1B. Write a delay subroutine to generate a time delay of 27.5ms without using timers. Assume crystal frequency as 12 MHz. inner loop should run 50 times.
- 1C. Explain DAA instruction with an example. (5+3+2)
- 2A. Write a program for 8051 to convert a 2-digit packed BCD number to its HEX value and store the result at memory 5000H onwards. The BCD number is stored at 9000H.
- 2B. Identify and explain the addressing mode used in each of the following 8051 instructions:
a. MOV A, #45H
b. MOVC A, @A+DPTR
c. MOV 2, 3
- 2C. Explain the function of the following pins of 8051. Mention the direction of each of the signals.
a. ALE b. \overline{PSEN} (5+3+2)
- 3A. Write an ALP to read 8-bit data repeatedly every 0.375 ms from P-0 and send it to P-2. Use timer-0 in mode-2 for 0.375 ms delay generation. Assume crystal frequency as 8 MHz.
- 3B. With an example for each, explain following ARM assembler directives:
i. AREA ii. ALIGN iii. RN
- 3C. Instruction, **JZ FCH**, is stored at **9460H**. What is the PC value if the condition is true and if it's false? (5+3+2)
- 4A. Interface DC motor to port-0 and two switches (S1 and S2) to INT0 and INT1 of 8051. Write an ALP, to rotate DC motor in clockwise direction with half speed if S1 is closed and anti-clockwise if S2 is closed using interrupt programming. Use level triggered signal for interrupt and also draw the interface diagram.
- 4B. What do you mean by conditional execution of ARM instructions? With relevant example, explain conditional execution and role of 'S' field in ARM instructions.

4C. Write the multiple register transfer instructions for performing PUSH and POP operations in the case of FA type of stack.

(5+3+2)

5A. Write a neat diagram of data flow model of ARM core. Explain sign extender, MAC, barrel shifter and incrementer blocks of the diagram.

5B. With a neat bit diagram, explain the data processing instruction format of ARM.

5C. Write an assembly language program to count the number of people entering a classroom. Assume that a pulse will appear at port pin P3.4 of 8051. After 60 people have entered the classroom, an LED connected to pin P0.0 should switch ON.

(5+3+2)