M. Sc. (Electronics) (Sem. IV) (CBCS) Examination

April / May - 2018

Paper - 14 : Embedded Programming Using AVR

(New Syllabus)

Faculty Code : 003

Subject Code : 1154002

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions : (1) All questions carry equal marks.

(2) Figures on right hand side indicate marks.

1 Answer the following : (any **seven**)   **14**

(1) Write a brief introduction of AVR microcontroller.

(2) Write any four applications of AVR microcontroller.

(3) What is the function of general purpose registers in AVR microcontroller ?

(4) What is the bit manipulation in AVR microcontroller programming ?

(5) Write the advantages of C-programming of AVR.

(6) Write the datatypes used in AVR c-programming.

(7) What are packed and unpacked BCD numbers ?

(8) Define HEX file in AVR C-programming.

(9) Draw a general view of counters and timers in microcontrollers.

(10) Define interrupt service routine.

2 Answer the following : (any **two**)   **14**

(a) Write a note on microcontroller versus general purpose microprocessor.   **7**

(b) Explain AVR status register in detail.   **7**

(c) Describe three primary ways to load a program in AVR microcontroller.   **7**

3   Answer the following :   14

    (a) Write the steps to program the AVR microcontroller 7
with Timer0 in normal mode.

    (b) Write an algorithm to program the AVR   7
microcontroller with Counter1 in normal mode.

OR

3   Answer the following :   14

    (a) Write a note on Interrupt versus Polling for   7
AVR microcontroller.

    (b) Write an algorithm to program the AVR   7
microcontroller to receive data serially.

4   Answer the following :   14

    (a) A door sensor is connected to Bit-1 of Port-B, and an 7
LED is connected to Bit-7 of Port-C. Write an AVR
C-program to monitor the door sensor and, when it
opens, turn ON the LED.

    (b) Write an AVR C-prograrn to toggle only the   7
PORTB.4 bit continuously every 2 ms. Use Timer-1,
Normal Mode, and no prescaler to create the delay.
Assume XTAL=8 MHz.

5   Answer the following : (any **two**)   14

    (a) Write an AVR C-program to receive bytes of data 7
serially and put them on Port-B. Use receive complete
interrupt instead of polling method.

    (b) Write an AVR C-program to read the keypad and 7
send the result to Port-D. PC0 - PC3 connected to
columns. PC4 - PC7 connected to rows.

    (c) Write an AVR C-prograrn to display the message 7
"HELLO WORLD"' on 16×2 LCD. Use 8-bit data to
interface an LCD to the AVR.

    (d) A switch is connected to pin PORTA.7. Write an 7
AVR C-program to monitor the status of SW and
perform the following :
      (i)   If SW = 0, the stepper motor moves clockwise.
      (ii) If SW = 1, the stepper motor moves
counterclockwise.