



BBB-003-1154002 Seat No. _____

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

June / July - 2021

Embedded Programming Using AVR : Paper - 14

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.
(3) Answer Any Five questions.

- 1** Answer the following in brief : **14**
- (1) What does "RAM" stand for? How is it used in computer systems?
 - (2) Explain various types of memory used in AVR microcontroller.
 - (3) What does "CPU" stand for? Explain its function in a computer.
 - (4) State which of the following is unidirectional and which is bi-directional:
(a) data bus (b) address bus. Why?
 - (5) What is the purpose of the instruction decoder?
 - (6) What does the term embedded system mean?
 - (7) Which pin is used for resetting in the ATmega32.
- 2** Answer the following in brief : **14**
- (1) Which group of AVR has smaller packages?
 - (2) In an embedded controller, why does the size of the ROM matter?
 - (3) Give the magnitude of the unsigned char and signed char data types.

- (4) Give two factors that can affect the delay size.
 - (5) How many clock sources does the AVR have?
 - (6) What is context saving?
 - (7) To which register does the I bit belong?
- 3** Answer the following : **14**
- (1) Draw the simplified block diagram of Timer 2 and explain each part.
 - (2) Write a note on criteria for choosing a microcontroller.
- 4** Answer the following : **14**
- (1) Write a note on brief history of the AVR microcontroller.
 - (2) What happens if two interrupts are activated at the same time? Explain.
- 5** Answer the following : **14**
- (1) Write a note on serial communication of AVR microcontroller.
 - (2) List some of the interrupt sources in the AVR and give difference between Interrupts Vs Polling with example.
- 6** Answer the following : **14**
- (1) Write a note on RS232 hand-shaking signals.
 - (2) What are line drivers such as MAX 232 used for?
- 7** Answer the following : **14**
- (1) Using Timer1, write a program that toggles pin PORTB.5 every second, while at the same time transferring data from PORTC to PORTD. Assume XTAL = 8 MHZ.
 - (2) Write a C program to toggle only the PORTB.4 bit continuously every 2 ms. Use Timer1, Normal Mode, and no pre-scaler to create the delay. Assume XTAL = 8 MHz.
- 8** Answer the following : **14**
- (1) Explain various types of memory used in AVR microcontroller.
 - (2) Describe the function of pins E, R/W and RS in the LCD.

- 9** Answer the following : **14**
- (1) Write a note on LCD Interface.
 - (2) Draw and explain matrix keyboard connection to ports.
- 10** Answer the following : **14**
- (1) Write an AVR C program to get the status of bit 5 of port B and send it to bit 7 of port C continuously.
 - (2) Using Timer0 generate a square wave on PORTB.5, while at the same time transferring data from PORTC to PORTD.
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