SPECIAL SUPPLE B.TECH/ECE/IT/7TH SEM/AEIE 4182/2018

INTRODUCTION TO EMBEDDED SYSTEMS
(AEIE 4182)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Among the following which processor/microcontroller architecture is based on RISC
(a) 8051 (b) ATmega 328
(c) 8085 (d) PIC microcontroller.

(ii) In 8051 microcontroller DPTR is
(a) 8 bit register (b) 16 bit register
(c) an opcode (d) none of above.

(iii) No of I/O ports present in 8051 microcontroller is
(a) 2 (b) 4 (c) 5 (d) 6.

(iv) How many 4K × 8 ROM IC is required to built 32K × 16 ROM?
(a) 32 (b) 16 (c) 8 (d) 4.

(v) In PIC microcontroller, carry from D3 to D4
(a) Set auxilliary carry bit (b) Reset auxilliary carry bit
(c) Set carry bit (d) Set digit carry bit.

(vi) ATmega328 is a
(a) PIC microcontroller
(b) AVR microcontroller
(c) ARM microcontroller
(d) MCS-51 family microcontroller.

(vii) Internal ADC of ATmega328 microcontroller is
(a) 8 bit (b) 10 bit (c) 12 bit (d) 16 bit.

(viii) In PIC microcontroller, prescalar is assigned through
(a) STATUS Register (b) INTCON Register
(c) OPTION Register (d) None of above.

(ix) Size of internal SRAM memory in ATmega328 microcontroller is
(a) 2 KB (b) 1 KB (c) 32 KB (d) 64 KB.

(x) No of general purpose registers present in ATmega 328 microcontroller is
(a) 6 (b) 12 (c) 24 (d) 32.

Group – B

2. (a) Define embedded system. Compare embedded system and general computing system.

(b) Define the following:
(i) Interpreter (ii) Assembler (iii) Simulator.

(c) Explain the internal RAM organization of 8051 microcontroller.

(2 + 2) + 3 + 5 = 12

3. (a) What is the difference between RISC and CISC architecture?

(b) What is the difference between VonNeumann and Harvard architecture?

(c) Discuss the function of W, Status and INDF register in PIC16F877 microcontroller.

3 + 3 + 6 = 12

Group – C

4. (a) Write the main features of ATmega 328 microcontroller.

(b) Draw and discuss the flag register of ATmega 328 microcontroller.

(c) Write a program (in assembly or C language) to add 5 number of byte data. Assume that the numbers are stored in memory location.

4 + 4 + 4 = 12

5. (a) Explain the function of ADMUX and ADCSRA registers of ATmega 328.

(b) Write short notes on (*any two*):
   (i) External hardware interrupts
   (ii) USART
   (iii) TCNT0 and TCCR0 registers.

4 + (4 × 2) = 12

Group – D

6. (a) Differentiate between:
   (i) Process and Thread, (ii)Thread and Task.

   (b) Briefly explain the operation of Round-Robin with interrupts.

(3 + 3) + 6 = 12

7. Write short notes on (*any two*): **(6 × 2) = 12**
   (i) TCB
   (ii) Encapsulating Semaphores
   (iii) Interrupt Latency.

Group – E

8. Design an interface between ATmega 328 microcontroller and stepper motor. Write a program (in assembly or C language) to rotate the stepper motor in clockwise direction.

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9. Design an interface between ATmega 328 microcontroller and temperature sensor (LM35). Write a program (in assembly or C language) to read sensor data and display the result on Port D.

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