

**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) In ATmega32, to initialise Port B as output Port, the DDRB register is loaded with the value
(a) 00H (b) 01H
(c) PORTB Register to be initialised (d) FFH
- (ii) Among the following which processor is following RISC architecture
(a) 8251 (b) 8051
(c) AT mega 328 (d) PIC microcontroller.
- (iii) The ADMUX Register has a RAM address of 27H, the IO address of the same is
(a) 07H (b) 27 H (c) 17 H (d) None these.
- (iv) ARM processors were basically designed for _____
(a) Main frame systems (b) Distributed systems
(c) Mobile systems (d) Super computers.
- (v) The Interrupt flags in Status Register, I=1, and Timer Overflow flags status for Timer 0, 1, 2, TOIE0=1, TOIE1=1, TOIE2=0. The Timer flag would interrupt the microcontroller is
(a) None (b) Timer0 Overflow flag
(c) Timer1 Overflow flag (d) Timer2 Overflow flag.
- (vi) The internal ADC of ATmega 328 is of
(a) 8 bit (b) 10 bit (c) 12 bit (d) 16 bit.
- (vii) In Atmega328, the no of 8 bit timer(s) is/are
(a) 3 (b) 2 (c) 1 (d) None of these.
- (viii) Size of internal EEPROM data memory of ATmega 32 is
(a) 2KB (b) 16KB (c) 32KB (d) None of the above.

B.TECH/CSE/ECE/EE/IT/7TH SEM/AEIE 4182/2020

- (ix) In ATmega 328, the ISR address for _____ is 0000H
(a) External Interrupt 0 (b) Reset
(c) Timer0 Overflow interrupt (d) No one of the above.
- (x) In Atmega328, the no of 16 bit timer(s) is/are
(a) 3 (b) 2 (c) 1 (d) None of these.

Group - B

2. (a) Explain RISC architecture. Name some device based on RISC architecture. Why is ARM processor most popular in embedded system field?
(b) Write an ALP/C program to convert an ASCII value, 6B H registers into BCD value. Store result in another register in an ATmega32.
(3 + 1 + 3) + 5 = 12
3. (a) Compare the Harvard and Princeton architectures.
(b) Describe various types of computer memories.
(c) Write significance of 'Prescalars' and 'Watchdog Timers' of Microcontrollers.
3 + 4 + (2 + 3) = 12

Group - C

4. (a) Describe the different parts of AVR Data memory for ATmega16.
(b) Explain the function of following registers of ATmega 328:
(i) ADMUX and ADCSRA registers
(ii) TCNT0 and TCCR0 registers
4 + (4 + 4) = 12
5. (a) Write and explain an ALP/C program to generate a square wave of 50 % duty cycle (with equal portion high and low) on Port B.3 using Timer0.
(b) Discuss about the sources of Interrupts in AVR Microcontroller. How the Interrupts are Enabled or Disabled?
8 + (2 + 2) = 12

Group - D

6. (a) What is OS? Write the names of various types OS? State the goals of an OS.
(b) List the layers between application and hardware.
(c) Why does an OS function provide two modes, user mode and supervisory mode?
(1 + 1 + 4) + 2 + 4 = 12
7. (a) Discuss the Process Control Block? Mention some of its component.

(b) Write the significance of Semaphore

(2 + 6) + 4 = 12

Group - E

8. (a) What is the purpose of Command Word? How command word register is initialised? What is the purpose of D0 - D7 pins of LCD?

(b) Draw and describe a flowchart, how a key pressed, can be detected in a 4x4 matrix keyboard? What is key debounce?

(2 + 3 + 1) + (4 + 2) = 12

9. (a) Write the features of ADC of ATmega32. How the 10 bit ADC output is fitted into ADCH-ADCL register, which is 16 bit in width?

(b) Write an ALP/C program to convert analogue voltage in to digital output using an ADC.

(4 + 2) + 6 = 12

Department & Section	Submission link:
CSE	https://classroom.google.com/c/MjQwMTQ4MDc3NjY1/a/Mjc0MDk1ODM5NTA1/details
ECE	https://classroom.google.com/c/MjQwMTQ4MDc3NjY1/a/Mjc0MDk1ODcxNDMz/details
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