

Communication Department

Microcomputer Systems - First Exam, Fall 2018/2019

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Answer All Questions (3 Questions, 3 pages):

Q1

Q1-A: [24] Choose the correct answer:

- 1: The microprocessor is a microcomputer system in a single chip.
 True False
- 2: CISC processors are normally have
 a large number of instructions. a simple design.
 a small number of transistors.
- 3: Harvard architecture uses shared data and address bus to access both data and program memory.
 True False
- 4: The ATmega328p has KByte of on chip SRAM.
 1 2
 4 8
- 5: The general purpose registers in the ATmega328p are bit wide.
 1 8
 16 32
- 6: Which register of AVR microcontrollers hold the address of instruction to be fetched?
 X register PC register
 Instruction register R0 register
- 7: Which section of the CPU is responsible for performing addition?
 SFR Instruction Decoder
 ALU
- 8: The flag is set whenever the result is too large.
 C Flag N Flag
 V Flag H Flag
- 9: The flag is set after the addition of 0x37 and 0x2A.
 C Flag N Flag
 V Flag H Flag
- 10: The width of program memory address bus in AVR MCU is dependent on
 Width of ALU Number of IO Lines
 Width of Program Counter Size of SRAM
- 11: The more address pins, the more memory locations are inside memory.
 True False
- 12: memory can be erased using electrical signal.
 PROM SRAM
 EPROM EEPROM
- 13: In the , data at any memory location is addressed by a 16 bit pointer register.
 Immediate addressing mode Direct addressing mode
 Indirect addressing mode
- 14: The instruction is used to store an immediate number on GPR register.
 MOV LDI
 ST

15: used to drive and control the direction of DC-Motor.

[] Signal conditioning circuit

[] H-bridge circuit

[] Transistor

[] None inverting amplifier

16: To set all pins of port B as input IO lines, you must

[] Clear all bits of DDRB register

[] Set all bits of DDRB register

[] Clear all bits of PINB register

[] Set all bits of PINB register

Q1-B: [12] Describe the "Assembly Error" for each instruction of the following:

1. MOV R20 , 15

.....

2. INC R16 , 1

.....

3. SUB 8 , R10

.....

4. LDS R16 , X

.....

5. OUT R18 , PORTB

.....

6. XOR R30 , R1

.....

Q2

Q2-A: [16] Complete following statements:

1: AVR CPU consists of: 1- 2- 3- 4-	2: The main parts of microcomputer are: 1- 2- 3- 4-
3: Program memory of ATmega328p is organized into 2 sections, which are: 1- 2-	4: The operation of PortC is programmed and controlled by 3 registers, which are: 1- 2- 3-

Q2-B: [18] Assume the **R16=0x03**, **R17=0x36**, **R28=0x9A**, **R29=0x1B**, **R30=0x02**, **R31=0x01**, and the contents of the first 4 bytes of SRAM are shown in "SRAM table". Find the contents of required registers after execution of the following code.

SRAM Table	
[0x100]	0x4B
[0x101]	0x3F
[0x102]	0x7C
[0x103]	0x03

Instructions	R16	R17	R28	R29	R30	R31
AND R28 , R17						
CLR R29						
LD R29 , Z						
ADD R16 , R17						
COM R31						
DEC R30						

----- **Q3** -----

Q3-A: [15] What is the main advantage of :

1. EEPROM over SRAM:
-
2. Mega AVR over Tiny AVR:
-
3. Parallel over sequential processor:
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Q3-B: [15] What is the main function of:

1. Boot loader:.....
-
2. Reset pin of ATmega328p:.....
-
3. Signal Conditioning Circuit
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