كلية التقنية الالكترونية
College of Electronic Technology - Tripoli

القســـم : التحكم - الإتصالات   أسئلة الامتحان النهائي   لمادة : أنظمة حاسب دقيقة
لطلبة الفصل : الرابع   رمز المادة : CE223   التاريخ : 11 / 03 / 2020

الفصل الدراسي : خريف 2019
إسم الطالب : ....
إسم الأستاذ: عبدالباسط عاشور   رقم القيد : ....   الزمن: ساعتان
المجموعة: ....

Important Notes:

- This paper contains **FIVE** questions in **FOUR** pages.
- Attempt **ALL** questions.
- Total Marks: **80**

Q.1 [24 Marks, 3 each] Underline the false statement, explain why it is wrong and correct it:

1.
- Moore's law states that the number of transistors in a chip will double every two years.
- In Von Neumann architecture, MPU can read RAM and ROM simultaneously.
- In parallel processing next instruction is fetched while the current instruction executes.

Correction:
....
....
....

2.
- Fax machine is an example of a microcomputer system.
- The number of bits per second sent or received by AVR is known as clock speed.
- When AVR is designed as LCD controller it is known as special purpose AVR.

Correction:
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3.
- An 8-bit ALU can process only 1 byte of data at a time.
- Every AVR microcontroller has an interrupt controller.
- Arduino Uno has up to 20 MIPS Throughput.

Correction:
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4.
- SEI is considered one of data transfer instructions.
- AVR ALU is directly connected to register file.
- ROM data bus of ATmega328p is 16-bit wide.

Correction:
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....

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5.
- To access a 1KB memory, data and address lines must be 8 data lines and 8 address lines.
- Storage bits in SRAM are made of Flip-flop.
- MOV instruction is used in register addressing mode.

Correction:
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6.
- ATmega328p has 23 digital I/O lines distributed in three ports B, C and D.
- Port C pins PC0 to PC5 can be used as analog inputs.
- Clearing all bits of PINB makes all bits of port B as inputs.

Correction:
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....

7.
- In TTL logic level, logic LOW is represented by 0V and logic HIGH is represented by 5V.
- Light emitting diodes are considered TTL compatible devices.
- PC serial port is considered as TTL compatible device.

Correction:
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8.
- UART is the only ATmega328p serial interface that have an error checking technique.
- I2C technique uses only 2 lines to have full duplex data transmission hence called TWI.
- SPI is a single master multi slave protocol that uses hardware to select slaves.

Correction:
....
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....

Q.2 [8 Marks] With proper diagrams, explain in your own words one of the following:

a) Successive Approximation ADC. **OR**

b) H-Bridge motor driver.   **OR**

c) Generating PWM signals using timers.

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Q.3 [12 Marks] The abbreviation of College of Electronic Technology (CET) is to be serially sent from one Arduino Uno to another using UART technique. If the ASCII code for C, E and T are **0x43**, **0x45** and **0x54** respectively, carry out the following tasks:

a) **[8 marks]** Draw the resultant UART signal with 8 data bits, odd parity and two stop bits.
b) **[4 marks]** Write assembly instructions to set transmission speed at 4800 bps.

Q.4 [12 Marks] For **I2C** serial communication protocol shown in figure (1), answer the following:

a) **[3 marks]** In figure (1.a), what is the value of **N** of last slave? Elaborate your answer.
b) **[4 marks]** Which slave the master is communicating with according to timing diagram in figure (1.b)?
c) **[5 marks]** Redraw the timing diagram to represent the master reading from EEPROM?

(a)

(b)

Fig. (1)

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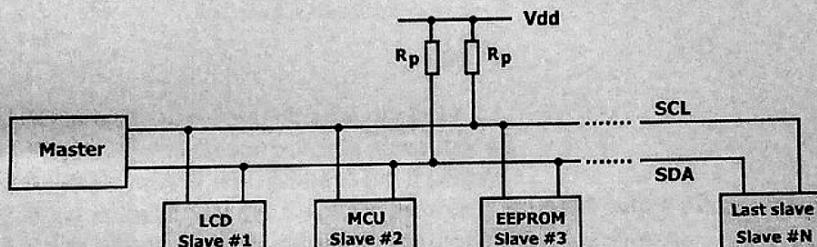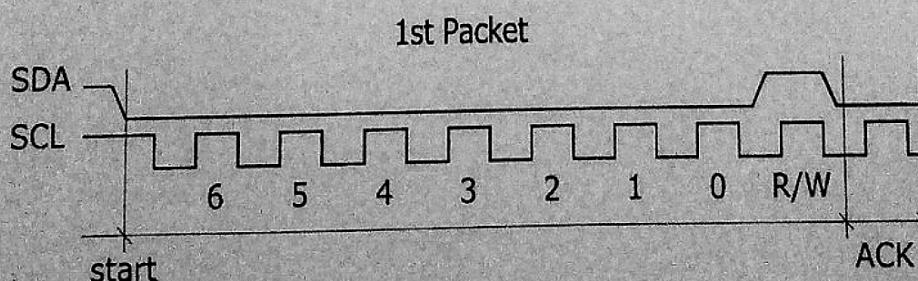
Q.5 [24 marks] Study the circuit shown in figure (2) below and then answer the following:
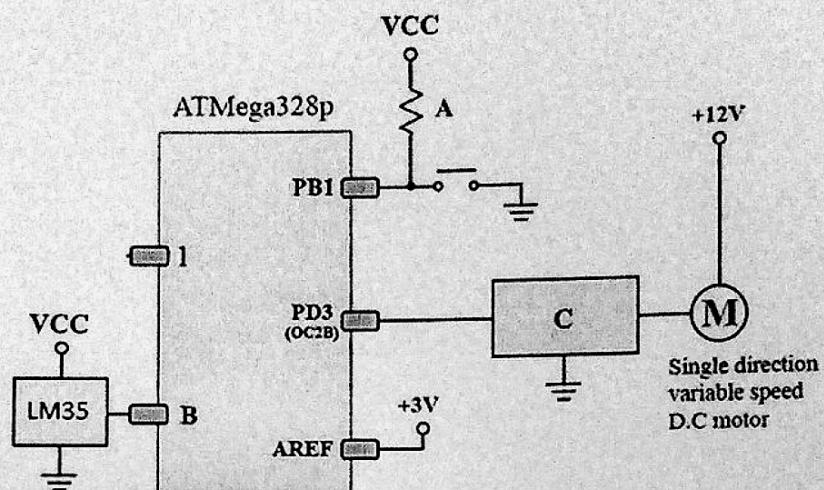
Fig. (2)

a) **[3 marks]** What is the name and purpose of pin 1?

b) **[3 marks]** What is the name and purpose of resistor A?

c) **[2 marks]** Replace letter B with possible pin number?

d) **[4 marks]** What is the digital out if voltage measured at LM35 output pin is 1V?

e) **[4 marks]** Write assembly instruction(s) to configure AREF as shown.

f) **[4 marks]** What is the name and purpose of block C?

g) **[4 marks]** Write assembly instruction(s) to run the motor at quarter of its maximum speed.

END OF QUESTIONS