**Question 1** (1 point)

In timer compare mode, [ ] is compared to the [ ] to generate an output signal.

Options:

- Clock Signal
- Prescaler Value
- Auto Reload Register
- Compare & Capture Register
- Timer Counter
- Output Signal

(1)

**Question 2** (1 point)

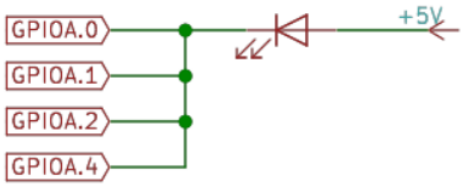
In down counting mode, if the scaled, incoming clock signal frequency is 3.7 MHz and the auto reload register (ARR) is set to 7000, how long is it between counter underflow events, in µs, to 3 decimal places?

Your Answer:

Answer

(2)

**Question 3** (1 point)




If pins 0, 1, 2, and 4 above are configured in push-pull mode, what is the result of writing 1, 1, 1, and 1 to these pins respectively (and simultaneously)?

- The LED lights up
- The LED does not light
- Short circuit!

(3)

**Question 4** (1 point)

If a signal goes from low to high (9.0V), and it takes 75ns for the signal to stabilise as high, what is the slew rate, in V/ns?

Your Answer:

Answer

(4)

**Question 5** (1 point) ✓ *Saved*

When in Pull Down mode, a digital input pin will read external high impedance (HiZ) as:

- (●) High
- ( ) Low
- ( ) HiZ

(5)

**Question 6** (1 point)

An output pin configured in push-pull mode can be used to power a DC motor.

- ( ) True
- ( ) False

(6)

**Question 1** (1 point)

Evaluate the following expression:

0b11010011

|

0b01010110

(7)

**Question 2** (1 point)

Which of the following operations results in bits 2, 7 and 14 being preserved in the variable x?

- x &= 0b0100_0000_1000_0100
- x ^= 0b0100_0000_1000_0100
- x |= 0b0100_0000_1000_0100
- x &= ~ 0b0100_0000_1000_0100

(8)

**Question 3** (1 point)

Which of the following operations results in bits 2, 7 and 14 being toggled in the variable x?

- x &= ~ 0b0100_0000_1000_0100
- x ^= 0b0100_0000_1000_0100
- x &= 0b0100_0000_1000_0100
- x |= 0b0100_0000_1000_0100

(9)

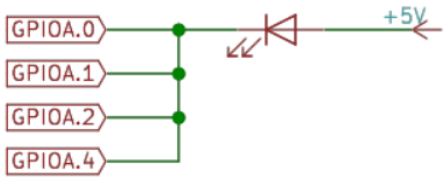
**Question 4** (1 point)

The timer counter increment operation occurs in the ALU of the microcontroller.

- True
- False

(10)

**Question 5** (1 point) ✓ *Saved*




If pins 0, 1, 2, and 4 above are configured in push-pull mode, what is the result of writing 0, 0, 1, and 0 to these pins respectively?

- ○ Short circuit!
- ○ The LED lights up
- ◉ The LED does not light

(11)

**Question 6** (1 point)

If a timer's incoming clock frequency is 2.9 MHz, and the prescaler value is set to 130, what is the resulting scaled clock frequency, in MHz, to 5 decimal places?

Your Answer:

Answer

(12)

**Question 1** (1 point)

Evaluate the following expression:

0b11010011 & 0b01010110

(13)

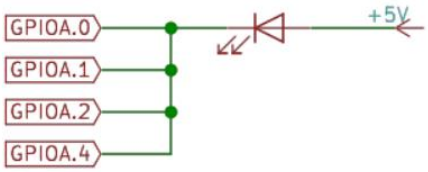
**Question 2** (1 point)

The prescaler can increase or decrease the frequency of the incoming clock signal.

- ○ True
- ○ False

(14)

**Question 3** (1 point)




If pins 0, 1, 2, and 4 above are configured in open drain mode, what is the result of writing 1, 1, 1, and 1 to these pins respectively?

- The LED does not light
- Short circuit!
- The LED lights up

(15)

**Question 4** (1 point)

How many PIO pins does the STM32F429 Discovery board support per GPIO port?

- 8
- 16
- 24
- 32

(16)

**Question 5** (1 point)

The pins in a GPIO port may be configured individually as either input or output.

- True
- False

(17)

**Question 6** (1 point)

If a timer's incoming clock frequency is 2.6 MHz, and the prescaler value is set to 260, what is the resulting scaled clock signal period, in µs, to 3 decimal places?

Your Answer:

Answer

(18)

**Question 1** (1 point)


Which output mode is correct for the above diagram?

- push-pull
- open drain
- either

(19)

**Question 2** (1 point)

A hardware timer generates interrupt events during overflow, but not overflow events.

- True
- False

(20)

**Question 3** (1 point)

In down counting mode, if the scaled, incoming clock signal frequency is 3.2 MHz and the auto reload register (ARR) is set to 8300, how long is it between counter underflow events, in µs, to 3 decimal places?

Your Answer:

Answer

(21)

**Question 4** (1 point)

What is the purpose of a Schmitt Trigger?

- To eliminate noise in digital signals.
- To eliminate noise in analog signals.
- To release the Schmitt hammer, which strikes the Schmitt firing pin, thus igniting a Schmitt explosion which propels the Schmitt projectile.
- To amplify analog signals.
- To compare signals to a reference value.

(22)

**Question 5** (1 point)

Transistors are composed of logic gates.

- ◯ True
- ◯ False

(23)

**Question 1** (1 point)

The majority of modern MCUs use port-mapped I/O.

- ◯ True
- ◯ False

(24)

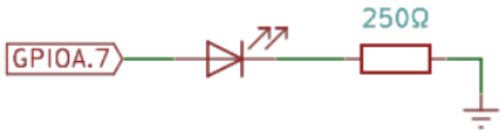
**Question 2** (1 point) ✓ *Saved*

Which of the following operations results in bits 2, 7 and 14 being set high in the variable x?

- ◯ x &= ~ 0b0100_0000_1000_0100
- ◯ x |= 0b0100_0000_1000_0100
- ◯ x &= 0b0100_0000_1000_0100
- ◉ x ^= 0b0100_0000_1000_0100

(25)

**Question 3** (1 point)




Which GPIO output mode is correct for the above circuit?

- ◯ push-pull
- ◯ open drain
- ◯ either

(26)

**Question 4** (1 point)

Peripheral timers can be configured to generate hardware interrupts in the MCU.

- ◯ True
- ◯ False

(27)

**Question 5** (1 point) ✓ *Saved*

If a timer's incoming clock frequency is 1.2 MHz, and the prescaler value is set to 120, what is the resulting scaled clock frequency, in MHz, to 5 decimal places?

Your Answer:

Answer

(28)

**Question 6** (1 point)

Evaluate the following expression:

0b11010011

^

0b01010110

(29)

**Question 1** (1 point)

Centre-aligned count mode generates both overflow and underflow interrupts.

- ◯ True
- ◯ False

(30)

**Question 2** (1 point)

Which of the following are GPIO pin modes:

- [ ] Pulse Width Modulation
- [ ] Compare and Capture
- [ ] Digital Input
- [ ] Analog Input
- [ ] Analog Output
- [ ] Memory Mapping
- [ ] Digital Output

(31)

**Question 3** (1 point)

In memory mapped I/O, values are read and written and pins are configured through:

- ( ) specially extended memory address space
- ( ) regular memory address space
- ( ) External RAM
- ( ) I/O pins
- ( ) general purpose registers

(32)

**Question 4** (1 point)

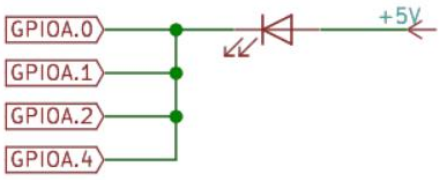
If a PWM signal's pulse has a width of 82µs and is low for 25µs between pulses, what is the duty cycle of this signal, to 3 decimal places, in percent?

Your Answer:

Answer

(33)

**Question 6** (1 point)




If pins 0, 1, 2, and 4 above are configured in open drain mode, what is the result of writing 0, 0, 1, and 0 to these pins respectively?

- The LED does not light
- The LED lights up
- Short circuit!

(34)

**Question 2** (1 point)

The memory mapped GPIO registers of the Cortex M-4 are contained in which memory region?

- External Device
- Peripheral Memory
- External RAM
- System Memory
- Instruction Memory
- Memory all alone in the moonlight
- Program Data Memory

(35)

**Question 3** (1 point)

An output pin configured in push-pull mode contains internal resistors to prevent short circuiting.

- True
- False

(36)

**Question 6** (1 point)

The timer's counter register is memory-mapped to the Cortex M-4's peripheral memory region.

- ◯ True
- ◯ False

(37)

**Question 3** (1 point)

Timer increment operations are aligned to _____ clock edges.

- ◯ Falling
- ◯ Rising

(38)

**Question 4** (1 point)

Which of the following operations results in bits 2, 7 and 14 being set low in the variable x?

- ◯ x &= 0b0100_0000_1000_0100
- ◯ x ^= 0b0100_0000_1000_0100
- ◯ x |= 0b0100_0000_1000_0100
- ◯ x &= ~ 0b0100_0000_1000_0100

(39)

**Question 5** (1 point)

Match the following GPIO port registers with their functions

| | |
|---|---|
| [ ⌄ ] Drives pin output | 1. ODR |
| [ ⌄ ] Stores and receives input | 2. IDR |
| [ ⌄ ] Sets output slew rate | 3. PUPDR |
| [ ⌄ ] Sets input pin in pull-up or pull-down mode. | 4. OTYPER |
| [ ⌄ ] Sets pin as digital input or output | 5. MODER |
| [ ⌄ ] Sets output pin in push-pull or open drain mode. | 6. OSPEED |

(40)

**Question 2** (1 point)

A single timer always has a single compare and capture register (CCR).

- True
- False