Ch16 Timer PWM Quiz ANS

1. Which register is used to divide the CPU clock frequency to generate a slower Timer Clock frequency?
A. Auto-Reload Register (ARR)
B. Capture Compare Register (CCR)
C. Prescaler Register (PSC)
D. Control Register (CR1)
ANS: C (Prescaler Register)

2. If the CPU Clock is 16 MHz and PSC is set to 15999, what is the Timer Clock frequency (fCK_CNT)?
A. 16 MHz
B. 1 MHz
C. 1 kHz
D. 100 Hz
ANS: C (16,000,000 / (15999 + 1) = 1,000 Hz = 1 kHz)

3. In Up-counting Mode, what happens when the Counter reaches the value in the Auto-Reload Register (ARR)?
A. It stops counting immediately.
B. It resets to 0 and generates an Update Event (UEV).
C. It reverses direction and starts counting down.
D. It waits for a software reset trigger.
ANS: B (Resets to 0 and generates UEV)

4. The formula for the Timer Period in Up-counting mode is:
A. (ARR + 1) * Clock Period
B. ARR * Clock Period
C. (PSC + 1) * ARR
D. 2 * ARR * Clock Period
ANS: A

5. In Center-aligned Counting Mode, the counter counts:
A. Up from 0 to ARR, then resets to 0.
B. Down from ARR to 0, then resets to ARR.
C. Up from 0 to ARR, then Down from ARR to 0.
D. Randomly between 0 and ARR.
ANS: C

6. Which PWM Mode behaves as "Low True" (Active Low) in Up-counting mode?
A. PWM Mode 1
B. PWM Mode 2
C. Center-aligned Mode
D. Capture Mode
ANS: A (Mode 1 is Low True/Active when CNT < CCR)

7. In PWM Mode 1 (Up-counting), if CNT < CCR, the output is:
A. Active (High)
B. Inactive (Low)
C. Toggled
D. Undefined
ANS: A

8. To increase the Duty Cycle in PWM Mode 1, you should:
A. Decrease the CCR value.
B. Increase the CCR value.
C. Set ARR to 0.
D. Increase the Prescaler (PSC).
ANS: B (Higher CCR means the "Active" condition CNT < CCR lasts longer)

9. How is the Duty Cycle calculated for PWM Mode 1?
A. Duty Cycle = 1 - (CCR / (ARR + 1))
B. Duty Cycle = CCR / (ARR + 1)
C. Duty Cycle = (ARR + 1) / CCR
D. Duty Cycle = PSC / ARR
ANS: B

10. A timer runs from a 72 MHz clock. PSC = 71 and ARR = 999. In PWM Mode 1, CCR = 250. What is the duty cycle?
A. 10%
B. 25%
C. 50%
D. 75%
ANS: B (Duty = CCR / (ARR + 1) = 250 / 1000 = 25%)