

# EE461 Microprocessor-based Digital Design

## Handling Interrupts Assignment 13 Solutions

1. The last two instructions in Example 14-1 in the PIC16F87XA Data Sheet are two `SWAPF` instructions. Why is it not sufficient to replace the two of them with the single instruction `MOVF W_TEMP, W`?

### SOLUTION

The `MOVF` instruction causes the `Z` bit of the `STATUS` register to be recalculated. This is not desirable because the interrupts service routine *must not* corrupt the contents of `STATUS` or it may alter the behavior of the interrupted program, which might be depending on a value of the `Z` bit it had computed before the interrupt occurred. Two `SWAPF` instructions achieve the same effect as a single `MOVF` instruction *without* altering the `Z` bit.

2. (T/F) The `RETFIE` instruction will reset the particular interrupt flag that triggered the interrupt in the first place.
3. (T/F) The `TMR2IF` bit will only be set by Timer 2 if the `TMR2IE` bit is set, too.
4. Setting aside storage for an interrupt service routine to save the contents of the `W`, `STATUS`, and `PCLATH` registers requires
  - (a) 3
  - (b) 4, because `W_TEMP` must be allocated in banks 0 and 1; `STATUS_TEMP` and `PCLATH_TEMP` need only be allocated in bank 0.
  - (c) 5
  - (d) 6 general-purpose registers be allocated.
5. (T/F) The `PEIE` bit must be set before the CPU can recognize an interrupt due to a change in bit 6 of Port B. False: the `RBIF` interrupt is not gated with `PEIE`.