

Name:

Id#

**COE 306, Term 171**

**Introduction to Embedded Systems**

**Quiz# 4**

Date: Tuesday, Dec. 18, 2017

**Q1.** Fill in the blank in each of the following questions:

- (1) The advantage of serial transmission in comparison to parallel transmission is that it is \_\_\_\_\_ while the advantage of parallel transmission is that it is \_\_\_\_\_.
- (2) The advantage of using differential signals in serial transmission is that it \_\_\_\_\_ the signal to noise ratio.
- (3) In \_\_\_\_\_ transmission, data flow is only in one direction while in \_\_\_\_\_ transmission, data flow is in both directions simultaneously.
- (4) Given 9600 baud rate and 8 voltage levels used for transmitting each symbol, the bit rate is \_\_\_\_\_.
- (5) Given a protocol with 3 bits of protocol (start, stop and parity), 7 bits of data, 9600 baud rate, and 1 bit per symbol (binary), the information rate is \_\_\_\_\_.
- (6) SPI has \_\_\_\_\_ (higher/lower) throughput than I<sup>2</sup>C.
- (7) In SPI, transmission involves two \_\_\_\_\_ registers one in master and one in slave connected in \_\_\_\_\_ topology.

(8) In I<sup>2</sup>C, a start condition is indicated by \_\_\_\_\_  
\_\_\_\_\_ and a stop condition is indicated by \_\_\_\_\_  
\_\_\_\_\_.

(9) In UART, a framing error occurs when \_\_\_\_\_.

(10) In UART, an overrun error occurs when \_\_\_\_\_.

**Q2.** It is required to interface a microcontroller as a master to three peripheral devices as slaves.

a. Show the block diagram interconnection of the master and slaves using SPI interface.

b. Show the block diagram interconnection of the master and slaves using I<sup>2</sup>C interface.