1. If the inputs to Item (7) are passive, the LED is ON.  
Yes ___ or No ___

2. What is the Department of Defense symbol for an OR device?  

3. Does item (2) above function like an AND device?  
Yes ___ or No ___

4. If both inputs in item (4) above are active the contacts are open?  
Yes ___ or No ___

5. Both item (6) inputs must be passive for the contacts to be closed?  
Yes ___ or No ___

6. What kind of relay is the device shown as item #1 above?  

7. Does item (2) above function like an OR device?  
Yes ___ or No ___

8. Which item above is the best symbol to represent a flip-flop?  

9. What is the number of the item that shows a function diagram of an instrument system that will open the relay contacts if one of its inputs becomes passive?  

10. What is the unique input pattern for a 5 input AND device?

11. If a 5 ohm resistor is in series with a parallel set of two 10 ohm resistors the total resistance of that circuit is __________.

12. 1 Volt is 1 Coulomb of charge per Joule of energy.  
Yes ___ or No ___

13. Item (15) is the only way to wire a START push button.  
Yes ___ or No ___

14. Item (14) is the only way to wire a STOP push button.  
Yes ___ or No ___

15. If R1, R2, and R3, equal 5, 10, and 10 ohms, respectively, what is the value of the total resistance for the circuit shown as item (12) above?  

16. If R1 equals 2R2, and R2 equals R3, what is the value of the Norton resistor in the Norton equivalent circuit of item (22)?  

17. Draw (in space below) the function diagram for an instrument system with an active low pressure sense high and an active high level sense low set of sensors that will turn an LED off if either of the sensors is active. Clearly show how the LED is wired and include the current limiting resistor in the diagram.

18. Draw (in space below) the function diagram for an instrument system with a Start push button, a Stop push button and an active low pressure sense high and an active high level sense low set of sensors that will turn an LED off if either of the sensors is active. Clearly show how the LED is wired and include the current limiting resistor in the diagram.

19. LED's burn out if the current exceeds 16 milliamps. Calculate the highest resistor value allowed for the TTL circuit in item 7? What are its units?

20. If the pressure sensor in the process described in item (8) goes into alarm a logic 0 signal will show up at the "Motor Run" output (the Q output) of the 7474. Yes ___ or No ___.

21. The LED in item (11) will be bright enough to see if 16 millamps pass through it. What should the resistance value be to permit that amount of current to pass through the LED.

22) If the Clear input item (22) is active, the LED is ON. Yes __ or No ___.
23) the gate shown as item (17) is open. Yes __ or No ___.
24) Item (25) is the equivalent circuit for a NAND. Yes __ or No ___.
25) If R1, R2, and R3, equal 5, 10, and 10 ohms, respectively, what is the value of the total resistance for the circuit shown as item (22) above._________