1. When is the next test? ______________________________________

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

3. Does item (5) above function like an AND device? Yes ____ or No ______

4. If one item (4) input is passive the contacts are open? Yes ___ or No ___

5. Both item (6) inputs must be active 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 (3) above function like an AND device? Yes___ or No ____

8. Which item above is the best symbol to represent a counter? ______

9. When Light Emitting Diodes are "forward" biased (item 11) the light is glowing. Is the LED in item 7 on (glowing) or on if both inputs are passive?

10. The resistor in item 11 is an example of a "pull up" resistor. Yes ___ No ___

11. 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? _____

12. What is the unique input pattern for a 5 input OR device?
13. Draw (in space below) the function diagram for an instrument system with two alarm sensors, one active high and the other active low, 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.

14. 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?

15. Draw in the space below the circuit in item 8 but include an active low, normally closed stop pushbutton that will stop the motor from running.

16. Using a normally open relay, show the function diagram for a three sensor system, (two of the sensors are active low, the third is active high) that will turn on an active low motor if any of the sensors are in alarm (active). Label the relay and clearly show the wiring of the relay. Also show how the power supply and the motor for the motor are wired to the relay.

17. Draw in the space below an LED with its current limiting resistor in a forward biased configuration.