

Name: \_\_\_\_\_

Section: \_\_\_\_\_

## **EE334 Homework: K-Maps #2**

### **Problems from Hambley:**

- P7.67, Pg. 2 of this PS

### **Additional Problems (Instructor Option):**

- P7.48 (a, b, d) – For part d, use a K-Map to reduce and then draw the circuit

Name: \_\_\_\_\_

Section: \_\_\_\_\_

## EE334 Homework: K-Maps #2

**#1 – You have designed a new engine that requires a coolant pump to run or stop when certain conditions are sensed. The engine has four sensors: Temperature (T), Pressure (P), Speed (S), and Altitude (A).**

- $T=1$  when air temperature  $> 90F$  otherwise  $T=0$ .
- $P=0$  when coolant pressure  $< 50\text{psig}$  otherwise  $P=1$ .
- $S=1$  when engine speed  $> 3900\text{RPM}$  otherwise  $S=0$ .
- $A=1$  when the altitude is  $> 50000\text{ft}$  otherwise  $A=0$ .

**Design a circuit that will turn the pump on when an output signal  $Y=1$  and off when the output signal  $Y=0$ .**

The pump should be **on** when any of the following conditions exist.

- Altitude is  $> 50000\text{ft}$ .
- Engine speed is  $> 3900\text{RPM}$  and coolant pressure  $< 50\text{psig}$ .
- Coolant pressure  $< 50\text{psig}$  and air temperature  $> 90F$ .

Otherwise, the pump should be **off**.

**a) Write the Sum of Products Boolean expression for Y.**

**b) Simplify the Boolean expression for Y using a K-Map.**

**c) Draw the logic diagram for the circuit you designed.**