

## ELEG 3143 Assignment # 1

1. If  $A$  and  $B$  are subsets in the same space, find
  - (a)  $(A - B) \cap (B - A)$
  - (b)  $(A - B) \cap B^c$
  - (c)  $(A - B) \cup (A \cap B)$
2. A space  $S = \{a, b, c, d, e, f\}$  has two subsets defined as  $A = \{a, c, e\}$  and  $B = \{c, d, e, f\}$ . Find
  - (a)  $A - B$
  - (b)  $(B - A) \cup A$
3. State whether each of the following defined events is an elementary event.
  - (a) Obtaining two heads when three coins are flipped
  - (b) Obtaining an ace when a card is selected at random from a deck of cards
  - (c) Obtaining three heads when three coins are flipped
4. If a pair of dice are rolled, determine the probability of each of the following events.
  - (a) Obtaining a sum of 11
  - (b) Obtaining a sum less than 5
  - (c) Obtaining a sum that is an even number

5. A company manufactures small electric motors having horse power ratings of 0.1, 0.5, or 1.0 horsepower (HP) and designed for operating with 120 V single-phase (1- $\phi$ ) AC, 240 V single-phase AC, or 240 V three-phase (3- $\phi$ ) AC. The motor types can be distinguished only by their nameplates. A distributor has on hand 3000 motors in the quantities shown in the table below.

Horse Power	120 V 1- $\phi$	240 V 1- $\phi$	240V 3- $\phi$
0.1	900	400	0
0.5	200	500	100
1.0	100	200	600

One motor is discovered without a name plate. Determine the probability of the following events.

- (a) The motor has a horsepower rating of 0.5 HP.
  - (b) The motor is designed for 240 V single-phase operation.
  - (c) The motor is 1.0 HP and is designed for 240 V three-phase operation.
  - (d) The motor is 0.1 HP and is designed for 120 V operation.
6. A box contains 25 transistors, of which 4 are known to be bad. A transistor is selected at random and tested.
- (a) What is the probability that it is bad?
  - (b) If the first transistor tests bad what is the probability that a second transistor selected at random will also be bad?
  - (c) If the first transistor tested is good, what is the probability that the second transistor selected at random will be bad?