

King Fahd University of Petroleum and Minerals  
Department of Electrical Engineering  
EE 315 Probabilistic Methods in Electrical Engineering

**Dr. H. Ragheb**

HW No. 1

1- Assume that  $S$  is all the real numbers and that

$$A = \{3 < x \leq 18\}$$

$$B = \{20 < x < \infty\}$$

$$C = \{0 \leq x \leq 20\}$$

What are  $B \cup C$ ,  $B \cap C$ ,  $B \cup \overline{C}$ ,  $A \cup C$ ,  $A \cap C$  and  $\overline{A \cap B}$  .

2- Given that  $P(A) = 0.92$ ,  $P(B) = 0.97$  and  $P(B \cap \overline{A}) = 0.06$ .

a- If  $A$  and  $B$  are subsystems in a chain system, what is the probability of the system operating correctly?

b- If  $A$  and  $B$  are subsystems in a parallel system, what is the probability of the system operating correctly?

3- It is given that  $P(A) = 0.6$ ,  $P(B) = 0.7$  and  $P(A \cap B) = 0.5$ .

a- Find  $P(\overline{A} \cap B)$ ,  $P(A \cap \overline{B})$  and  $P(\overline{A} \cap \overline{B})$ .

b- Find  $P(A \cup B)$ ,  $P(\overline{A} \cup B)$ ,  $P(A \cap \overline{B})$  and  $P(\overline{A} \cap \overline{B})$ .

4- A pointer is spun on a circular dial; it will come to rest *equally likely* in any direction on the dial. The dial is divided into 10 equal segments labeled  $a_1, a_2, \dots, a_{10}$ . Define

$$A = \{a_1, a_3, a_5, a_7\}$$

$$B = \{a_4, a_5, a_6, a_7, a_8\}$$

$$C = \{a_6, a_8, a_{10}\}$$

Find the probabilities of the following events:  $A, B, C, A \cap B, A \cup B, A \cap C, A \cup C,$

$B \cap C$  and  $B \cup C$  .