

- 1) Consider the experiment of tossing four fair coins and observing the outcome. List all the elements of the sample space. Give two examples of event spaces.
- 2) Let $S = \{a, b, c, d\}$ be a sample space such that $P(\{a\})=P(\{b\})=1/4$ and $P(\{c\})=2P(\{d\})$. Find the probability function P .
- 3) Is it possible to have an assignment of probabilities in some random experiment such that $P(A) = 1/2$, $P(B) = 1/4$ and $P(A \cap B) = 1/3$?
- 4) Prove that $P(A \cap B) \geq P(A) + P(B) - 1$.
- 5) If we know that $P(A \cup B)=2/3$ and $P(A \cap B)=1/3$, can we determine $P(A)$ and $P(B)$?
- 6) A die has been loaded so that the probability of a particular number coming up is proportional to that number. Compute
 - (i) the probabilities of all the singleton events,
 - (ii) the probability that an even number will occur,
 - (iii) the probability that a number greater than 4 will occur.
- 7) Let A, B, C be three events. Find the expressions for the events
 - (i) only A occurs,
 - (ii) both A and B but not C occur,
 - (iii) at least one event occurs,
 - (iv) all three events occur,
 - (v) at most one event occurs,
 - (vi) none of the events occurs.
- 8) Let $P(A) = x$, $P(B) = y$ and let $P(A \cap B) = z$. Find
 - (i) $P(A \cap B \cap C)$,
 - (ii) $P(A \cap C \cup B \cap C)$,
 - (iii) $P(A \cup B \cap C)$.