ASSIGNMENT NO 5

1. Give an example of 3 events A, B, C which are pairwise independent but not jointly independent.

Hint: find an example where whether C occurs is completely determined if we know whether A occurred and whether B occurred, but completely undetermined if we know only one of these things.

ANS:

Throw two fair dice.
Consider the events:

- A:={the sum of the points is 7}A:={the sum of the points is 7},
- B:={the first die rolled a 3}B:={the first die rolled a 3},
- C:={the second die rolled a 4}C:={the second die rolled a 4}.

All three events have probability 1/6.
Moreover, you can check that they are pairwise independent.
However, they are not jointly independent.

2. A bag contains one marble which is either green or blue, with equal probabilities. A green marble is put in the bag (so there are 2 marbles now), and then a random marble is taken out. The marble taken out is green. What is the probability that the remaining marble is also green?

ANS:

let G represents green marble and B represents Blue marble.
According to the question. After putting a green marble in the bag, we have
Let already assume that the marble in the bag is green.
Then, after taking green marble.
Probability that the remaining marble is also green =1.
Let assume that already present marble in the bag is blue, then after taking green marble.
Probability that the remaining marble in the bag is green = 0
So, required probability =0+1=1