Student: ____________________________________

Group: _____________________________________

Lecturer: A.S. Eremenko

HOMEWORK 5

1. Probability of some event A, given the occurrence of some other event B is the:

1	

a) joint probability;

b) unconditional probability;

c) marginal probability;

d) conditional probability.

2. Conditional probability is undefined if:

1	

a) all outcomes are equally likely;

b) we know that the outcome is within some given event B;

c) the conditioning event has zero probability;

d) $P(B) > 0$.

3. General rule for calculating various probabilities in conjunction with a tree-based sequential description of an experiment includes following steps:

1	

a) set up the tree so that an event of interest is associated with a leaf;

b) record the conditional probabilities associated with the branches of the tree;

c) construct probabilistic model for experiment;

d) obtain the probability of a leaf by multiplying the probabilities recorded along the corresponding path of the tree.

4. We are partitioning the sample space into a number of scenarios. Then, the probability that some defined event occurs is a weighted average of its conditional probability under each scenario, where each scenario is weighted according to its (unconditional) probability. This is a statement of:

1	

a) multiplication rule;

b) total probability theorem;

c) Bayes` rule;

d) rule of sum.

5. What basic rules verify the Bayes` rule:

1	

a) definition of conditional probability;

b) total probability theorem;

c) multiplication rule;

d) rule of sum?

6. Which of statements listed below is true for independent events:

a) occurrence of B provides no information and does not alter the probability that A has occurred, i.e. $P(A|B) = P(A)$;

1	

b) if A and B are independent, so are A and B^c;

c) $P(A \cap B) = P(B)P(A|B)$;

d) occurrence of two events is governed by distinct and noninteracting physical processes?

7. To solve the problem of reliability of complex system we use:

1	

a) dividing system into subsystems;

b) assumption that components can fail independently;

c) conditional probabilities;

d) series and parallel connections of system components.

Problem 1. Let A and B be events. Show that $P(A \cap B|B) = P(A|B)$, assuming that $P(B) > 0$.

2	

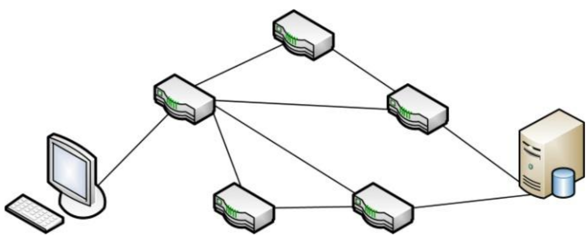
Solution:

Problem 2. A batch of one hundred items is inspected by testing four randomly selected items. If one of the four is defective, the batch is rejected. What is the probability that the batch is accepted if it contains five defectives?

Solution:

4	

Problem 3. Find the probability that network is operational if all links are up with probability 0.95.



Solution:

7	

20	