HomeWork2

Chapters 3 (Probability)

Q. 1: A message can follow different paths through servers on a network. The senders message can go to one of five servers for the first step, each of them can send to five servers at the second step, each of which can send to four servers at the third step, and then the message goes to the recipients server.
(a) How many paths are possible?
(b) If all paths are equally likely, what is the probability that a message passes through the first of four servers at the third step?

Q2: A maintenance firm has gathered the following information regarding the failure mechanisms for air conditioning systems:

		Evidence of gas leaks	
		satisfactory	unsatisfactory
Evidence of electrical failures	satisfactory	55	17
	unsatisfactory	32	3

The units without evidence of gas leaks or electrical failure showed other types of failure. If this is a representative sample of AC failure, find the probability:
(a) That failure involves a gas leak;
(b) That there is evidence of electrical failure given that there was a gas leak;
(c) That there is evidence of a gas leak given that there is evidence of electrical failure.

Q3: Samples of laboratory glass are in small, light packaging or heavy, large packaging. Suppose that 2 and 1% of the sample shipped in small and large packages, respectively, break during transit.
It is also known that 60% of the samples are shipped in large packages and 40% are shipped in small packages.
a). What proportion of samples break during shipment?
b). If samples are shipped through small and light packaging, what is the probability that samples break during the shipment?
c). If samples break during the shipment, what is the probability that samples are shipped through small and light packaging?

Q4: A batch of 25 injection-molded parts contains 5 that have suffered excessive shrinkage.
(a) If two parts are selected at random, and without replacement, what is the probability that the second part selected is one with excessive shrinkage?
(b) If three parts are selected at random, and without replacement, what is the probability that the third part selected is one with excessive shrinkage?

Q5: A batch of 500 containers for frozen orange juice contains 5 that are defective. Two are selected, at random, without replacement, from the batch. Let *A* and *B* denote the events that the first and second container selected is defective, respectively.
(a) Are *A* and *B* independent events?
(b) If the sampling were done with replacement, would *A* and *B* be independent?