



Yaşar University

Department of Mathematics

MATH 2240 Probability and Statistics for Engineers

MIDTERM EXAMINATION

1. (20) In a class, there are 1000 students as following:

	Male	Female	Total
Major A	200	250	450
Major B	250	300	550
Total	450	550	1000

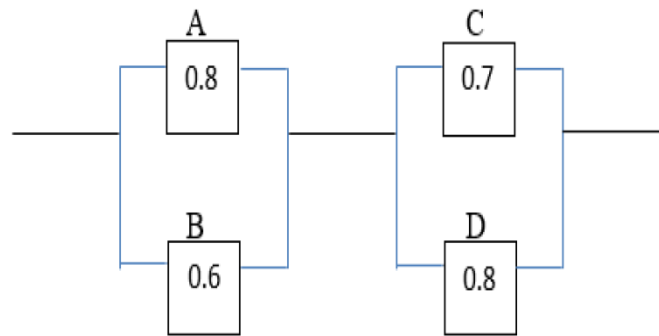
- a) What is the probability that a randomly selected student from this class is a female.
- b) If a selected student from this class is female, then what is the probability that she is from Major A.

2. (20) The number of e-mail messages received per hour has the following distribution:

X : nb of msg	1	2	3	4	5
$P(X)$	0.15	0.15	0.30	0.20	0.20

Determine the mean and standard deviation of the number of messages received per hour.

3. (20) If X is a random variable such that X follows a Binomial distribution with the parameters of n and p [$X \sim \text{Binomial}(n, p)$]. If $E(X)=12$ and $\text{Var}(X)=3$, find n and p .
4. (20) In a certain factory, accidents occur at a mean rate of 2 per week. Assuming the number of accidents per week follows a Poisson Distribution. Find the probability of less than 3 accidents occurring in a given fortnight (2 weeks).
5. (20) The figure below represents the probabilities of each component part surviving for 2000 hours. Calculate the probability of survival for 2000 hours for complete the system. The components are independent.



$$P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

$$P(X = x) = {}^nC_x p^x (1 - p)^{n-x} \quad \mu = np \quad \sigma^2 = npq$$

$$P(X) = \frac{\lambda^x e^{-\lambda}}{x!}$$

$$\mu = \sum xP(x) \quad \sigma^2 = \sum (x - \mu)^2 P(x) \quad \sigma^2 = \sum x^2 P(x) - \mu^2$$