MATH 2212 ENGINEERING STATISTICS
MIDTERM EXAMINATION

Academic integrity is expected of all students of Yaşar University at all times, whether in the presence or absence of members of the faculty. Understanding this, I declare that I shall not give, use nor receive unauthorized aid in the examination.

- PLEASE NOTE THAT QUESTIONS ARE IN THE ORDER OF MATERIAL COVERED IN DURING THE SEMESTER.
- GIVE ALL NECESSARY DETAILS IN DEVELOPING YOUR ANSWERS. YOU WILL NOT GET FULL CREDIT UNLESS THE DEVELOPMENT IS COMPLETE!
- YOU ARE RESPONSIBLE FOR THE LEGIBILITY OF YOUR WRITING. YOU MAY LOSE POINTS IF THE ORGANIZATION OF YOUR ANSWER MAKES THE DEVELOPMENT DIFFICULT TO FOLLOW.
- YOU ARE RESPONSIBLE TO GIVE PROPER AMOUNT OF TIME TO SOLVE EACH QUESTION. A GOOD STRATEGY IS TO START FROM THE QUESTIONS THAT YOU CAN SOLVE WITH LEAST EFFORT.

Please do not forget to write down your name-surname, your student number, and your section number on your answer sheet. For solving the given question and uploading your answer, you have only 30 minutes (16:40-17:10). Note that you do not have any extra time to upload your answer to the system. You are expected to submit your hand-written solution for this question to Moodle in pdf format. The submitted answers in any other format type will not be accepted.

1. Suppose that the random variable X has the probability distribution:

$$f(x) = \begin{cases} \frac{1}{\lambda} x^{\frac{1}{\lambda}-1} & \text{for } 0 \leq x \leq 1 \text{ and } \lambda > 0, \\ 0 & \text{otherwise.} \end{cases}$$

Let $X_1, X_2, \ldots, X_n$ be a random sample of size n.
a) Find the maximum likelihood estimator (MLE) of $\hat{\lambda}_{MLE}$.
b) Find the method of moment estimator of $\hat{\lambda}_{MoME}$.
c) Suppose that we have collected four observations (i.e., $n=4$) and that the observations are $X_1=0.3$, $X_2=0.5$, $X_3=0.2$, and $X_4=0.8$. Under this circumstance, find the point estimate of λ by using part (a).