



COMSATS University Islamabad

Attock Campus

Department of Mathematics

Assignment # 03

Class: BSM-VI
Subject: Real Analysis II
Instructor: Dr. Atiq ur Rehman

Due Date: 09-12-2021 (1:30PM)
Course Code: MTH322
Marks: 10

Question # 1

Prove that a series of functions $\sum f_n$ defined on $[a, b]$ converges uniformly on $[a, b]$ if and only if for every $\varepsilon > 0$ and for all $x \in [a, b]$, there exist an integer N such that

$$|f_{n+1}(x) + f_{n+2}(x) + \dots + f_{n+p}(x)| < \varepsilon, \quad \forall n \geq N, p \geq 1.$$

Question # 2

Show that the sequence $\{f_n\}$, where $f_n(x) = nxe^{-nx^2}$, $x \geq 0$, is not uniformly convergent on $[0, k]$, $k > 0$.

Academic Honesty Requirements:

You are encouraged to work with others in the completion of assignments but it doesn't include copying. However, in the spirit of Academic Honesty, which includes crediting others for their contribution to your work, please include one of the following statements with every submitted assignment on title page:

1. I worked alone on this assignment.
2. I worked with the following: List their full names. Include their relationship to you if they are not also a member of this class.