COMSATS University Islamabad
Attock Campus

Department of Mathematics

Quiz/Assignment # 04

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

Due Date: 25-12-2020 (1500 Hrs)
Course Code: MTH211
Marks: 10

Instructions: (one must follow the instructions)

- Please name the PDF as **qa4-mth322-xyz**, where xyz is last three digits of your registration number (e.g., if your registration number is **sp20-mmt-071**, then name the as **qa4-mth322-071**) before submission.
- Similarity of a solution with other students may reduce your marks.
- Please make sure that the PDF is good before sending.
- Email PDF at **atiq+mth322@cuiatk.edu.pk** (any email address can be used for sending).
- Please send email only once.
- Do not forget to read the academic honesty requirement before sending.

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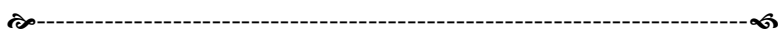
Question # 1

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

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

Question # 2

Prove that $\left\{ \dfrac{\sin x - 2\cos x}{n^2} \right\}$ is uniformly convergent for $x \in [0, \pi]$.

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 and write myself.**
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 and write myself.