Name: .... **Class: MSc-III** **Reg. No.:** ....

Quiz 4: Real Analysis II

Instructions:

- Please choose the most correct option by filling or ticking or crossing the box.
- Spoiled or overwritten selection has no credit.

Question 1 Find the value of p for which $\int_0^1 \frac{1}{x^{p+1}}dx$ is convergent

- ☐ $p > 0.$
- ■ $p < 0.$
- ☐ $p < 1.$
- ☐ $p \leq 0.$

Question 2 If $\{f_n\}$ is uniformly convergent on $[a, b]$, then under suitable condition which of the following is NOT true.

- ☐ $\lim\limits_{n\to\infty} \int_a^b f_n(x)dx = \lim\limits_{n\to\infty} \int_a^b \lim_{x\to x_0} f_n(x)dx$
- ☐ $\lim\limits_{x\to x_0} \left(\lim\limits_{n\to\infty} f_n(x)\right) = \lim\limits_{n\to\infty} (\lim_{x\to x_0} f_n(x))$
- ■ None of these
- ☐ $\left(\lim\limits_{n\to\infty} f_n(x)\right)' = \lim\limits_{n\to\infty} f_n'(x)$ for all $x \in [a, b]$.

Question 3 If $\left\{f_n(x) = \frac{1}{x^n}\right\}$ be sequence of functions defined on $I := [2, 10]$, then $\min\limits_{x\in I} f_n(x) =$

- ☐ 10^n
- ☐ $\dfrac{1}{2^n}$
- ■ $\dfrac{1}{10^n}$
- ☐ 2^n

Question 4 If $f, |f| \in \mathcal{R}(\alpha; a, b)$, then one has

- ☐ $\int_a^b f d\alpha \geq \int_a^b |f| d\alpha.$
- ■ $\int_a^b |f| d\alpha \geq \int_a^b f d\alpha.$
- ☐ $\left|\int_a^b f d\alpha\right| \leq \int_a^b f d\alpha$
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Question 5 If $\lim_{n\to\infty} a_n = 0$, then $\sum a_n$ .... convergent.

- ☐ is
- ☐ must be
- ■ may be
- ☐ is not

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- ■ $p < 0$.
- ☐ $p > 0$.
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