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| Salahaddin University–Erbil |  | Module: | Mathematical Analysis |
| College of Basic Education | Stage: | Third |
| Department: Mathematics | Round: | First |
|  First Semester Examination 2022-2023 | Time: |  2 Hours |

Q1: Define an ordered field F, and show that for any $a,b\in F,$ if $0<a<b$, then $\frac{1}{a}>\frac{1}{b}$ .

 (10 Marks)

Q2: Define countable set, and show that the set of all real numbers is not countable set.

 (10 Marks)

Q3: State Dense of irrational numbers, show that between any two distinct real numbers, there is an irrational number. (10 Marks)

Q4: Use $(ε,N) $method to show that a sequence $\left\{\frac{3n+4}{7n+6}\right\}$ converges to $\frac{3}{7}$. (10 Marks)

Q5: Prove or disprove the following: (5+5+5+5) Marks

1. Every Convergent sequence is bounded.
2. ($\frac{2+\sqrt{3}}{5})\in Q^{c}$.
3. If $\{a\_{n}\}$ converges to $a\_{0}$ and $\{b\_{n}\}$ converges to $b\_{0}$ , then $\left\{a\_{n}-b\_{n}\right\} $converges to $a\_{0}$-$b\_{0}$.
4. If a subset *A* of an ordered field *F* has a least upper bound, then it has also greatest lower bound.

 Examiner: Dr. Sami Ali Hussein