Mid-West University

Examinations Management Office

End Semester Exam-2081

B.Ed. Level /V Semester

Sub: Fundamentals of Real Analysis (MATH451)

Roll No. .....

Group 'A' **10×1=10**

Tick (✓) the Best Answer.

1. Between any two distinct real number there exist:
   (a) Only one rational number
   (b) Finite number of rational numbers
   (c) Infinite many rational numbers
   (d) Only two rational numbers

2. Which of the following is an open set?
   (a) $\{x: a \leq x < b\}$ (b) $\{x: a < x \geq b\}$
   (c) $\{x: a < x < b\}$ (d) $\{x: a \leq x \leq b\}$

3. A non-empty set $S \subset R$ bounded above has ...
   (a) An infimum (b) A supremum
   (c) Infimum & supremum (d) Neither supremum nor infimum

4. Which one of the following is the neighborhood of each of its point?
   (a) Set of natural number (b) Set of rational number
   (c) Set of irrational number (d) Open interval (a,b)

5. Which of the following is not a bounded sequence?
   (a) $\langle 1 + (-1)^n \rangle$ (b) $\langle n^2 \rangle$
   (c) $\langle (-1)^n + \frac{1}{n} \rangle$ (d) $\langle \frac{\langle (-1)^n \rangle}{(n-1)!} \rangle$

6. The series $\sum \frac{1}{(logn)^p}$ is divergent if ...
   (a) $p > 1$ (b) $p < 1$
   (c) $p \leq 1$ (d) $p = 1$

7. If $\sum u_n$ is a positive term series and $\lim_{x \to \infty} n\left[\frac{u_n}{u_{n+1}} - 1\right] = l$ then,
   (a) Comparison test (b) Cauchy's root test
   (c) D'Alemberts ratio test (d) Raabe's test

8. Which of the following is a value of $\lim_{x \to 0} xsin\left(\frac{1}{x}\right)$?
   (a) 0 (b) 1
   (c) -1 (d) ∞

9. A function f(x) is called derivable from right at x=c if for $h > 0$ ...
   (a) $\lim_{x \to 0} \frac{f(c+h)-f(c)}{h}$ exists (b) $\lim_{x \to 0} \frac{f(c+h)+f(c)}{h}$ exists
   (c) $\lim_{x \to 0} \frac{f(c-h)-f(c)}{h}$ exists (d) $\lim_{x \to 0} \frac{f(c-h)-f(c)}{-h}$ exists

10. The value of 'C' of Rolle's theorem for the function f(x)=sinx in $[0,\pi]$ is given by...
    (a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$
    (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{4}$

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End Semester Exam-2081

Level: B.Ed. / V Semester FM: 60

Time: 3 hrs PM: 30

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Candidates are requested to give their answers in their own words as far as practicable.

Attempt All the Questions.

Group 'B' **6 × 5 = 30**

1. Define bounded below of the set. The set R^- is bounded above and unbounded below.

2. Define countable set. Prove that the open interval [0,1] is uncountable.

3. The set of limit points of every sequence u is closed set.

   Or

   A monotonic sequence $\langle u_n \rangle$ is convergent iff it is bounded.

4. Show that the series. $\frac{2^2.4^2.6^2.....(2n)^2}{3^2.5^2.7^2.....(2n+1)^2}$ is convergent by Gauss test.

5. Define limit. Show that $\lim_{x \to 5}(2x + 10) = 20.$

6. If f is derivable at a point, then it is continuous at that point. But converse is not true.

   Or

   If f is continuous on [a,b] then it is uniformly continuous on [a,b].

Group 'C' **2 × 10=20**

7. Define complete ordered field. The set of rational numbers Q is not complete.

8. State the D'Alembert's Ratio test. Test the conveorgence of series $\sum \frac{\sqrt{n}}{\sqrt{n^2+1}} x^2$.

   Or

   State and prove Taylor theorem

THE END