Kandi Raj College – Department of Mathematics – Internal Examination – 3rd Semester – Program course

Full Marks: GCC – T – 3 = 10 and SEC – T – 1 = 05 [Only for students opting for Mathematics as SEC]

GCC – T – 3 — 10

Real Analysis — 10

Answer any TWO questions:

1. Show that the sequence $\{u_n\}$ where $u_n = \frac{3n}{n+1}$ is monotonic increasing and bounded above. Also show that it is convergent and find its limit. **05**

2. Examine the convergence of the series $\frac{1+2}{2^3} + \frac{1+2+3}{3^3} + \frac{1+2+3+4}{4^3} + \cdots$ **05**

3. Show that the sequence $\{f_n\}$, where $f_n(x) = x^{n-1}(1-x)$ converges uniformly in the interval $[0,1]$. **05**

SEC – T – 1 [ONLY FOR STUDENTS OPTING FOR MATHEMATICS AS SEC] — 05

Use separate answer script for SEC

Logic & Sets — 05

Answer any ONE (1) question:

1. What is the difference between a "Contradiction" and a "Tautology"? **1+2+2**
Which of the following is a "Tautology" or "Contradiction": (a) $(p \to q) \vee (p \to r)$; (b) $p \to (q \vee r)$.

2. Use truth table to show: $\sim (p \vee q) \equiv (\sim p) \wedge (\sim q)$. **2+3**
Without using truth table show: $(p \wedge q) \vee (\sim p) = \sim p \vee q$.