# University of Sargodha



M.A/M.Sc Part- II/Composite, 2nd-A 2009

Math: I/VI Advanced Analysis

m Marks: 60

Time Allowed: 2:15 Hours

***Subjective Part***

**Attempt any four questions. All questions carry equal marks.**

Show that if Lebesgue outer measure $m^* E = 0$, then $E$ is measurable. (20)

For the Bessel function $J_n(x)$ show that $2J_n'(x) = J_{n-1}(x) - J_{n+1}(x)$ (20)

Prove that $P_n(x) = \frac{1}{2^n n!}\frac{d^n}{dx^n}(x^2-1)^n$ where $P_n(n)$ is a Legender Polynomial. (20)

If $f$ and $g$ are bounded measurable functions defined on a set $E$ of finite measure, then $\int_E (af + bg) = a\int_E f + b\int_E g$ where $a, b > 0$ (20)

Prove that every infinite countable set $A$ is countable. (20)

Show that $[a, \infty)$ is measurable. (20)