ANALYSIS-III

Q.1 Find the radius of convergence for Power Series whose nth term is n^2x^n.

Q.2 Let $f_n(x)=\frac{nx}{1+n^2x^2}$

Show that f_n-> 0 pointwise on R.Also check that if f_n->0 uniformly on[0,1].Justify.

Q.3 A Bounded function f on [a,b]is integrable iff for each E>0 there exist a partition P of [a,b] such that U(f,P)-L(f,P)<E.

Q.4 Let f(x)=x,x is rational no. and f(x)=0,x is irrational, Calculate the upper and lower Darboux integrals for f on [0,b].Is f integrable on [0,b]?

Q.5 Prove that every monotonic function f on [a,b]is integrable.

Q.6 Prove that every continuous function f on [a,b] is integrable.

Q.7 Determine the convergence/divergence of the following improper integral

$$\int_{1}^{+\infty} \frac{1}{x^2}$$

Q.8 A Bounded function f on[a,b] is Riemann integrable iff it is Darboux integrable.

Q.9 Check for Uniform Convergence

$f_n(x)=\frac{1}{n} Sin(nx+n)$ on R.

Q.10 Let f be a bounded function on [a,b].If P and Q are partitions of [a,b] and set P is contained in Q, then

L(f,P)≤L(f,Q)≤U(f,Q)≤U(f,P)

Q.11 If f is a bounded function on[a,b], and if P and Q are partitions of [a,b], then

L(f,P)≤U(f,Q)

Q.12 If f is a bounded function on [a,b] then L(f)≤U(f).

Q.13 Check for Uniform Convergence

$f_n(x)=\frac{x}{n}$ on [0,1].

Q.14 Check for Uniform and Pointwise Convergence

$f_n(x)=x^n$ on [0,1].