Prof T J Osler
Real Analysis

I Decide if each series given converges or diverges. Also give a reason for each answer. Select your reasons from:

(A) nth term test, (B) Comparison with p series., (C) Comparison with geometric series

(D) Integral test, (E) Ratio test, (F) Nth root test, (G) alternating series test.

1. $\sum_{n=0}^{\infty} \frac{2^n}{n!}$, 2. $\sum_{n=0}^{\infty} 3^n$ 3. $\sum_{n=2}^{\infty} \frac{1}{\ln(n)}$, 4. $\sum_{n=0}^{\infty} \frac{n^4}{n^5+4}$, 5. $\sum_{n=0}^{\infty} (-1)^n \log(n)$,

6. $\sum_{n=0}^{\infty} \frac{2n+2}{3n+4}$, 7. $\sum_{n=0}^{\infty} \frac{1}{\sqrt{(n+1)(n+2)(n+3)}}$, 8. $\sum_{n=1}^{\infty} \frac{(-1)^n}{\log(n)}$, 9. $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$,

10. $\sum_{n=0}^{\infty} \frac{1}{(\ln(n))^n}$, 11. $\sum_{n=3}^{\infty} \frac{\log(n)}{n^2}$, 12. $\sum_{n=0}^{\infty} \frac{n^3}{4^n}$, 13. $\sum_{n=2}^{\infty} \frac{1}{n^{\sqrt{n}}}$

II. For each of the following series, decide if it (A) Converges Absolutely,

(B) Converges Conditionally, or (C) Diverges.

1. $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$, 2. $\sum_{n=1}^{\infty} \frac{\sin(nx)}{n^4}$, 3. $\sum_{n=0}^{\infty} \frac{(-1)^n n}{3^n}$, 4. $\sum_{n=0}^{\infty} (-1)^n \log(n)$,

5. $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$, 6. $\sum_{n=0}^{\infty} x^n$, for $|x|<1$, 7. $\sum_{n=0}^{\infty} \frac{x^n}{n!}$ for all x.