School of Mathematics

Thapar University, Patiala

UMA003: Mathematics-I, (Tutorial Sheet 04)

Check the convergence/ divergence of the following series:

(1) $\sum_{n=2}^{\infty} \frac{\log n}{n}$

(2) $\sum_{n=1}^{\infty} \frac{5^n}{4^n+3}$

(3) $\sum_{n=1}^{\infty} \frac{\tan^{-1} n}{1+n^2}$

(4) $\sum_{n=1}^{\infty} \frac{1}{\cosh n}$

(5) $\sum_{n=2}^{\infty} \frac{1}{n(\log n)^p}$, where $p \geq 0$

(6) $\sum_{n=1}^{\infty} \frac{(\ln n)^2}{n^3}$

(7) $\sum_{n=1}^{\infty} \frac{(\ln n)^3}{n^3}$

(8) $\sum_{n=1}^{\infty} \frac{(\ln n)^2}{n^{3/2}}$

(9) $\sum_{n=1}^{\infty} \frac{10n+1}{n(n+1)(n+2)}$

(10) $\sum_{n=1}^{\infty} \frac{1}{1^2+2^2+3^2+...+n^2}$

(11) $\sum_{n=1}^{\infty} \frac{n^{\sqrt{2}}}{2^n}$

(12) $\sum_{n=1}^{\infty} \frac{n!}{10^n}$

(13) $\sum_{n=1}^{\infty} \left(1-\frac{1}{3n}\right)^n$

(14) $\sum_{n=1}^{\infty} \frac{(n+3)!}{3!\ n!\ 3^n}$

(15) $\sum_{n=1}^{\infty} \frac{n!}{n^n}$

(16) $\sum_{n=1}^{\infty} \frac{1.3.5....(2n-1)}{4^n\ 2^n\ n!}$

(17) $\sum_{n=1}^{\infty} \frac{1.3.5....(2n-1)}{(2.4.6....2n)\ (3^n+1)}$