Prof. K. Singh

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2016

B.Tech II Semester (CE)

COURSE CODE: 10B11MA201 MAX. MARKS: 15

COURSE NAME: Mathematics-II

COURSE CREDITS: 04 MAX. TIME: 1 HR

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

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1. **Find the interval of convergence of the series** $\frac{x}{2!}+\frac{x^2}{4!}+\frac{x^3}{6!}+\cdots+\frac{x^n}{(2n)!}+\cdots$ [2.5]

2. **Investigate the convergence of the series** $\sum_{n=1}^{\infty}\frac{1}{n(n+1)}$. [2.5]

3. **Determine a power series solution of the differential equation** $y''+y=0$ **of the form** $\sum_{n=0}^{\infty}c_n x^n$. [4]

4. **Show that** $J_n(x)=x^n\sum_{m=0}^{\infty}\frac{(-1)^n x^{2m}}{2^{2m+n}\,m!\,(n+m)!}$, $n\geq 0$ ***an integer***, **is a solution of the Bessel's equation** $x^2y''+xy'+(x^2-n^2)y=0$. [6]