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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Test -1 EXAMINATION, September 2018

B.Tech. III Semester (CSE, ECE, IT)

COURSE NAME: Mathematics-II MAX.MARKS:15

COURSE CODE: 10B11MA201 MAX.TIME: **1 hour**

Note: Attempt all questions. Carrying of mobile phones during examinations will be treated as a case of unfair means. Marks are indicated against each question in square brackets.

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1. Test the convergence of the following infinite series

(a) $\left(\frac{2^2}{1^2}-\frac{2}{1}\right)^{-1}+\left(\frac{3^3}{2^3}-\frac{3}{2}\right)^{-2}+\left(\frac{4^4}{3^4}-\frac{4}{3}\right)^{-3}+\ldots\ldots$ **[2.5]**

(b) $1+\frac{x}{1}+\frac{1}{2}\frac{x^3}{3}+\frac{1}{2}\frac{3}{4}\frac{x^5}{5}+\frac{1}{2}\frac{3}{4}\frac{5}{6}\frac{x^7}{7}+\ldots\ldots\ldots$ **[2.5]**

2. Find series solution of $y''-\frac{1}{4x}y'+\frac{1}{8x^2}y=0$ **about** $x=0$. **[5]**

3. (a) Show that $\frac{d}{dx}\left\{x^{-n}J_n(x)\right\}=-x^{-n}J_{n+1}(x)$ **[2.5]**

(b) Express $J_{5/2}(x)$ **in terms of sine and cosine.** **[2.5]**

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