

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- September 2016

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

COURSE CODE: 10B11MA201

MAX. MARKS: 15

COURSE NAME: MATHEMATICS II

COURSE CREDITS: 4

MAX. TIME: 1Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Use of any calculator is not allowed.

1. Discuss the convergence of the following infinite series of positive terms:

$$(a) \sum_{n=1}^{\infty} \frac{n^n 2^n}{n!} \quad (2)$$

$$(b) x^2 + \frac{2^2}{3.4} x^4 + \frac{2^2.4^2}{3.4.5.6} x^6 + \frac{2^2.4^2.6^2}{3.4.5.6.7.8} x^8 + \dots \quad (3)$$

2. Solve the following differential equations using the method of solution in series:

$$(2x + x^3) \frac{d^2 y}{dx^2} - \frac{dy}{dx} - 6xy = 0. \quad (5)$$

3. Prove that

$$(a) \frac{d}{dx} [x^{-n} J_n(x)] = -x^{-n} J_{n+1}(x). \quad (2.5)$$

$$(b) J_{\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}} \sin x. \quad (2.5)$$
