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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION – FEBRUARY 2019

B.Tech. II Semester

COURSE CODE: 18B11MA211

MAX. MARKS: 15

COURSE NAME: ENGINEERING MATHEMATICS II

COURSE CREDITS: 04

MAX. TIME: 1HR

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

1. (a) Test the convergence of the series $\frac{1}{2\sqrt{1}} + \frac{x^2}{3\sqrt{2}} + \frac{x^4}{4\sqrt{3}} + \frac{x^6}{5\sqrt{4}} + \dots$, $x > 0$. [3M] [CO1]

(b) Examine the series $\sum (-1)^{n-1} \frac{n}{n^2+1}$ for convergence and absolute convergence. Is the series conditionally convergent? [2M] [CO1]

2. Find the Fourier series of the following function

$$f(x) = \begin{cases} x + \pi, & -\pi < x < 0 \\ 0, & 0 \leq x < \pi \end{cases}$$

It is given that $f(x + 2\pi) = f(x)$.

Also, find the value of $f(0)$ and show that $\sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} = \frac{\pi^2}{8}$.

[5M] [CO1]

3. Solve the following differential equations.

(a) $(D^2 + 1)^3(D^2 + D + 1)^2y = 0$

[3M] [CO2]

(b) $(D^4 - D^3 - 9D^2 - 11D - 4)y = 0$

[2M] [CO2]
