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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION, May 2019
B. Tech, Semester-II (CSE/IT/ECE/CE)

Course Code: 18B11MA211 MAX. MARKS: 35
Course Name: Engineering Mathematics-II
Course Credits: 04 MAX. TIME: 2 Hrs

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

1. Find the general solution of the differential equation $y''' + y' = 2x^2 + 4\sin x$. [CO-2]

2. Show that $\frac{d}{dx}[x^{-n}J_n(x)] = -x^{-n}J_{n+1}(x)$. [CO-3]

3. Find the solution of wave equation $u_{xx} = \frac{1}{c^2}u_{tt}$ corresponding to initial deflection given by

$$f(x) = \begin{cases} \frac{2k}{\pi}x, & 0 < x < \frac{\pi}{2} \\ \frac{2k}{\pi}(\pi - x), & \frac{\pi}{2} \le x < \pi \end{cases}$$ [CO-4]

and initial velocity $g(x) = 0$.

4. Check whether *Cauchy-Riemann* equations are satisfied for $f(z) = (2x^2 + x) - iy(2x + 1)$ at the point $z = 1 + i$. Hence, conclude whether $f(z)$ is differentiable at the point $z = 1 + i$ or not? [CO-5]

5. Find the *Laurent* series expansion of $f(z) = \frac{1}{(2-z)(z+3)}$ in the annular domain $2 < |z| < 3$. [CO-6]

6. Evaluate $\oint_C \frac{1}{z^2(z+1)(z-1)}dz$, where C is $|z| = 3$. [CO-6]

7. Using theorem of residues, evaluate $\int_0^{2\pi} \frac{1}{17 - 8\cos\theta}d\theta$. [CO-6]

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