Class Test 2

November 10, 2021 @3:00 PM

Duration: 60 Minutes (+ 30 Minutes for other formalities)

- Login in to usual Google meeting and remain logged in during the exam.
- Keep you video on
- Check your Roll no on the question paper.
- Answer all the questions.
- All questions carry equal marks.
- Answer questions explicitly, with all the necessary step.
- Upload the answer script as PDF file to welearn.
- You need not upload question paper.
- Do not use improper methods
- Have a good day.

[1 of 4] Find the series solution at $x = 0$ for the differential equation

$$m\frac{d^2y}{dx^2} + \gamma\frac{dy}{dx} + \kappa y = 0 \tag{1}$$

[2 of 4] Express the following function in terms of Fourier series

$$f(x) = \begin{cases} -1 & x > \frac{1}{2} \\ -x & -\frac{1}{2} \leq x \leq \frac{1}{2} \\ +1 & x < -\frac{1}{2} \end{cases} \tag{2}$$

[3 of 4] Find the Fourier transform of the following function

$$f(x) = \frac{\sin(\pi x)}{\pi x} \tag{3}$$

[4 of 4] For the differential equation in the following form

$$x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + \left(x^2 - n^2\right)y = 0 \tag{4}$$

convert it to Sturm-Liouville and Normal form