

Department of Mathematics

Indian Institute of Technology Delhi

MTL 743 FOURIER ANALYSIS: Minor-I

Total marks: 20

Time: 1 hour and 30 Minutes

1. No marks will be provided if appropriate justification is not provided.
 2. Every question is compulsory.
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1. Compute $\chi_{[0,\pi]} * \chi_{[\pi,2\pi]}$. [4]

2. (a) Find the Fourier series of the Function $f(x) = x^2$, $x \in [-\pi, \pi]$. [3]

(b) Find the sum of the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$. [2]

3. Show that there exists a continuous function whose Fourier series diverges at a given point. [3]

4. Show that the Dirichlet kernel can be written as a quotient of sin functions [3]

5. Give an example (with proper justification) of a summability kernel. [5]