

DEPARTMENT OF MATHEMATICS
Indian Institute of Technology Guwahati

MA746: Fourier Analysis
Instructor: Rajesh Srivastava
Time duration: Two hours

Quiz I
February 15, 2019
Maximum Marks: 10

N.B. Answer without proper justification will attract zero mark.

1. (a) If D_n is the sequence of Dirichlet kernel on S^1 . Does it imply that $D_n * D_n = D_n$? **1**
(b) Does there exist $f \in L^1(S^1)$ such that $\sum_{n=-\infty}^{\infty} |n\hat{f}(n)|^2 = \infty$? **1**

2. If the series of complex numbers $\sum_{n=0}^{\infty} a_n$ is Cesaro summable to l , then show that $\lim_{n \rightarrow \infty} \frac{a_n}{n} = 0$,
where $s_n = a_1 + \dots + a_n$. **2**

3. Let f be Lebesgue measurable function on S^1 such that $\int_0^{2\pi} \frac{|f(t)|}{t} dt < \infty$. Show that
 $\lim_{n \rightarrow \infty} S_n(f; 0) = 0$. **3**

4. Show that there exists $f \in L^1(S^1)$ such that partial sum sequence $S_n(f)$ of the Fourier
series of f does not converge to f in L^1 -norm. **3**

END