

Indian Statistical Institute, Delhi Centre

Measure Theoretic Probability

Fall 2010

Quiz # 2

Date: October 5, 2010 (Tuesday)

Total Points: 10

Note:

- Please write your name.
- There are 2 problems carrying 5 points each. Answer all of them.
- Please write your answer for each of the problems in the space provided and show all your work.
- This is a CLOSE NOTE and CLOSE BOOK examination.
- You have 20 minutes to complete the quiz.

Name: _____

1. Let $\mathbf{X} = \mathbf{Y} = \mathbb{N}$ and $\mathcal{F} = \mathcal{G} = \mathcal{P}(\mathbb{N})$. Find the product σ -algebra $\mathcal{F} \otimes \mathcal{G}$ on the product space $\mathbf{X} \times \mathbf{Y}$.

2. Suppose $f : [0, 1] \mapsto \mathbb{R}$ is a bounded Riemann Integrable function. Then show that

$$\lim_{t \rightarrow 0} \int_0^1 |f(x+t) - f(x)| dx = 0.$$

