Name:
Roll Number:
Department:
Program: BTech / MTech TA / MTech RA / PhD   (Tick one)

భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

AI5090/EE5817: Probability and Stochastic Processes
Quiz 02
Date: 26 August 2025

Question	1	2	Total
Marks Scored			

1. **(3 Marks)**

   Fix a sample space Ω and an associated σ-algebra $\mathscr{F}$.
   Fix a non-empty set $A \in \mathscr{F}$, and consider the collection

   $$\mathscr{F}_A := \left\{ B \subseteq A : \ B \in \mathscr{F} \right\}.$$

   Show that $\mathscr{F}_A$ is a σ-algebra of subsets of A. Justify every point clearly.

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2. Consider the collection

$$\mathscr{D} := \left\{ [-b, -a) \cup (a, b] : \ a, b \in \mathbb{R}, \ a \leq b \right\}.$$

(a) **(1 Mark)**
Give an example of a set that belongs to $\sigma(\mathscr{D}) \setminus \mathscr{D}$.

(b) **(1 Mark)**
Give an example of a set belongs to $\mathscr{B}(\mathbb{R}) \setminus \sigma(\mathscr{D})$.