

Probability and Random Processes

MA6.102, Monsoon-2022

Exam: Quiz 2
Total Marks: 30

Date: 18 Oct 2022
Time: 12:00-12:45

Instructions:

- This is a closed book exam.
- Answering all three questions is compulsory.
- Clearly state the assumptions (if any) made that are not specified in the questions.

1. Prove the following statements and demonstrate their applications by solving the problems of your choice.

- (a) Let X be a continuous random variable with pdf $f_X(x)$ and $Y = g(X)$ is a differentiable function. Derive the pdf of Y . [10]
- (b) Using the axioms of probability, show that [10]

$$f_{X|Y}(x|y) = \frac{f_{X,Y}(x,y)}{f_Y(y)}.$$

- (c) Consider X and Y are continuous and independent random variables. Derive the pdf of $X + Y$. [10]

All the Best!

$f_{X|Y}(x|y) \cdot f_Y(y)$