

# International Institute of Information Technology, Hyderabad

(Deemed to be University)

## Probability and Random Processes

MA6.102, Monsoon-2022

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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.

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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]

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All the Best!