

## CHENNAI MATHEMATICAL INSTITUTE

### Probability Theory

#### Quiz-2

Answer ALL questions. Maximum marks: 10. Duration 30min.

1. Let  $X$  be a random variable with distribution function

$$F(x) = \begin{cases} 0, & \text{if } x < 0, \\ x/16, & \text{if } 0 \leq x < 16, \\ 1, & \text{if } x \geq 16. \end{cases}$$

Find the distribution function of  $Z = \sqrt{X}$ .

- 2 Let  $F_{X,Y}(x, y)$  be the following joint distribution function of the random variables  $X, Y$

$$F_{X,Y}(x, y) = \begin{cases} 0, & \text{if } x < 0 \\ (1 - e^{-x})(1/2 + (1/\pi) \tan^{-1} y) & \text{if } x \geq 0. \end{cases}$$

Find the marginal distribution functions  $F_X(x), F_Y(y)$ .

3. A fair coin is tossed a random number  $N$  times until head turns up for the first time. Find the mass function of the random variable  $N$ .