

Q4.

$$F(x|\alpha, \beta) = \Pr(X \leq x) = \int_{-\infty}^x f(u|\alpha, \beta) du$$

$$f(u|\alpha, \beta) = \frac{\alpha \beta^\alpha}{u^{\alpha+1}}$$

$$F = \int_{-\infty}^x \frac{\alpha \beta^\alpha}{u^{\alpha+1}} du$$

$$= \alpha \beta^\alpha \int_{-\infty}^x \frac{1}{u^{\alpha+1}} du$$

$$= \alpha \beta^\alpha \int_{-\infty}^x u^{-(\alpha+1)} du$$

$$= \alpha \beta^\alpha \int_{-\infty}^x \left[\frac{u^{-(\alpha+1)}}{-\alpha} \right]_{-\infty}^x$$

$$= \alpha \beta^\alpha \left[\frac{x^{-(\alpha+1)+1}}{-\alpha} - 0 \right]$$

$$= \beta^\alpha \left[\frac{x^{-\alpha}}{-1} \right]$$

$$= -\beta^\alpha \left(\frac{1}{x^\alpha} \right)$$

$$= -\left(\frac{\beta}{x} \right)^\alpha \Rightarrow \therefore \text{CDF} = 1 - \left(\frac{\beta}{x} \right)^\alpha //$$