

Qn 15 b) $y = x^{a-1} e^{-x}$

$$\therefore \frac{dy}{dx} = -x^{a-1} \cdot e^{-x} + (a-1)(e^{-x} x^{a-2}) = 0$$

$$\Rightarrow \{(a-1) - x\} = 0$$

$$\Rightarrow \boxed{x = a-1}$$

Clearly $\frac{d^2y}{dx^2} < 0$

$\therefore (x=a-1)$ is the maxima.

proved.