Section – 3

Q1

Ans 1 (i) $f(x) \geq 0$ for every x in $(1,2)$ and

$$\int_{-\infty}^{\infty} f(x)\,dx = \int_{-\infty}^{0} 0\,dx + \int_{0}^{\infty} e^{-x}\,dx = 1$$

Hence the function $f(x)$ satisfies the requirements for a density function.

(ii) Required probability $= P(1 \leq x \leq 2) = \int_{1}^{2} e^{-x}\,dx =$

$$e^{-1} - e^{-2}$$

$$= 0.368 - 0.135 = 0.233$$

This probability is equal to the shaded area in fig 4.17.1 (a)

(iii) Cumulative probability function $F(2)$

$$\int_{-\infty}^{2} f(x)\,dx = \int_{-\infty}^{0} 0\,dx + \int_{0}^{2} e^{-x}\,dx = 1 - e^{-2}$$

$$= 1 - 0.135 = 0.865$$

shown in fig 4.17.1

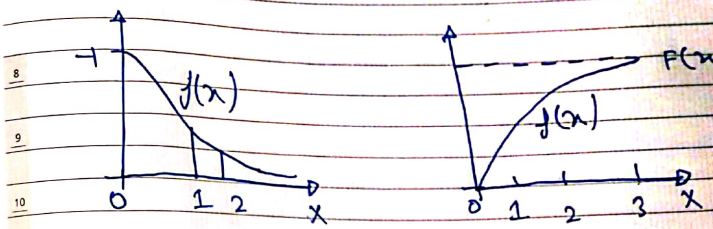

fig 4.17.1