Q. (4) If $f(x) = x e^{x(1-x)}$ then $f(x)$ is:

A. increasing in $[-1/2, 1]$

B. decreasing in R

C. increasing in R

D. decreasing in $[-1/2, 1]$

Ans: (A)

Given, $f(x) = x e^{x(1-x)}$

$$f'(x) = e^{x(1-x)} + x e^{x(1-x)} (1-2x)$$

$$= e^{x(1-x)} [1 + x - 2x^2]$$

$$= -e^{x(1-x)} (x-1)(2x+1)$$

which is positive in $\left(\frac{-1}{2}, 1\right)$.

$\therefore$ $f(x)$ is increasing in $\left[\frac{-1}{2}, 1\right]$.