The integral $\int \frac{dx}{x^2(x^4+1)^{3/4}}$ equals :

[Main 2015]

(a) $-(x^4 + 1)^{\frac{1}{4}} + c$

(b) $-\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}} + c$

(c) $\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}} + c$

(d) $(x^4 + 1)^{\frac{1}{4}} + c$

Answer: $I = \int \frac{dx}{x^2(x^4+1)^{3/4}} = \int \frac{dx}{x^3(1+x^{-4})^{3/4}}$

Let $x^{-4} = y$

$$\Rightarrow -4x^{-3}dx = dy \Rightarrow dx = \frac{-1}{4}x^3 dy$$

$$\therefore I = \frac{-1}{4}\int \frac{x^3 dy}{x^3(1+y)^{3/4}} = \frac{-1}{4}\int \frac{dy}{(1+y)^{3/4}}$$

$$\frac{-1}{4} \times 4(1+y)^{1/4} = -(1+x^{-4})^{1/4} + C$$

$$= -\left(\frac{x^4+1}{x^4}\right)^{1/4} + C$$

Option (b) is the answer