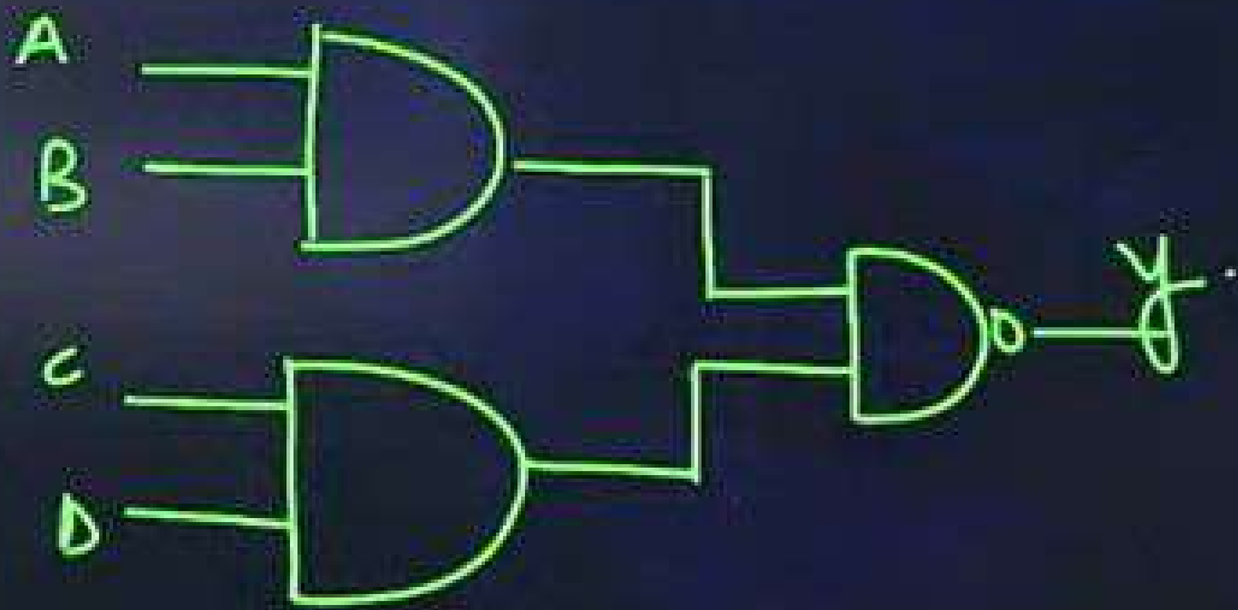
Combination of logic gates to find final output.



Question on current through LCR Circuit

The general solution of $\left(x\frac{dy}{dx} - y\right)\sin\left(\frac{y}{x}\right) = x^3 e^x$ is:

put $\frac{y}{x} = u$

diff w.r.t x

$$\frac{x\frac{dy}{dx} - y}{x^2} = \frac{du}{dx}$$

$$x\frac{dy}{dx} - y = x^2\frac{du}{dx}$$

A. $e^x(x-1) + \cos y/x + c = 0$

B. $xe^x + \cos y/x + c = 0$

C. $e^x(x+1) + \cos y/x + c = 0$

D. $ex^x - \cos y/x + c = 0$

$$\cancel{x^2}\frac{du}{dx}\sin u = x^{\cancel{3}}e^x$$

$$\sin u\frac{du}{dx} = xe^x$$

$$\int \sin u\, du = \int xe^x\, dx$$

$$-\cos u = xe^x - \int 1\cdot e^x\, dx$$

$$-\cos\left(\frac{y}{x}\right) = xe^x - e^x + c$$

$$-\cos\left(\frac{y}{x}\right) = e^x(x-1) + c$$

Find the area of the region bounded by the parabola $y^2 = 4ax$ and its latus rectum.

$$A = 2\int_0^a y\,dx$$

$$= 2\int_0^a 2\sqrt{a}\sqrt{x}\,dx$$

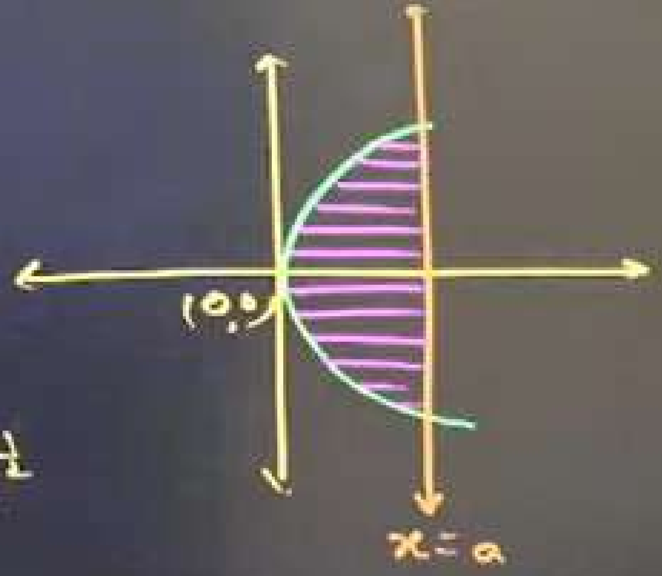
$$= 4\sqrt{a}\,\frac{2}{3}\left[x^{\frac{3}{2}}\right]_0^a$$

$$= \frac{8\sqrt{a}}{3}\left[a^{\frac{3}{2}} - 0\right)$$

$\sqrt{a} = a^{\frac{1}{2}}$

$a^{\frac{3}{2}}$

$\sqrt{a} \times a^{\frac{3}{2}} = a^{\frac{1}{2}} a^{\frac{3}{2}} = a^2$



MHTCET 2024 LIVE PAPER DISCUSSION

If $p \wedge q$ is F, $p \rightarrow q$ is F then the truth values of p and q are ________.

T F

✓T F   T F

✓F T

A. T, T

B. T, F ✓

C. F, T

D. F, F

The inverse of the matrix $\begin{bmatrix}1 & 0 & 0\\ 3 & 3 & 0\\ 5 & 2 & -1\end{bmatrix}$ is :

$A^{-1} = \frac{1}{|A|}\,\text{adj} A$

$A^{-1} = \frac{1}{-3}\begin{bmatrix}-3 & & \\ 3 & & \\ -9 & & \end{bmatrix}$

$|A| = 1(-3) = -3$

(A) $-\frac{1}{3}\begin{bmatrix}-3 & 0 & 0\\ 3 & 0 & 0\\ 9 & 2 & -3\end{bmatrix}$

(B) $-\frac{1}{3}\begin{bmatrix}-3 & 0 & 0\\ 3 & -1 & 0\\ -9 & -2 & 3\end{bmatrix}$

(C) $-\frac{1}{3}\begin{bmatrix}3 & 0 & 0\\ 3 & -1 & 0\\ -9 & -2 & 3\end{bmatrix}$

(D) $-\frac{1}{3}\begin{bmatrix}-3 & 0 & 0\\ -3 & -1 & 0\\ -9 & -2 & 3\end{bmatrix}$