An electrolytic cell with current efficiency 50% is used to reduce 12.3 gm of nitrobenzene to aniline. If the potential drop across the cell is 3.0 volts, the energy consumed is:

(A) 86.85 KJ	(B) 173.7 KJ
(C) 347.4 KJ	(D) None of the options given

Solution

When $C_6H_5NO_2$ is reduced to $C_6H_5NH_2$, the change in oxidation state of N is 6.

Now,
$$\frac{W}{E} = \frac{Q}{F} \times 50\%$$

 $\therefore \frac{12.3}{123/6} = \frac{Q}{96500} \times \frac{1}{2}$
 $\therefore Q = 115.8KCoul.$

Energy = QV = 115.8 x 3.0 = 347.4 KJ

Hence, (C)