Exemplar Problems

(2) Conservation of momentum in collision between particles can be understood from

(A) conservation of energy

(B) Newton's first law only

(C) Newton's second law only

(D) Both Newton's second and third law.

Ans:- (D) By Newton's 2nd law of motion we can say $\frac{dp}{dt} = F_{ext}$.

Since by the law of conservation of momentum we have $F_{ext} = 0$

Therefore, $\frac{dp}{dt} = 0 \Rightarrow$ momentum is constant

Also by Newton's 3rd law of motion, we have $F_{12} = -F_{21}$

$$\Rightarrow \frac{dp_{12}}{dt} = -\frac{dp_{21}}{dt} \Rightarrow dp_{12} = -dp_{21}$$

$$\Rightarrow dp_{12} + dp_{21} = 0$$

Thus the law of conservation of momentum is proved.