

2. A person pushes a box on a rough horizontal platform surface. He applies a force of 200 N over a distance of 15 m. Thereafter, he gets progressively tired and his applied force reduces linearly with distance to 100 N. The total distance through which the box has been moved is 30 m. What is the work done by the person during the total movement of the box ?

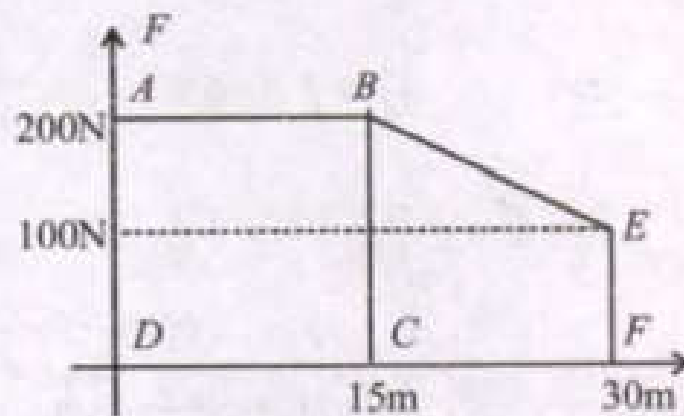
[Main 4 Sep. 2020 (II)]

- (a) 3280 J (b) 2780 J (c) 5690 J (d) 5250 J

Ans

(d) The given situation can be drawn graphically as shown in figure.

Work done = Area under F - x graph
= Area of rectangle $ABCD$ + Area of trapezium $BCFE$



$$W = (200 \times 15) + \frac{1}{2}(100 + 200) \times 15 = 3000 + 2250$$

$$\Rightarrow W = 5250 \text{ J}$$