8. The sum of the series
$1+2\times3+3\times5+4\times7+\ldots$ upto 11th term is

[JEE Main 2019, 9 April Shift-II]

(a) 915 (b) 946 (c) 916 (d) 945

Exp. **(b)**

Given series is

$1+(2\times3)+(3\times5)+(4\times7)+\ldots$upto 11 terms.

Now, the rth term of the series is $a_r = r(2r-1)$

$\therefore$ Sum of first 11-terms is

$$S_{11} = \sum_{r=1}^{11} r(2r-1) = \sum_{r=1}^{11}(2r^2 - r) = 2\sum_{r=1}^{11} r^2 - \sum_{r=1}^{11} r$$

$$= 2\frac{11\times(11+1)(2\times11+1)}{6} - \frac{11\times(11+1)}{2}$$

$$\left[\because \sum_{r=1}^{n} r^2 = \frac{n(n+1)(2n+1)}{6} \text{ and } \sum_{r=1}^{n} r = \frac{n(n+1)}{2}\right]$$

$$= \left(\frac{11\times12\times23}{3}\right) - \left(\frac{11\times12}{2}\right)$$

$$= (11\times4\times23) - (11\times6)$$

$$= 11(92-6) = 11\times86 = 946$$