Answer: C

It helps to keep a simple tally and apply the rules year by year:

Year	1	2	3	4	5	6	7	8	9	10
Carry forward days	6	4	7	6	7	*S*	6	2	5	7
Cumulative days	6	10	17	23	30	*10*	16	18	23	30

Take care to note that she carries forwards the fully ten days out of sabbatical.

15 The battery of Tim's car has a maximum charge of 100 kWh. A warning light comes on when he has only 10 kWh left. He always charges it as soon as he can after the warning light comes on. The car travels 135km on 30 kWh of battery power. Last time he charged, which he was able to do immediately after the light came on, he only had £12 with him so he spent it all on electricity at £0.75 per kWh. He then drove 63km and saw a new garage offering electricity at £0.50 per kWh - an offer too good to miss. He charged the battery completely and paid with a credit card – the bank offers him free contents insurance if he pays with credit card regularly.

How much did it cost?

    A £ 44.40
    B £ 38.80
    C £ 44.00
    D £ 22.22
    E £ 14.10

Answer: C

Firstly, when the light comes on, Tim had $10\ kWh$ left. $\frac{£12}{£0.75} = 16$, so his battery when he left the charger was at $26\ kWh$.

We can calculate his energy consumption as $135 \div 30 = 4.5\ km/kWh$. If he drove a further 63km, that will have consumed $\frac{63}{4.5} = 14\ kWh$, leaving $12\ kWh$ in the battery. The battery has spare capacity of $100 - 12 = 88\ kWh$, and then $88\ kWh \times £0.50 = £44.00$ spent at the end.