

$$\textcircled{18} \quad \text{Sum of 100 obs} = 50 \times 100 \\ = 5000$$

$$\text{New Sum} = 5000 + 150 - 50 \\ = 5100$$

$$\text{New Mean} = \frac{5100}{100} \\ = 51 \quad (\text{B})$$

$$\textcircled{19} \quad \text{Sum of 50 nos} = 50 \times \bar{x} \quad \text{where } \bar{x} \text{ is mean}$$

$$\text{New Sum} = 53 \times 50 - 50 \bar{x}$$

$$\text{New Mean} = -3.5$$

$$\frac{53 \times 50 - 50 \bar{x}}{50} = -3.5$$

$$\Rightarrow \frac{50(53 - \bar{x})}{50} = -3.5$$

$$\Rightarrow \bar{x} = 53 + 3.5$$

$$\Rightarrow \bar{x} = 56.5 \quad (\text{D})$$

$$\textcircled{20} \quad \text{Mean of all 25 obs.} = 36$$

$$\text{Sum} = 36 \times 25 \\ = 900$$

$$\text{Mean of first 13 obs} = 32$$

$$\text{Sum} = 32 \times 13 \\ = 416$$

$$\text{Mean of last 13 obs.} = 40$$

$$\text{Sum} = 40 \times 13 \\ = 520$$

$$13^{\text{th}} \text{ obs} = 520 + 416 - 900 \\ = 936 - 900 \\ = 36 \quad (\text{B})$$