

Discrete Mathematics

Question (4):[a] $n = 100$, $r = 4$, using definition of permutation:

$$\Rightarrow P(100, 4) = \frac{n!}{(n-r)!} = \frac{100!}{(100-4)!} = \boxed{94\,109\,400} \text{ ways}$$

Prizes for first 2 persons remaining 2 prizes

$$\begin{aligned} \text{[b]} &= P(4, 2) \times P(96, 2) = \frac{4!}{(4-2)!} \times \frac{96!}{(96-2)!} \\ &= 12 \times 9120 = \boxed{109\,440} \text{ ways} \end{aligned}$$