

1.6

$$\begin{aligned} \text{CPI} &= \frac{45000}{45000 + 75000 + 8000 + 1500 \times 1} + \\ &\quad \frac{75000}{45000 + 75000 + 8000 + 1500 \times 2} + \\ &\quad \frac{8000}{45000 + 75000 + 8000 + 1500 \times 4} + \\ &\quad \frac{1500}{45000 + 75000 + 8000 + 1500 \times 2} \\ &= 1.78 \end{aligned}$$

$$\text{MIPS} = \frac{400}{1.78} = 224.7$$

$$\text{程序执行时间} = \frac{45000 \times 1 + 75000 \times 2 + 8000 \times 4 + 1500 \times 2}{400 \times 10^6} = 5.75 \times 10^{-4} \text{ s}$$

1.9

$$(1) \text{ 操作1: } \frac{2}{1} = 2 \quad \text{操作2: } \frac{20}{15} = 1.33 \quad \text{操作3: } \frac{10}{3} = 3.33 \quad \text{操作4: } \frac{4}{1} = 4$$

$$(2) \text{ 操作1: } \alpha = \frac{10}{90} = \frac{1}{9} \quad k=2 \quad \therefore S = \frac{1}{\frac{2}{9} + \frac{1}{18}} = \frac{18}{17} = 1.06$$

$$\text{操作2: } \alpha = \frac{32}{90} = \frac{1}{3} \quad k=\frac{4}{3} \quad \therefore S = \frac{1}{\frac{2}{3} + \frac{1}{4}} = \frac{12}{11} = 1.09$$

$$\text{操作3: } \alpha = \frac{35}{90} = \frac{7}{18} \quad k=\frac{10}{3} \quad \therefore S = \frac{1}{\frac{11}{18} + \frac{7}{60}} = 1.37$$

$$\text{操作4: } \alpha = \frac{15}{90} = \frac{3}{18} = \frac{1}{6} \quad k=4 \quad \therefore S = \frac{1}{\frac{5}{6} + \frac{1}{24}} = \frac{24}{21} = \frac{8}{7} = 1.14$$

$$(3) S = \frac{1}{\frac{1}{18} + \frac{1}{4} + \frac{7}{60} + \frac{1}{24}} = 2.16$$