T1 ① C ② A ③ D ④ ~~C~~ ⑤ A

T2 $\mu = np = 6 \quad \sigma^2 = np(1-p) = 5.7$

$P(S_{100} \geq 10) = 1 - \Phi\left(\frac{4}{\sqrt{5.7}}\right) = 0.047$

T3 $\mu = np = 193.92 \quad \sigma^2 = np(1-p) = 7.7568$

$P(S_{202} \leq 200) = \Phi\left(\frac{6.08}{\sqrt{7.7568}}\right) = 0.985$

T4 ① $\mu = 0 \quad \sigma^2 = \frac{1}{12}$

$P(S_{1500} \geq 15) = 1 - \Phi\left(\frac{3}{\sqrt{5}}\right) = 0.09$

$P(|S_{1500}| \geq 15) = 2 \times P(S_{1500} \geq 15) = 0.18$

② $P(S_x \leq 10) = \Phi\left(10\sqrt{\frac{12}{x}}\right)$

要求 $2[1 - P(S_x \leq 10)] \leq 0.04$

即 $P(S_x \leq 10) \geq 0.98$

$\Phi\left(10\sqrt{\frac{12}{x}}\right) \geq 0.98$

$x = 300$

T5 $EX = \int_0^1 6x^2(1-x)\,dx = \frac{1}{2}$

对 $\forall \varepsilon > 0$, $\lim\limits_{n\to\infty} P\left(\left|\frac{1}{n}\sum_{k=1}^{n} X_k - \frac{1}{2}\right| \geq \varepsilon\right)$ 成立.

$\therefore \frac{1}{n}\sum_{k=1}^{n} X_k \xrightarrow{P} \frac{1}{2}$

T6 $EX_1 = \frac{1}{\lambda}$ $\quad EX_2 = \int_{10}^{+\infty} \lambda x e^{-\lambda x} dx = -xe^{-\lambda x}\Big|_{10}^{+\infty} - \frac{1}{\lambda} e^{-\lambda x}\Big|_{10}^{+\infty}$

$\sigma_1^2 = \frac{1}{\lambda^2}$ $\quad = 10e^{-10\lambda} + \frac{1}{\lambda} e^{-10\lambda} = (10+\frac{1}{\lambda})e^{-10\lambda}$

$EX_2^2 = \int_{10}^{+\infty} \lambda x^2 e^{-\lambda x} dx = -x^2 e^{-\lambda x}\Big|_{10}^{+\infty} + 2EX_2$

$= (120+\frac{2}{\lambda}) e^{-10\lambda}$

$\sigma_2^2 = EX_2^2 - (EX_2)^2$

$P(Y_1) \sim N(EX_1, n_1\sigma_1^2)$

$P(Y_2) \sim N(EX_2, n_2\sigma_2^2)$

$P(Y_1+Y_2) \sim N(EX_1+EX_2, n_1\sigma_1^2 + n_2\sigma_2^2)$

要求 $\Phi\left(\frac{C - EX_1 - EX_2}{\sqrt{n_1\sigma_1^2 + n_2\sigma_2^2}}\right) \geq 0.95$

T7 \