1. The total arrival process corresponds to the merging of two independent Poisson processes, and is therefore Poisson with rate $\lambda = \lambda_A + \lambda_B = 7$. Thus, the number N of jobs that arrive in a given three-minute interval is a Poisson random variable, with $\mathbf{E}[N] = 3\lambda = 21$, $\text{var}(N) = 21$, and PMF

$$p_N(n) = \frac{(21)^n e^{-21}}{n!}, \qquad n = 0, 1, 2, \ldots.$$

2. Each of these 10 jobs has probability $\lambda_A/(\lambda_A + \lambda_B) = 3/7$ of being type A, independently of the others. Thus, the binomial PMF applies and the desired probability is equal to

$$\binom{10}{3}\left(\frac{3}{7}\right)^3\left(\frac{4}{7}\right)^7$$

3. Each future arrival is of type A with probability $\lambda_A/(\lambda_A + \lambda_B) = 3/7$ of being type A, independently of the others. Thus, the number K of arrivals until the first type A arrival is geometric with parameter $3/7$. The number of type B arrivals before the first type A arrival is equal to $K - 1$, and its PMF is similar to a geometric, except that it is shifted by one unit to the left. In particular,

$$p_K(k) = \left(\frac{3}{7}\right)\left(\frac{4}{7}\right)^k, \qquad k = 0, 1, 2, \ldots.$$