

253. You are given:

- (i) For $Q = q$, X_1, X_2, \dots, X_m are independent, identically distributed Bernoulli random variables with parameter q .
- (ii) $S_m = X_1 + X_2 + \dots + X_m$
- (iii) The prior distribution of Q is beta with $a = 1$, $b = 99$, and $\theta = 1$.

Determine the smallest value of m such that the mean of the marginal distribution of S_m is greater than or equal to 50.

- (A) 1082
- (B) 2164
- (C) 3246
- (D) 4950
- (E) 5000