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**Farida Parvez Barbhuiya\*** (faridaparvezb@gmail.com), Department of Mathematics, Indian Institute of Technology Kharagpur, Kharagpur, WestBengal 721302, India, and **Umesh Chandra Gupta**. *Discrete-time queue with batch renewal input and random serving capacity rule.*

We consider a discrete-time infinite buffer queue in which customers arrive in batches of random size such that the inter-arrival times are arbitrarily distributed. The customers are served in batches by a single server according to random serving capacity rule and the service times are geometrically distributed. We model the system via supplementary variable technique and further use displacement operator method to solve non-homogeneous difference equation. The analysis done using these methods results in an explicit expression of steady-state queue-length distribution at pre-arrival and arbitrary epochs simultaneously, in terms of roots of the underlying characteristic equation. Our approach enables one to estimate the asymptotic distribution at pre-arrival epoch by a unique largest root of the characteristic equation lying inside the unit circle. With the help of few numerical results, we demonstrate that the methodology developed throughout the work is computationally tractable and is suitable for light-tailed inter-arrival distributions and can also be extended to heavy-tailed inter-arrival distributions. The model considered here generalizes the previous work done in the literature in many ways. (Received September 18, 2018)