18101064

(11)

Here, Mean Arrival time,

$$\lambda = \frac{5}{9} \text{ min}$$

Mean Service time,

$$\mu = \frac{5}{10} = \frac{1}{2} \text{ min}$$

Utilization factor,

$$\rho = \frac{\lambda}{\mu} = \frac{5}{9} \times \frac{2}{1}$$

$$= \frac{10}{9}$$

18101064

Expected waiting time per customer queue

$$W_q = \frac{\lambda}{2\mu(\mu - \lambda)}$$

$$= \frac{5}{9} \times \frac{18}{2}$$

$$= 10$$

Expected waiting time per customer System

$$W_s = W_q + \frac{1}{\mu}$$

$$= 10 + \frac{1}{\frac{1}{2}}$$

$$= 10 + 2$$

$$= 12$$

(3) 18101064

Expected Number of Customer in queue,

$$L_q = \frac{\lambda^2}{2\mu(\mu-\lambda)} = \frac{\frac{25}{81}}{\frac{1}{18}} = \frac{50}{9} = 5.56$$

Expected Number of customer in system,

$$L_s = L_q + \frac{\lambda}{\mu}$$

$$= 5.56 + \frac{5/9}{1/2}$$

$$= \frac{60}{9}$$

$$= 6.67$$