Assignment 4

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1 Problem

$(GATE(CS)2013 − 2Q)$ Suppose p is the number of cars per minute passing through a certain road junction between 5 *PM* and 6 *PM*, and p has a Poisson distribution with mean 3. What is the probability of observing fewer than 3 cars during any given minute in this interval?

(A) $8/(2e^3)$
(B) $9/(2e^3)$
(C) $17/(2e^3)$
(D) $26/(2e^3)$

2 Solution

Probability of Poison Distribution is,

$$\Pr(X = p) = \frac{e^{-\mu}\mu^p}{p!} \qquad (2.0.1)$$

Here, p refers to no. of cars per minute,
$p \in \{0, 1, 2, \ldots, \infty\}$
Mean of poison distribution,

$$\mu = 3 \qquad (2.0.2)$$

$$\Pr(X = p) = \frac{e^{-3}3^p}{p!} \qquad (2.0.3)$$

TABLE 4
Table of probability of no. of cars passing per minute

p	0	1	2	3	$\ldots$
$\Pr(X = p)$	$1/e^3$	$3/e^3$	$9/(2e^3)$	$9/(2e^3)$	$\ldots$

by Boolean logic,

$$\Pr(X < 3) = \Pr(X = 0) + \Pr(X = 1) + \Pr(X = 2) \qquad (2.0.4)$$

$$\Pr(X < 3) = \frac{17}{2e^3} \qquad (2.0.5)$$

Option (C) is correct

Probability−
    simulated:0.42209
    theoretical:0.42319