TUTORIAL 6 Ehsanlin Nouri

PAGE No.
DATE

Q1

a) $P(H) = \lambda$

$\therefore P(T) = 1-\lambda$

$\therefore$ for first H at K+1th

$(1-\lambda)^K(\lambda)$

b) M : no. of tones for forhead

$S = E[M]$

$S = \lambda \times 1 + (1-\lambda) \times (S+1)$

$\therefore S = \lambda + S + 1 - \lambda S - \lambda$

$\therefore S = \frac{1}{\lambda}$

PAGE No.
DATE

Q2 $Var(X) = E[(X - E[X])^2]$

TP: $Var(X) = E(X^2) - E[X]^2$

$Var(X) = E(X - E[X])^2)$

$= E[X^2 - 2XE[X] + E[X]^2]$

$= E[X^2] - 2E[XE[X]] + E[X]^2$

$= E[X^2] - 2E[X]^2 + E[X]^2$

$= E[X^2] - E[X]^2$

b) $E[X] = 0$ & $E[X^2] = 1$

1) Var of $X = ?$

2) If $Y = a + bX$, $Var(Y) = ?$

PAGE No.
DATE

1) $Var(x) = E(x^2) - E[x]^2$

$= 1 - 0$

$= 1$

2) $E[Y^2] = E[(a+bx)^2]$

$= E(a^2 + 2abx + b^2x^2)$

$= a^2 + 2abE[x] + b^2E[x]$

$= a^2 + b^2$

$E[Y] = E[a+bx] = a + bE[x]$

$= a + b(0)$

$= a$

$Var(Y) = a^2 + b^2 - a^2$

$= b^2$

Q3 P(A) : Aku products

P(B) : have cars.

a) $P(B) = P(B, A) + P(B, \sim A)$

$= P(B/A)P(A) + P(B/\sim A)P(\sim A)$

$= 0.99 \times 10^{-5} + (1 - 0.99 \times 10^{-5}) \times 1 - 10^{-5})$

$= 1.99 \times 10^{-5}$

b) $P(A/B) = \frac{P(A, B)}{P(B)} = \frac{P(A/B)\,P(A)}{P(B}$

$= \frac{0.99 \times 10^{-5}}{1.99 \times 10^{-5}}$

$\therefore P(A/B) = 0.497$