POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name _____ _____ **Enrollment No.**____ _____

Jaypee Institute of Information Technology, Noida

T1 Examination, Odd Semester 2016
B.Tech III Semester

Course Title : Probability and Random Processes / Probability Theory and Random Processes **Maximum Time : 1 Hr.**

Course Code : 15B11MA301 / 10B11MA411 **Maximum Marks : 20**

Q1: The moment generating function ($M_X(t)$) of random variable X is given by $\frac{t}{(2-t)^2(1-t)}$.

Calculate the first two central moments of X. **[3]**

Q2: If the variance of Binomial distribution is 4 with equal probabilities for success and failure at each Bernoulli trail. What is the probability of getting more than two successes? **[3]**

Q3: The probability mass function of a random variable X is defined as $P[X=0]=\frac{3}{2}k^2$, $P[X=1]=2k-5k^2$, $P[X=2]=\frac{5}{2}k$, where $k>0$ and $P[X=r]=0$ if $r\neq 0,1,2$. Find (*i*) the value of k, (*ii*) $P[0<X<1.5/X>0]$, and (*iii*) The distribution function of X. **[4]**

Q4: Information is transmitted digitally as a binary sequence known as bits. However, noise on the channel corrupts the signal, in that a digit transmitted as '0' is received as '1' with probability 0.05, with a similar random corruption when the digit '1' is transmitted. The 0s and 1s are transmitted in the ratio 2:3. What is the probability that the sequence '10' was transmitted given that sequence '01' is received? **[5]**

Q5: The joint probability density function $f(x,y)=\begin{cases} cxy, & x>0, y>0, x>y, x+y\leq 2 \\ 0 & Otherwise \end{cases}$. Find (*i*) the value of c, (*ii*) $P[0<Y<1/X=1.5]$, (*iii*) $P[0<Y<0.5/X=1]$ and (*iv*) $E[Y/X]$. **[5]**

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