Question One (5-Points)

Write True if the statement is true or False if not:

1. The probability of success in the binomial distribution must be fixed during all trails: True
2. The mean and the variance of a Poisson random variable are equal: True
3. Trails in the hypergeometric distribution are independent: False
4. The values of the standard normal distribution extends from $-\infty$ to $\infty$: True
5. In the uniform distribution all intervals of equal length have the same probability: True

Question Two (5-Points)

1. If the ratio of defective items in a shipment is 20%, a sample of size five is taken randomly with replacement, then the probability of at least one defective item is:
   a. $0.67232$  
   b. $0.32768$  
   c. $0.4096$  
   d. $0.5904$

2. The number of a customers in a certain bank follow a Poisson distribution with an average of five customers per hour, then the probability of three customers in 30 minutes is:
   a. $0.7862$  
   b. $0.1404$  
   c. $0.8596$  
   d. $0.2138$

3. In a certain group there are 5 management, 4 finance, and 3 economic students, if a sample of size 3 is randomly taken without replacement, then the probability that there are one from each topic is:
   a. $\frac{1}{22}$  
   b. $\frac{7}{11}$  
   c. $\frac{3}{11}$  
   d. $\frac{2}{11}$

4. The yearly incomes for a group of 20,000 professional people is normally distributed with mean $\mu = $60,000 and standard deviation $\sigma = $5000. Then the number of these people have a yearly income over $70,000 is:
   a. $456$  
   b. $228$  
   c. $10228$  
   d. $912$

5. If $X$ is uniformly distributed over the interval $[-2, 3]$, the $P(X \leq 0)$ is:
   a. $0$  
   b. $0.4$  
   c. $-0.4$  
   d. $0.6$

NOTE: you may use One of the following areas, where

<table>
<thead>
<tr>
<th>$z_0$</th>
<th>0.2</th>
<th>0.5</th>
<th>1.5</th>
<th>2.0</th>
<th>2.2</th>
<th>2.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P(0 &lt; Z &lt; z_0)$</td>
<td>0.0793</td>
<td>0.1915</td>
<td>0.4332</td>
<td>0.4772</td>
<td>0.4861</td>
<td>0.4878</td>
</tr>
</tbody>
</table>