STD :: XII  
Mathematics and Statistics  
Topic: - Probability distribution and Binomial distribution

Question Bank (B-Type)

Q. 1) A r. v. has the following Probability distribution

<table>
<thead>
<tr>
<th>x</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>0.1</td>
<td>k</td>
<td>0.2</td>
<td>2k</td>
<td>0.3</td>
<td>k</td>
</tr>
</tbody>
</table>

Find the value of k and calculate mean and variance of x

Q. 2) Suppose the error involved in making certain measurement is a continuous r.v. x with pdf

\[ f(x) = \begin{cases} 
    k(4 - x^2) & -2 \leq x \leq 2 \\
    0 & \text{otherwise}
\end{cases} \]

Compute
i) \( p(x > 0) \)
ii) \( p(-1 < x < 1) \)
iii) \( px < -0.5 \) or \( x > 0.5 \)

Q. 3) Let

\[ f(x) = \begin{cases} 
    \frac{x^2}{18} & -3 < x < 8 \\
    0 & \text{otherwise}
\end{cases} \]

be the p.d.f. of r.v. x then find \( p(x < 1) \) and \( p(|x| < 1) \)

Q. 4) The probability that a certain kind of component will survive a check test is 0.6. Find the probability that exactly 2 of the next 4 components tested survive.

Q. 5) A large chain retail stores purchases certain kind of electronic device from a manufacturer. The manufacturer indicates that the defective rate of device is 3%. The inspector of the retailer picks 20 items from a shipment. What is the probability that there will be at least one defective item among these 20

Q. 6) The probability that a student is not swimmer is 0.4. If students are randomly chosen. Find the prob. that

a) 4 out of them are swimmer
b) Atleast 4 are swimmer

Q. 7) Determine k if \( f(x) = \begin{cases} 
    k e^{-\theta x} & 0 < x < \infty, \quad \theta > 0 \\
    0 & \text{otherwise}
\end{cases} \)
is the p.d.f of r.v. x
also find \( p(x > \frac{1}{6}) \) and find M if \( p(0 < x < M) = \frac{1}{2} \)