1. In a basin the monthly potential evapotranspiration (ET) values, \( U_p \), within a year and the monthly precipitation heights, \( P \), are given in the table below. It is assumed that there is not available moisture (i.e. the soil is at the drying level) at the beginning of October. The maximum moisture, which can be kept by the soil till the drying point reaches the field capacity, corresponds to 100mm precipitation height. Accordingly compute the monthly actual evapotranspiration values within a year.

<table>
<thead>
<tr>
<th>Months</th>
<th>O</th>
<th>N</th>
<th>D</th>
<th>J</th>
<th>F</th>
<th>M</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>J</th>
<th>A</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>( U_p ) (mm)</td>
<td>111.5</td>
<td>44.4</td>
<td>5.2</td>
<td>9.4</td>
<td>7</td>
<td>45.6</td>
<td>82.5</td>
<td>148.4</td>
<td>201.3</td>
<td>227</td>
<td>207.9</td>
<td>170.6</td>
</tr>
<tr>
<td>( P ) (mm)</td>
<td>28.8</td>
<td>93.8</td>
<td>8.8</td>
<td>61</td>
<td>75.2</td>
<td>163.5</td>
<td>6.5</td>
<td>9.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>25.2</td>
</tr>
</tbody>
</table>

2. The Horton's infiltration equation is given below:
\[
f = f_c(f_0 - f_c)e^{-kt}
\]
where \( f_0 = 82 \text{ mm/hr} \), \( f_c = 10 \text{ mm/hr} \), \( k = 0.3 \text{ 1/hr} \) for a certain area.

The two hourly rainfall data are:
- 0-2 hr 30mm/hr
- 2-4 hr 70mm/hr
- 4-6 hr 15mm/hr

a) Plot the rainfall data as a histogram and the loss curve on the same graph.
b) Compute the effective precipitation depth from the plotted diagram by integration.
c) For the same effective depth, determine the \( \Omega \) index.

3. The 8 hourly rainfall data are given below. \( f_0 \), the initial value of the infiltration capacity is 5mm/hr, and \( f_c \), the limit value of the infiltration capacity is 2mm/hr and \( k \) is 0.4 1/hr.

a) Draw hyetograph.
b) Draw standard infiltration curve.
c) Draw infiltration rate
d) Calculate infiltration in 8 hour.
e) Calculate runoff rate.
f) Determine \( \Omega \) and W infiltration indexes.

<table>
<thead>
<tr>
<th>Hour</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation (mm)</td>
<td>6</td>
<td>10</td>
<td>15</td>
<td>18</td>
<td>24.5</td>
<td>26.5</td>
<td>28</td>
<td>29</td>
</tr>
</tbody>
</table>