**Ex.No-2** **PANDAS**

**AIM:**

To analyse and study the best performance point of Reciprocating pumps using Pandas.

**PROCEDURE :**

1. Dataset Creation:

   Create a hypothetical dataset containing information about actual discharge(m3/s), input power(W), and output power(W).

2. Correlation Analysis :

   Calculate the correlation matrix to examine the relationships between actual Discharge, input power, and output power using pandas''corr()' function.

3. Efficiency calculation :

   Calculate the efficiency for each input value using the given formula: Efficiency(%) = Output_power/Input_power *100

4. Head calculation:

   Calculate the total head for each performance using the given formula : Head (m) = output_power/actual discharge *ρg

5. Best Efficiency Point (BEP) :

   Identify the Best Efficiency Point of the reciprocating pump from the efficiency by selecting the highest index values using the pandas' 'nlargest()' function

**PROGRAM:**

```
import pandas as pd data={
    'Actual Discharge':[40,50,60,70,80,90],
    'Input Power':[1,2,3,4,5,10],
    'Output Power':[70,30,90,100,140,170]
}
density=1000 gravity=9.81
a=pd.DataFrame(data)
a['Efficiency']=(a['Output Power']/a['Input Power'])*100
a['Head']=(a['Output Power']/a['Actual Discharge'])/(density*gravity) corr_matrix=a.corr()
print(corr_matrix)
max_efficiency=corr_matrix['Efficiency'].nlargest(2).iloc[1]
print("\nParameter with the highest correlation with efficiency=",max_efficiency)
```

**OUTPUT:**

```
                  Actual Discharge  Input Power  Output Power  Efficiency  \
Actual Discharge          1.000000     0.922018      0.901611   -0.614487
Input Power               0.922018     1.000000      0.881684   -0.533271
Output Power              0.901611     0.881684      1.000000   -0.227847
Efficiency               -0.614487    -0.533271     -0.227847    1.000000
Head                      0.466245     0.489913      0.797480    0.391574

                     Head
Actual Discharge  0.466245
Input Power       0.489913
Output Power      0.797480
Efficiency        0.391574
Head              1.000000

Parameter with the highest correlation with efficiency= 0.3915744643953921
```

**Result:**

The programs were run successfully