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