Ex.No- **PANDAS**

2AIM:

ToanalyseandstudythebestperformancepointofReciprocatingpumpsusingPandas.

PROCEDURE:

1. DatasetCreation:

   Createahypotheticaldatasetcontaininginformationaboutactualdischarge(m3/s),inputpower(W), and outputpower(W).

2. CorrelationAnalysis:

   Calculatethecorrelationmatrixtoexaminetherelationshipsbetweenactual Discharge,inputpower, and outputpowerusing pandas''corr()'function.

3. Efficiencycalculation:

   Calculatetheefficiencyforeachinputvalueusingthegivenformula:Efficiency(%)

   =Output_power/Input_power*100

4. Headcalculation:

   Calculatethetotalheadforeachperformanceusingthegivenformula: Head

   (m)=output_power/actualdischarge *ρg

5. BestEfficiencyPoint(BEP):

   IdentifytheBestEfficiencyPointofthereciprocatingpumpfrom

   theefficiencybyselectingthehighestindexvaluesusingthepandas''nlargest()'functi

   on

PROGRAM:

```
importpandasaspd data={
    'ActualDischarge':[40,50,60,70,80,90],'Input
    Power':[1,2,3,4,5,10],
    'OutputPower':[70,30,90,100,140,170]
}
density=1000
gravity=9.81a=pd.DataFra
me(data)
a['Efficiency']=(a['OutputPower']/a['InputPower'])*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("\nParameterwiththehighestcorrelationwithefficiency=",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:

Theprograms wererunsuccessfully