Python for Petroleum Upstream Industry - Assignment

Section A: Core Python (Lists, Tuples, Dictionaries, Loops, Conditionals)

1. Well Production Data (List & For Loop):

You have daily oil production data for one week from Well-A:

production = [1050, 980, 1025, 1100, 975, 990, 1005]

- Calculate the average weekly production.

- Display all days where production was above 1000 barrels/day.

2. Formation Properties (Tuples):

Define a tuple containing the following formation properties:

('Porosity', 0.21), ('Permeability', 150), ('Formation Thickness', 30)

- Write a function that takes this tuple and prints it in a readable format.

3. Well Dictionary (Dictionary & If-Else):

Create a dictionary storing the following well info:

```
well_info = {
    'Well_Name': 'B-25',
    'Status': 'Active',
    'Depth_m': 3200,
    'Reservoir': 'Sandstone'
}
```

- Check if the well is active.

- Print a custom message: "Well B-25 is currently active in Sandstone formation."

Python for Petroleum Upstream Industry - Assignment

Section B: Functions and Loops

4. Calculate Oil in Place (Function):

Write a function to calculate OOIP using:

OOIP = (7758 * A * h * phi * (1 - Sw)) / Bo

Inputs: A=500, h=30, phi=0.2, Sw=0.25, Bo=1.2

5. Cumulative Production (While Loop):

Write a program to take user input until -1 is entered.

- Calculate total cumulative oil produced.

- Print average daily production.

Section C: NumPy, Pandas, and Matplotlib

6. NumPy for Pressure Data:

pressure = np.array([3500, 3450, 3400, 3350, 3300])

- Find pressure drop per interval.

- Calculate average pressure.

7. Pandas for Well Logs:

```
data = {
    'Depth_ft': [1000, 1010, 1020, 1030, 1040],
    'GR_API': [80, 75, 78, 82, 77],
```

'RT_ohm_m': [20, 25, 22, 19, 23]

}

- Convert to DataFrame.

- Calculate GR and RT mean.

- Add 'Lithology' column: if GR < 80 -> 'Sandstone', else 'Shale'.

8. Matplotlib - Plot Production Profile:

days = [1, 2, 3, 4, 5, 6, 7]

production = [1050, 980, 1025, 1100, 975, 990, 1005]

- Plot line chart with labels and title.

- Highlight the highest production day.