```
# To find BOD at 7th day at 25°C
# To find Decay Coefficient at 25°C
T = float(input("Temperature at 3rd day BOD: "))
T1 = float(input("Temperature at 7th day BOD: "))

# Calculate decay coefficient for 25°C
K2 = K1 * (1.047 ** (T1 - T))
print("The value of K2 is:", K2)

# To find Ultimate BOD
B1 = float(input("BOD at 3rd day (mg/L): "))
t = float(input("Time in days for B1: "))

# Calculate E for BOD at 3rd day
E = (1 - 2.718 ** (-K1 * t))
print("The value of E is:", E)

# Ultimate BOD calculation
B_u = B1 / E
print("The ultimate BOD (B_u) is:", B_u)

# To find BOD at 7th day at 25°C
t1 = float(input("Time in days for B2 (7th day): "))

# Calculate E1 for BOD at 7th day with adjusted decay coefficient K2
E1 = (1 - 2.718 ** (-K2 * t1))
print("The value of E1 is:", E1)

# Calculate BOD at 7th day
B2 = B_u * E1
print("The value of B2 is:", B2, "mg/L")
```

```
Decay Coefficient at 20°C: 0.23
Temperature at 3rd day BOD: 20
Temperature at 7th day BOD: 25
The value of K2 is: 0.2893751572825015
BOD at 3rd day (mg/L): 50
Time in days for B1: 3
The value of E is: 0.4983803458214343 7
The ultimate BOD (B_u) is: 100.32343355585682
Time in days for B2 (7th day): 7
The value of E1 is: 0.8680610647811111
The value of B2 is: 87.08686655499413 mg/L
```

```
# Determination of density of sludge removed from aeration tank

# Input values
M = float(input("Enter the value of initial mass (kg): "))  # Initial mass in kg
S = float(input("Enter the value of solid containing sludge in percentage (%): "))  # Percentage
Gs = float(input("Enter the value of specific gravity of sludge solids: "))  # Specific gravity
Rho_W = float(input("Enter the value of density of water (kg/m^3): "))  # Density of water

# Calculate mass of solid content in sludge
Ws = (S / 100) * M  # Corrected calculation to get mass of solids
m = M - Ws  # Mass of water
print("The value of mass of water:", m)

# Volume of water
Vw = m / Rho_W
print("The Value of Volume of water:", Vw)

# Density of solid content in sludge
Rho_S = Gs * Rho_W
print("The value of Density of solid content in sludge:", Rho_S)

# Volume of solid content in sludge
Vs = Ws / Rho_S
print("The value of volume of solid content in sludge:", Vs)

# Total volume of the sludge mixture
Vt = Vw + Vs
print("The value of total volume of solid content in sludge:", Vt)

# Density of sludge removed from aeration
```

```
Rho_SL = M / Vt
print("The value of Density of sludge removed from aeration:", Rho_SL)
```

```
Enter the value of initial mass (kg): 100
Enter the value of solid containing sludge in percentage (%): 2
Enter the value of specific gravity of sludge solids: 2.2
Enter the value of density of water (kg/m^3): 1000
The value of mass of water: 98.0
The Value of Volume of water: 0.098
The value of Density of solid content in sludge: 2200.0
The value of volume of solid content in sludge: 0.0009090909090909091
The value of total volume of solid content in sludge: 0.0989090909090992
The value of Density of sludge removed from aeration: 1011.0294117647057
```