```
#To find the downstream depth of open channel
Q = float(input("Enter the value of Discharge: "))
T = int(input("Enter the value of top width: "))
g = float(input("Enter the value of acceleration due to gravity: "))
y1 = float(input("Enter the value of upstream depth: "))
Z = float(input("Enter the value of hump: "))

# Discharge per meter width
q = Q / T
print("The value of discharge per meter width is:", q)

# Area calculation
A1 = T * y1
print("Value of upstream area is:", A1)

# Froude number calculation
Fr1 = ((Q * Q * T) / (g * A1 * A1 * A1)) ** 0.5
print("The value of Froude number is:", Fr1)

if Fr1 > 1:
  print("The flow is supercritical flow")
else:

  print("The flow is Subcritical flow")

# Upstream Energy
E1 = y1 + ((Q * Q) / (2 * g * A1 * A1))
print("The value of energy at the initial section is:", E1)

# Downstream energy
E2 = E1 - Z
print("The value of downstream energy E2 is:", E2)

# Critical Depth
yc = (q * q / g) ** 0.3333
print("The value of critical depth is:", yc)
Ec = 1.5 * yc
print("The value of critical energy is:", Ec)

if Ec > E2:
 print("Choking Condition")
else:
 print("SAFE")

# Calculation of Zmax
Zmax = E1 - Ec
print("The value of maximum hump is:", Zmax)
```

```
Enter the value of Discharge: 4.8
Enter the value of top width: 2
Enter the value of acceleration due to gravity: 9.81
Enter the value of upstream depth: 1.6
Enter the value of hump: 0.1
The value of discharge per meter width is: 2.4
Value of upstream area is: 3.2
The value of Froude number is: 0.3786140830096141
The flow is Subcritical flow
The value of energy at the initial section is: 1.714678899082569
The value of downstream energy E2 is: 1.614678899082569
The value of critical depth is: 0.8373856872261649
The value of critical energy is: 1.2560785308392473
SAFE
The value of maximum hump is: 0.45860036824332173
```

Start coding or generate with AI.