

ES4-P5

February 16, 2025

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[1]: # ES4 P5

# Swamee-Jain Diameter Discharge

def qJain(diameter,headloss,gravity,length,roughness,viscosity):
    import math
    sqs=math.sqrt(gravity*headloss/length)
    temp1 = roughness/(3.7*diameter)
    temp2 = 1.78*viscosity/(sqs*diameter**(3/2))
    temp3 = math.log10(temp1+temp2)
    qJain = -2.22*(diameter**(5/2))*sqs*temp3
    return qJain

## Left Pipe
viscosity = 1.45e-05 # given
roughness = 1.64e-04 # given
headloss = 120 # ft
length = 1*5280 # miles
diameter = 96/12 # feet
gravity = 32.2
qlleft = qJain(diameter,headloss,gravity,length,roughness,viscosity)
diameter = 108/12 # feet
qright = qJain(diameter,headloss,gravity,length,roughness,viscosity)
print("Left Discharge = ",round(qlleft,3)," CFS ")
print("Right Discharge = ",round(qright,3)," CFS ")

Left Discharge = 1774.862 CFS
Right Discharge = 2408.413 CFS
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