Questions for self-control

1. Describe the main symbols used in Fortran?
2. Explain the use of different data types. Give examples.
3. Describe the constants, variables, constants and variables and a valid types.
4. What are the priorities arithmetic. Present arithmetic symbols? Explain the order of arithmetic operations. Justify the applicability brackets.
5. What are the standard features of the Fortran?
6. The name of the input and output is in Fortran?
7. Give rules for working with data.

Tasks for independent work

1. Determine the time required to empty the tank diameter D = 1 m. The tank is filled to a height h = 2 m. Hole in bottom d = 3 cm. Coefficient expenses α = 0,61; g = 9,81 m / s2, π = 3,1415. The formula:

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where - sectional area of the tank, m2; - Square hole m2.

2. Determine the value of the criterion Reynolds number Re in the annulus of the heat exchanger "pipe in pipe" and related value if the pipes with outer diameter = 22 mm = 51 mm, wall thickness = 2 mm = 2.5 mm; Mass flow rate = 1.730 kg / s, density = 1150 kg / m3, dynamic viscosity = 1,2 • 10-3 Pa • s. Formulas:

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3. The air mass of 1 kg at the initial settings P1 = 1 • 105 Pa = 303 K by adiabatic compressed to P2 = 1 • 106 Pa. Find a final volume of air at R = 292,7 J / (kg • K), K = 1.4, using the formula:

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4. Determine the volume of air flow under normal conditions and related value, if it passes through the heat exchanger tubes (the number of pipes = 100, outer diameter =

20 mm, wall thickness = 2 mm) Speed = 9 m / s at T = 50 ° pressure Pman = 2 • 105 Pa barometric pressure = 1,68 • 10 Pa pressure po = 1,01 • 10 Pa, kg / m, T = 273 K. The formula:

; ; ; ; P = P + P.

5. Find a diameter pipeline to transport hydrogen mass flow at V = 0,04 kg / s and related values. The length of the pipeline L = 1000 m. Useful pressure drop P = 1080 Pa. Hydrogen density ρ = 0,0825 kg / m3; = 0.03. Formulas for the calculation:

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6. Find the maximum deflection plate whose radius = 0.2 m, thickness = 0.03 m, which is rigidly fixed on the circuit and subjected to a uniformly distributed load = 0.3 MPa in modulus of elasticity E = 2 • 10 MPa, Poisson's ratio , = 4. Calculation formula:

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7. Determine the maximum flow for a couple of conditions: the area of the nozzle f = 1 • 10-5 m2 = specific volume of 0.5 m3 / kg, the initial pressure P = 1 • 106 Pa indicators for polytropic = 1,135, g = 9,81 m / s2. Calculation formula:

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8. Determine the maximum stress in circular rigid plate contour radius r = 0,35 m, thickness h = 0,05 m under uniform load q = 5,8 MPa. Poisson's ratio = 0.3; n = 2. Formulas:

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9. Determine the maximum gas flow through the nozzle that narrows if initial gas parameters P0 = 6,4 • 106 Pa, V0 = 0,0139 m / s, k = 1,4, area nozzle aperture f = 5 • 10-5 m2 . Calculation formula:

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10. Determine the displacement U disk external surface with an external radius a = 0,15

m and the inner radius b = 0,05 m that occur under the influence of centrifugal forces. Disk rotation speed = 157 rad / s, E = 2 • 10 MPa, g = 9,81 m / s, γ = 7,65 • 10 N / m, n = 2, = 0.3. Formulas: