| قائمة الاسئلة |
|---|
| ميكانيكا الموائع الحيوية- كلية الهندسة - قسم الطبية الحيوية - المستوى الثاني- 3ساعات - درجة هذا الاختبار (50) |
| د.حمود النهاري |

1) An ideal fluid is
   1) - one which obeys Newton's law of viscosity
   2) - frictionless and compressible
   3) - very viscous
   4) + frictionless and incompressible

2) The viscosity of a gas
   1) - decreases with increase in temperature
   2) + increases with increase in temperature
   3) - is independent of temperature
   4) - is independent of pressure for very high-pressure intensities

3) Flow at constant rate through a tapering pipe is 1) steady flow 2) uniform flow 3) unsteady flow 4) non-uniform flow The correct answer is
   1) - (1) and (2)
   2) + (1) and (4)
   3) - (2) and (3)
   4) - (2) and (4)

4) Equation of continuity is based on the principle of conservation of
   1) + mass
   2) - energy
   3) - momentum
   4) - none of the above

5) In steady flow of a fluid, the total acceleration of any fluid particle
   1) + can be zero
   2) - is never zero
   3) - is always zero
   4) - is independent of coordinates

6) The pitot tube is used to measure
   1) - velocity at stagnation point
   2) + stagnation pressure
   3) - static pressure
   4) - dynamic pressure

7) The shear stress distribution for a fluid flowing in between the parallel plates, both at rest, is
   1) - constant over the cross section
   2) - parabolic distribution across the section
   3) + zero at the mid plane and varies linearly with distance from mid plane
   4) - zero at plates and increases linearly to midpoint

8) The velocity distribution for laminar flow through a circular tube
   1) - is constant over the cross-section
   2) - varies linearly from zero at walls to maximum at center
   3) + varies parabolically with maximum at the center
   4) - none of the above

9)

A jet of water discharges into an open tank, and water leaves the tank through an orifice in the bottom at a rate of 0.004 m³/ s. If the cross-sectional area of the jet is 0.0025 m² where the velocity of water is 7 m/ s, at what rate is water accumulating in (or evacuating from) the tank
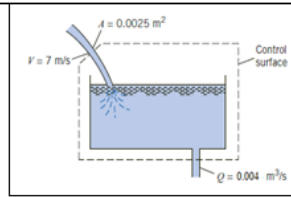
1) + 13.5 kg/s
2) - 14.5kg/s
3) - 17.5kg/s
4) - None of the above

10) Bernoulli's equation cannot be applied when the flow is
1) - rotational
2) - turbulent
3) - unsteady
4) + all of the above

11) The continuity equation is the result of application of the following law to the flow field
1) - First law of thermodynamics
2) - Conservation of energy
3) - Newtons second law of motion
4) + Conservation of mass

12) The region between the separation streamline and the boundary surface of the solid body is known as
1) + Wake
2) - Drag
3) - Lift
4) - Boundary layer

13) The total head of a liquid particle in motion is equal to
1) + Pressure head + kinetic head + potential head
2) - Pressure head - (kinetic head + potential head)
3) - Potential head - (pressure head + kinetic head)
4) - Kinetic head - (pressure head + potential head)

14) The bulk modulus of elasticity with increase in pressure
1) - Decreases
2) + Increases
3) - Remain constant
4) - Increases first up to certain limit and then decreases

15) In a static fluid _____
1) - Resistance to shear stress is small
2) - Fluid pressure is small
3) - Linear deformation is small
4) + Only normal stress can exist

16) Which of the following statesman is not correct?
1) - Absolute pressure- atmospheric pressure= gauge pressure
2) - Atmospheric pressure- absolute pressure= vacuum pressure
3) - Atmospheric pressure + gauge pressure = absolute pressure
4) + Atmospheric pressure + absolute pressure = gauge pressure

17) Cavitation occurred in a fluid is due to _____.
1) - High pressure
2) - High viscosity

3)   +   Low pressure

4)   -   Low viscosity

18)   When the fluid properties don't change with respect to time, the flow is ____.

     1)   -   Uniform flow

     2)   -   Non-uniform flow

     3)   +   Steady flow

     4)   -   Unsteady flow

19)   In which case, you can apply Bernoulli's Equation?

     1)   -   Turbulent, unsteady flow

     2)   +   Laminar, steady flow

     3)   -   Rotational flow

     4)   -   None of these

20)   ……………… is a measure of a fluid's resistance to deformation under shear stress.

     1)   +   Viscosity

     2)   -   shear stress

     3)   -   stagnation point.

     4)   -   Density

21)   Pressure measured relative to this zero pressure is termed ……………

     1)   +   absolute pressure.

     2)   -   Vacuum pressure

     3)   -   gage pressure

     4)   -   None of the above

22)   is defined as the difference between atmospheric pressure and actual pressure.

     1)   -   absolute pressure.

     2)   +   Vacuum pressure

     3)   -   gage pressure

     4)   -   None of the above

23)   The ……………..is proportional to the rate of strain, and the constant of proportionality is the viscosity.

     1)   -   Viscosity

     2)   +   Shear stress

     3)   -   Stagnation point.

     4)   -   Pressure

24)   ………………is an unsteady flow characterized by intense cross-stream mixing.

     1)   +   Turbulent flow

     2)   -   Transient flow

     3)   -   Laminar flow

     4)   -   Uniform flow

25)   ……………..is a well-ordered state of flow in which adjacent fluid layers move smoothly with respect to each other.

     1)   -   Turbulent flow

     2)   -   Transient flow

     3)   +   Laminar flow

     4)   -   Uniform flow

26)   The total weight of a 14 ft^3 tank of oxygen if the oxygen is pressurized to 500 psia, the tank itself weighs 150 lbf, and the temperature is 70°F is ……… Ib   Hint (R_{O2} = 1555 ft·lbf/(slug ·° R)) .

     1)   +   189.3831

     2)   -   448.186

     3)   -   39.383

4)   -   151.223

27)   The discharge in the channel is ……..m³/s if the water is 2 m deep (d =2m), the channel is 5 m wide, and the maximum velocity is 2 m/ s.
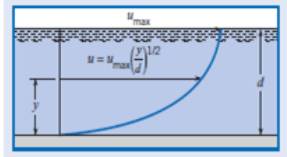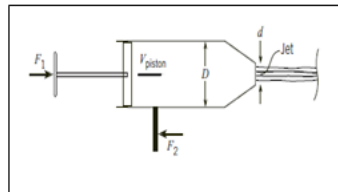

1)   -   13.33

2)   +   6.667

3)   -   20

4)   -   56.569

28)   A pressure of 10 kPa, gage, is applied to the surface of water in an enclosed tank. The distance from the water surface to the outlet is 1m. The temperature of the water is 20°C. the velocity (m/ s) of water at the outlet is ………... The speed of the water surface is much less than the water speed at the outlet.

$Υ=9790N/m^3 , ρ = 998 \, kg/m^3$

1)   +   6.2976

2)   -   0.6487

3)   -   4.432

4)   -   15.558

29)   An engineer, who is designing a water toy, is making preliminary calculations. A user of the product will apply a force F_1 that moves a piston (D= 80 mm) at a speed of V_{piston}= 250 mm /s. Water at 20°C jets out of a converging nozzle of diameter d =15 mm. To hold the toy stationary the user applies a force F_2 to the handle . ρ=998 kg/m³
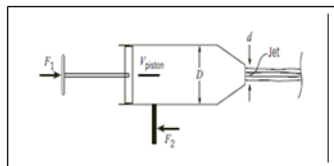**Then the velocity in jet equal to ……………..m/s**

1)   -   126.67

2)   +   7.1111

3)   -   117.75

4)   -   25.27

30)   An engineer, who is designing a water toy, is making preliminary calculations. A user of the product will apply a force F_1 that moves a piston (D= 80 mm) at a speed of V_{piston}= 250 mm /s. Water at 20°C jets out of a converging nozzle of diameter d =15 mm. To hold the toy stationary the user applies a force F_2 to the handle . ρ=998 kg/m³
Then the force F_1 equal to …………..N

1)   +   126.67

2)   -   7.1111

3)   -   117.75

4)   -   25.27

31)

An engineer, who is designing a water toy, is making preliminary calculations. A user of the product will apply a force F_1 that moves a piston (D= 80 mm) at a speed of V_{piston}= 250 mm /s. Water at 20°C jets out of a converging nozzle of diameter d =15 mm. To hold the toy stationary the user applies a force F_2 to the handle . ρ=998 kg/m³

Then the force F_2 equal to ....N
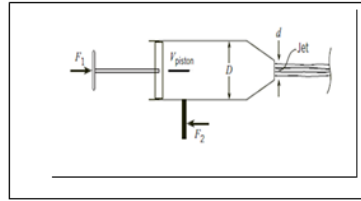
1)   -   126.67
2)   -   7.1111
3)   +   117.75
4)   -   25.27

32)   For these velocity distributions in a round pipe, indicate the kinetic-energy correction factor α

Hint $V = V_m - \dfrac{r}{r_0} V_m$

1)   -   1.4
2)   +   2.7
3)   -   2
4)   -   0.3333

33)   A pipe 50 cm in diameter carries water (10°C) at a rate of 0.7 m³/ s. A pump in the pipe is used to move the water from an elevation of 30 m to 40 m. The pressure at section 1 is 70 kPa gage and the pressure at section 2 is 350 kPa gage. What power in kilowatts must be supplied to the flow by the pump? Assume h_L= 3 m of water and $\alpha_1 = \alpha_2 = 1$, Y=9810 N/m³
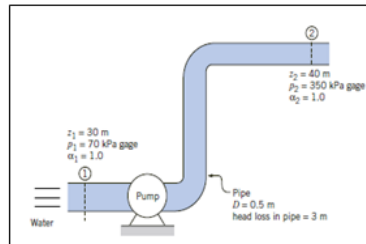
1)   -   203.557 kw
2)   +   285 kw
3)   -   264.379 kw
4)   -   273 kw

34)   Piezometric tubes are tapped into a venturi section as shown in the figure. The liquid is incompressible. The upstream piezometric head is 1 m, and the piezometric head at the throat is 0.5 m. The velocity in the throat section is twice large as in the approach section. Find the velocity in the throat section.
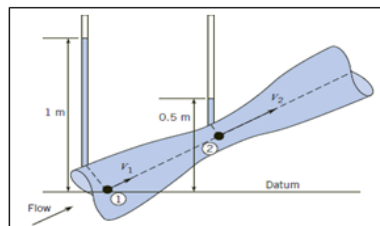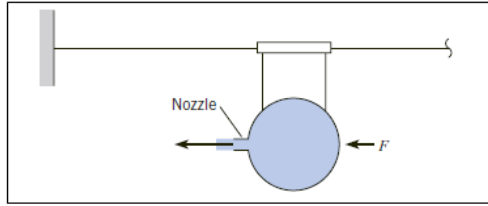
1)   -   3.62 m/s
2)   -   1.56 m/s
3)   -   2.72 m/s
4)   +   None of the above

35)

The balloon rocket is held in place by a force F. The pressure inside the balloon is 9 in-H2O, the nozzle diameter is 1.0 cm, and the air density is 1.2 kg /m^3. Find the the force F. Neglect friction and assume the air flow is in viscid and irrational.

1) + 0.352 N
2) - 0.312N
3) - 0.0312N
4) - 31.2N