Question 1

- The phenomenon of momentum transfer in fluid is driven by

a. Fluid under study
b. Unidimensional flow
c. Velocity gradient
d. Geometry under consideration
e. None of these

Question 2

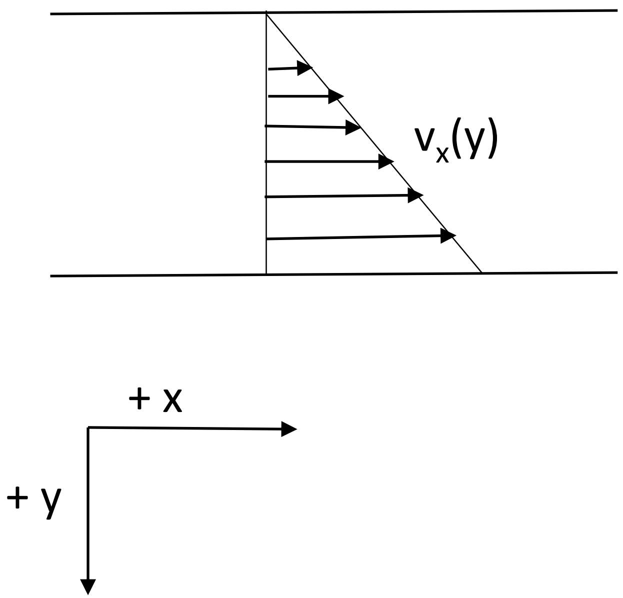
- ❑ The right expression for shear stress in given flow situation is

a. $\tau_{yx} = -\mu \dfrac{dv_x}{dy}$

b. $\tau_{yx} = \mu \dfrac{dv_x}{dy}$

c. $\tau_{xy} = -\mu \dfrac{dv_x}{dy}$

d. $\tau_{xy} = \mu \dfrac{dv_x}{dy}$



Question 3

- Steady state assumption in Shell momentum balance mean :

a. There is no motion of the solid body
b. There is no flow in direction of body forces
c. At any point in the space pressure, velocity and density components do not change with time.
d. At any point in the space the pressure forces are non-existent
e. None of these

Question 4

- The total number of components including both Molecular Momentum-Flux Tensor (π_{ij}) and Convective Momentum Flux tensor ($\rho\mathbf{v}\,\mathbf{v}$) in a general situation is :

a. 9

b. 12

c. 18

d. 21

e. None of these

Question 5

- Which of these pair of quantities are comparable in terms of direction of momentum flow ? For the convective expression $v_j \rho v_i$, interpret ρv_i as the flux of i_{th} momentum and velocity component v_j as the direction of momentum transport.

a. $v_x \rho v_y, \tau_{xy}$

b. $v_x \rho v_y, \tau_{yx}$

c. $v_y \rho v_x, \tau_{xy}$

d. $v_y \rho v_x, \tau_{xx}$

e. None of these

Question 6

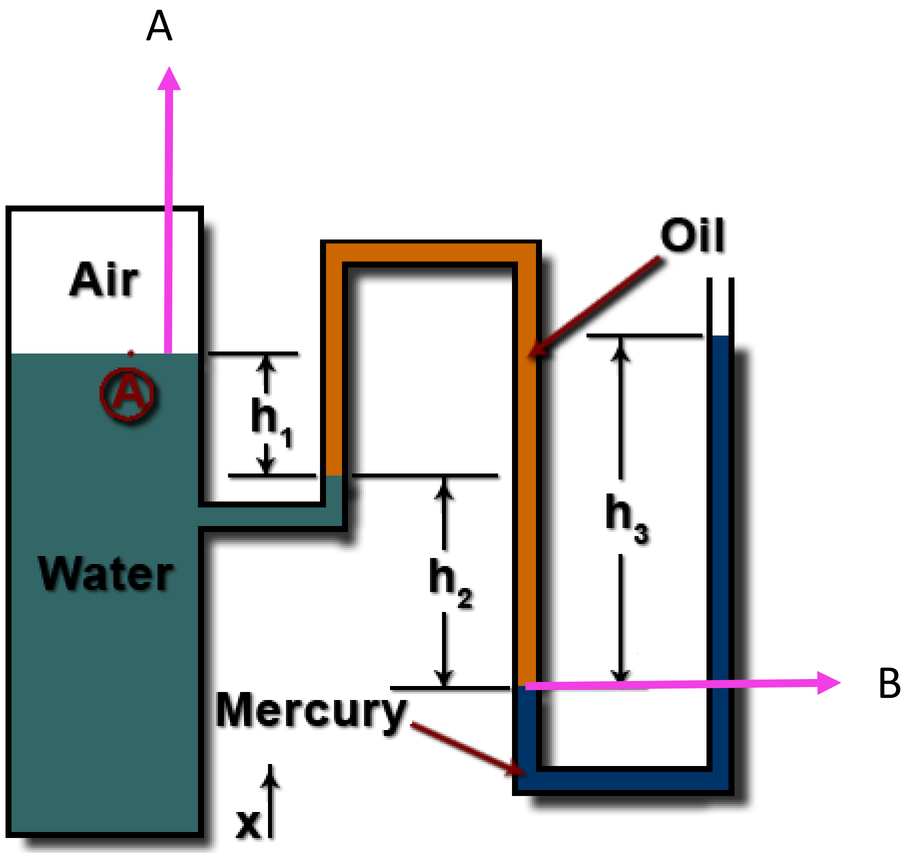
- Shell momentum balances are not useful in which of the following case ?

a. Steady flow
b. Turbulent Flow
c. Rectilinear flow
d. Non-compressible flow
e. None of these

Question 7

- Pressure difference $P_B - P_A$ is :

  a. $\rho_{oil} g h_1 + \rho_{oil} g h_2$
  b. $\rho_w g h_1 + \rho_{oil} g h_2$
  c. $\rho_w g h_1 + \rho_{oil} g\ (h_2 + h_3)$
  d. $\rho_w g h_1 + \rho_{mercury} g h_3$
  e. None of these



Question 8

- The plane on which the shear stress τ_{xz} is acting is :

a. XY
b. XZ
c. YZ
d. None of these

Question 9

- The right tensor expression for momentum transfer in +ve z direction of x momentum is :

a. τ_{yx}

b. τ_{xx}

c. τ_{zx}

d. τ_{xz}

e. τ_{zz}

Question 10

- For the given general velocity profile which of the options are correct

$V_x = V_x (x,y,z)$; $V_z = 0$; $V_y = 0$;

a. Convective momentum transfer in z direction = 0
b. There is no shear stress in fluid.
c. Molecular momentum transport is 0.
d. $\tau_{zx} = 0$
e. None of the above.