

# Unit 5 - Week 3

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## Assignment 3

The due date for submitting this assignment has passed. **Due on 2019-08-21, 23:59 IST.**  
 As per our records you have not submitted this assignment.

- 1) Identify the type of flow for  $F(z) = Uz$

Where  $z = x + iy$ , ( $\therefore i = \sqrt{-1}$ )

  - a) Source
  - b) Sink
  - c) Uniform flow in x direction
  - d) Uniform flow in y direction

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: c.
- 2) Identify the type of flow for  $F(z) = -iVz$

Where  $z = x + iy$ , ( $\therefore i = \sqrt{-1}$ )

  - a) Source
  - b) Vortex
  - c) Uniform flow at an angle
  - d) Uniform flow in y direction

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: d.
- 3) Identify the type of flow for  $F(z) = \frac{m}{2\pi} \ln(z)$

Where  $z = x + iy$ , ( $\therefore i = \sqrt{-1}$ )

  - a) Source
  - b) Vortex
  - c) Uniform flow at an angle
  - d) Uniform flow in y direction

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a.
- 4) Identify the type of flow for  $F(z) = cze^{-i\alpha}$

Where  $z = x + iy$ , ( $\therefore i = \sqrt{-1}$ )

  - a) Source
  - b) Vortex
  - c) Uniform flow at an angle
  - d) Uniform flow in y direction

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: c.
- 5) When an uniform flow is superposed on a source at origin, the streamline through the stagnation point will take a form of

  - a) Vortex
  - b) Rankine full body
  - c) Rankine half body
  - d) Doublet

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: c.
- 6) If a source at  $z=-a$  and sink at  $z=+a$  are superposed and  $a \rightarrow 0$ , the resulting flow becomes

  - a) Vortex
  - b) Rankine full body
  - c) Rankine half body
  - d) Doublet

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: d.
- 7) Superposition of uniform flow and the source at origin results in a stream function of the following form

  - a)  $Ur \sin\theta + \frac{m}{2\pi} \theta$
  - b)  $Ur \cos\theta + \frac{m}{2\pi} \theta$
  - c)  $U\theta + \frac{m}{2\pi} r$
  - d) None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a.
- 8) Superposition of uniform flow and the source at origin results in a potential function of the following form

  - a)  $Ur \cos\theta + \frac{m}{2\pi} \ln(r)$
  - b)  $Ur \cos\theta + \frac{m}{2\pi} \theta$
  - c)  $U\theta + \frac{m}{2\pi} \ln(r)$
  - d) None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a.
- 9) Water is drawn from a well, which is at a distance of 'a' from an infinite line source. The streamlines can be obtained by superposing

  - a) Uniform flow and sink
  - b) Two sources separated by distance 2a
  - c) A source and a sink separated by distance 2a
  - d) A source and a sink separated by distance a

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: c.
- 10) A source is located 'a' distance away from impermeable wall. The flow can be simulated by superposing

  - a) Two sources '2a' distance apart
  - b) Two sources 'a' distance apart
  - c) One source and one sink '2a' distance apart
  - d) None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a.
- 11) Unit of mass diffusivity is

  - a)  $m^2/s$
  - b)  $m/s$
  - c)  $kg.m/s$
  - d) None of these

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a.
- 12) Molar flow rate under Fickian diffusion can be described as

Where A is the area of cross-section

D is diffusivity,  $\frac{\partial C}{\partial x}$  is the concentration gradient

  - a)  $-AD \frac{\partial C}{\partial x}$
  - b)  $-D \frac{\partial C}{\partial x}$
  - c)  $-D \frac{\partial^2 C}{\partial x^2}$
  - d) None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a.
- 13) Difference between diffusion and dispersion

  - a) Dispersion does not involve Brownian motion
  - b) Dispersion involves advection as well as diffusion
  - c) Dispersion involves diffusion of more than one phase
  - d) None of these

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: b.
- 14) As the size of the pore is decreased, which of the following mode of transport becomes dominant?

  - a) Viscous flow
  - b) Poiseuille's flow
  - c) Knudsen diffusion
  - d) None of these

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: c.
- 15) When the size of the pore is increased to  $10\mu m$ , the mechanism that is likely to dominate

  - a) Viscous flow
  - b) Poiseuille's flow
  - c) Knudsen diffusion
  - d) None of these

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a.