Unit 12 - Week 10: Finite Volume Method - I

Assignment 10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-04-08, 23:59 IST.

1) The accuracy of mean value approximation when applied to find the cell averaged value of source term is *1 point*

- 1st order
- 2nd order
- 3rd order
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
2nd order

2) Which of these theorem is used to transform the general diffusion term into surface based integral in the finite volume method? *1 point*

- Stokes theorem
- Curl theorem
- Gauss divergence theorem
- Leibniz theorem

No, the answer is incorrect.
Score: 0
Accepted Answers:
Gauss divergence theorem

3) The diffusion flux at east face center for uniform grid can be written as *1 point*

- $\vec{J_e} \cdot \vec{S_e} = -\Gamma_e A_e \frac{\phi_P - \phi_E}{\Delta x}$
- $\vec{J_e} \cdot \vec{S_e} = -\Gamma_e A_e \frac{\phi_E - \phi_P}{\Delta x}$
- $\vec{J_e} \cdot \vec{S_e} = -\Gamma_e A_e \frac{\phi_E - \phi_W}{2\Delta x}$
- $\vec{J_e} \cdot \vec{S_e} = -\Gamma_e A_e \frac{\phi_W - \phi_E}{2\Delta x}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\vec{J_e} \cdot \vec{S_e} = -\Gamma_e A_e \frac{\phi_E - \phi_P}{\Delta x}$

4) The discretized equation for source-free one-dimensional steady heat conduction equation in uniform grid is *1 point*

- $T_i = T_{i+1} + T_{i-1}$
- $2T_i = T_{i+1} + T_{i-1}$
- $3T_i = T_{i+1} + T_{i-1}$
- $4T_i = T_{i+1} + T_{i-1}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$2T_i = T_{i+1} + T_{i-1}$

5) The discretized equation for source-free one-dimensional unsteady heat conduction equation using explicit method is *1 point*

- $a_i T_i^{n+1} = a_{i+1} T_{i+1}^{n+1} + a_{i-1} T_{i-1}^{n+1} + \left(a_i - a_{i+1} - a_{i-1}\right) T_i^n$
- $a_i T_i^{n+1} = a_{i+1} T_{i+1}^{n+1} + a_{i-1} T_{i-1}^{n+1} + \left(a_i - a_{i+1} - a_{i-1}\right) T_i^{n+1}$
- $a_i T_i^{n+1} = a_{i+1} T_{i+1}^{n} + a_{i-1} T_{i-1}^{n} + \left(a_i - a_{i+1} - a_{i-1}\right) T_i^{n}$
- $a_i T_i^{n+1} = a_{i+1} T_{i+1}^{n} + a_{i-1} T_{i-1}^{n} + \left(a_i - a_{i+1} - a_{i-1}\right) T_i^{n+1}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$a_i T_i^{n+1} = a_{i+1} T_{i+1}^{n} + a_{i-1} T_{i-1}^{n} + \left(a_i - a_{i+1} - a_{i-1}\right) T_i^{n}$

6) Which one of the following is correct for the volume integral using mean value approximation in three-dimensional flow? *1 point*

- Product of the integrand at the face center and the volume of the control volume
- Product of the integrand at the control volume center and the volume of the control volume
- Product of the integrand at the control volume center and the surface area of the control volume
- Product of the integrand at the face center and the surface area of the control volume

No, the answer is incorrect.
Score: 0
Accepted Answers:
Product of the integrand at the control volume center and the volume of the control volume

7) In finite volume method, the unit surface normal is generally considered pointing outward in a cell. *1 point*

- True
- False

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

8) For one-dimensional steady-state diffusion problem, the diffusive flux leaving the exit face is not same as the diffusive flux entering the inlet face. *1 point*

- True
- False

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