Unit 13 - Module 6 - Issues in practical problems - Part 1 : Basics of finite volume method including grid generation

Assignment 11

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

1) Which of the following statements is true when we solve flow through a complicated geometry like that shown in Figure 1

- structured grids cannot be used
- unstructured grids cannot be used
- only hybrid grids can be used
- both can be used

No, the answer is incorrect.
Score: 0
Accepted Answers: both can be used

2) Which of the following cannot be claimed as advantages of an unstructured grid method of solution over a structured grid solution

- ease of grid generation
- ease of solution of $Ax = b$ after discretization
- ease of grid refinement after solution
- none of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: ease of solution of $Ax = b$ after discretization
4) Which of the following statements is NOT true when we solve a complex geometry problem using the structured grid approach?

- The diagonal structure of the coefficient matrix is preserved
- We can no longer use finite difference methods to discretize the equations
- We can generate a body-fitted grid for virtually any three-dimensional geometry
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
both (2a, 2c)

5) Which of the statements is true about the transformation of the Poisson equation into a non-orthogonal curvilinear coordinate system?

- The elliptic equation becomes hyperbolic
- The hyperbolic equation becomes elliptic
- The transformed equation remains elliptic
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
The transformed equation remains elliptic

6) Which of the following statements is true about using the finite volume method:

- The governing equations are different from those for finite difference method
- It can be used with structured grids but not with unstructured grids
- It can be used with unstructured grids but not with structured grids
- It can be used with both grids

No, the answer is incorrect.
Score: 0
Accepted Answers:
It can be used with both grids

7) Consistent evaluation of fluxes in the finite volume method means

- at least second order accuracy in evaluation of fluxes
- evaluation of fluxes at mid-points of faces
- ensuring that flux leaving a cell through a particular face is equal to the flux entering a neighbouring cell with which the face is shared

No, the answer is incorrect.
Score: 0
Accepted Answers:
8) Which of the following methods can be used to generate grid for the domain shown in Figure 1:

- Advancing front method
- Algebraic grid generation
- Bowyer-Watson algorithm
- All of the above

Score: 0
Accepted Answers: 
All of the above

9) Which of the following methods should be used if no area lying outside the computational domain is triangulated while generating mesh for Figure 1

- Advancing front method
- Domain nodalization
- Bowyer-Watson algorithm
- None of the above

Score: 0
Accepted Answers: 
Advancing front method

10) Which of the following statements is true about the Bowyer-Watson algorithm for Delaunay triangulation:

- All the boundary grid nodes are inserted first
- All the interior grid nodes are inserted first
- All the nodes, including boundary and interior nodes, are inserted randomly
- Only the interior grid nodes are inserted randomly

Score: 0
Accepted Answers: 
All the nodes, including boundary and interior nodes, are inserted randomly

11) Which of the following statements is true about the advancing front method:

- All boundary edges are ordered in an anti-clockwise sequence
- All boundary edges are ordered in a clockwise sequence
- Internal boundary edges are ordered in clockwise sequence and external ones in anti-clockwise sequence
- Boundary edges need not be ordered in any sequence
The following possibility can happen during advancing front method 1 point of triangulation:

- Triangles of high aspect ratio are created
- Domain outside the boundary also gets triangulated near concave boundaries
- Domain outside the boundary also gets triangulated near convex boundaries
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Internal boundary edges are ordered in clockwise sequence and external one in anti-clockwise sequence

The following possibility can happen during Bowyer-Watson method 1 point of triangulation:

- Triangles of high aspect ratio are created
- Domain outside the boundary also gets triangulated near concave boundaries
- Domain outside the boundary also gets triangulated near convex boundaries
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Triangles of high aspect ratio are created