University of Mumbai

Examination 2020 under cluster 4 (PCE)

Program: BE Mechanical Engineering
Curriculum Scheme: Rev2012 (CBSGS)
Examination: Final Year, Semester VII
Course Code: MEE7015 and Course Name: Computational Fluid Dynamics
Time: 1 hour Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	The Crank-Nicolson scheme is
Option A:	fourth-order accurate
Option B:	third-order accurate
Option C:	second-order accurate
Option D:	first-order accurate
Q2.	For which of these problems is the Crank-Nicolson scheme unconditionally stable
Option A:	Compressible flows
Option B:	Advection problems
Option C:	Diffusion problems
Option D:	Convection-Diffusion problems
Q3.	What is the central differencing scheme similar to?
Option A:	Quadratic interpolation profile
Option B:	Linear interpolation profile
Option C:	Weighted average method
Option D:	Geometric mean
Q4.	The hybrid differencing scheme is
Option A:	never bounded
Option B:	bounded unconditionally
Option C:	bounded in the low Peclet number
Option D:	bounded in the high Peclet number
Q5.	Which scheme of the following ensure conservativeness?
Option A:	Central differencing
Option B:	Upwind differencing
Option C:	TVD scheme
Option D:	Quadratic scheme
Q6.	The pressure equation for the incompressible flow is
Option A:	Eulerian equation
Option B:	Divergence equation
Option C:	Lagrangian equation
Option D:	Poisson equation
Q7.	Which of these does not characterize a turbulent flow?
Option A:	Time-independence
Option B:	Rapid mixing
Option C:	Three-dimensional fluctuations

Option D:	Instability
Q8.	Represent the velocity of turbulent flow using Reynolds decomposition.
Option A:	Steady velocity + Mean velocity
Option B:	Steady velocity + Fluctuating component of velocity
Option C:	Variation in velocity + Fluctuating component of velocity
Option D:	Mean variation + Fluctuating component of velocity
Q9.	The Reynolds stress term arises in the turbulent equation only when
Option A:	two quantities are correlated
Option B:	two quantities are uncorrelated
Option C:	the flow is steady
Option D:	the flow is unsteady
Q10.	Consider the general discretized equation $a_P\Phi_P=a_W\Phi_W+a_E\Phi_E+S$. Which of these will become zero for the left boundary node?
Option A:	Φ_E
Option B:	a_E
Option C:	Φ_W
Option D:	a_W
Q11.	TDMA is consists of a
Option A:	Forward Elimination
Option B:	Backward Elimination
Option C:	Downward Elimination
Option D:	Upward Elimination
Q12.	A generalised version of the TDMA, known as the
Option A:	Penta-Diagonal Matrix Algorithm
Option B:	Diagonal Matrix Algorithm
Option C:	Penta Matrix Algorithm
Option D:	Penta-Diagona Algorithm
Q13.	Which ONE of the following schemes is stable and second order accurate in both time and space for the unsteady diffusion equation?
Option A:	FTCS-explicit
Option B:	Crank-Nicolson's scheme
Option C:	FTCS-implicit
Option D:	FTCS-Dynamics
Q14.	CFD is the third approach for fluid flow analysis. What are the other two approaches?
Option A:	Theoretical and experimental
Option B:	Physical and Mathematical
Option C:	Numerical and experimental
Option D:	Experimental and physical

Q15.	CFD packages solve the algebraic equations of flow using _____ method.
Option A:	Direct
Option B:	Iterative
Option C:	Analytical
Option D:	Trial and error
Q16.	Computational investigation is _____ experimental investigation.
Option A:	Faster than
Option B:	At the same speed of
Option C:	Slower than
Option D:	Cannot be compared
Q17.	Energy conservation equation is necessary to solve this property of fluid flow.
Option A:	Pressure
Option B:	Temperature
Option C:	Density
Option D:	Velocity
Q18.	What are the two major types of boundary conditions?
Option A:	Wall and symmetry
Option B:	Inlet and outlet
Option C:	Dirichlet and Neumann
Option D:	Initial and physical
Q19.	While applying the constant pressure boundary condition, which of these is done?
Option A:	When there is an impermeable boundary
Option B:	When there is constant pressure
Option C:	When we do not know the flow distribution but we know the pressure at the boundaries
Option D:	When we do not know the pressure at the boundaries
Q20.	Which of these does not come under partial differential equations?
Option A:	Laplace's equation
Option B:	Equations of motion
Option C:	1-D wave equation
Option D:	Heat equation
Q21.	The finite volume method _____ the governing equations in each cell.
Option A:	Discretizes
Option B:	Sums up
Option C:	Integrates
Option D:	Multiplies
Q22.	_____expressions are used when data to the left of a point at which a derivative is desired are not available
Option A:	Forward difference
Option B:	Backward difference

Option C:	Central difference
Option D:	End difference
Q23.	Which of these properties limit the time-step size in the explicit schemes?
Option A:	Convergence
Option B:	Stability
Option C:	Consistency
Option D:	Error
Q24.	The ratio of logest edge length to shortest edge length is called
Option A:	Aspect ratio
Option B:	Skewness
Option C:	Smoothness
Option D:	Orthogonality
Q25.	Triangular element is commonly used in
Option A:	Structured grid
Option B:	Unstructured grid
Option C:	Static grid
Option D:	Dynamic grid

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	C
Q3.	B
Q4	B
Q5	A
Q6	D
Q7	A
Q8.	B
Q9.	A
Q10.	D
Q11.	A
Q12.	A
Q13.	B
Q14.	A
Q15.	B
Q16.	A
Q17.	B
Q18.	C
Q19.	C
Q20.	B
Q21.	C
Q22.	A
Q23.	B
Q24.	A
Q25.	B