

**University of Mumbai**  
**Examination 2020 under cluster 4 (PCE)**

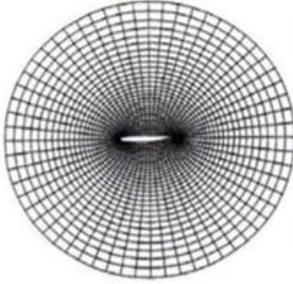
Program: BE Mechanical Engineering  
Curriculum Scheme: Rev2016 (CBCGS)  
Examination: Final Year, Semester VII

Course Code: MEDLO7034 and Course Name: Computational Fluid Dynamics

Time: 1 hour

Max. Marks: 50

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

Q1.	The region of interest for analysis in CFD is called as _____
Option A:	Cell
Option B:	Domain
Option C:	Mesh
Option D:	Grid
Q2.	Which is the input part of a CFD problem?
Option A:	Post-processing
Option B:	Flow visualization
Option C:	Pre-processing
Option D:	Solving
Q3.	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
Q4.	 <p>Identify type of Grid</p>
Option A:	C type
Option B:	H type
Option C:	O type
Option D:	X type
Q5.	_____ is introduced because of computer's inability to handle large number of significant digits.
Option A:	Round-off Error
Option B:	Truncation Error
Option C:	Discretization Error
Option D:	modeling error
Q6.	The number of discretized equations is equal to the number of _____

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Option A:	Discretized cells
Option B:	Boundary conditions
Option C:	Variables
Option D:	Boundary-side elements
Q7.	The error occurred by approximating the infinite sum by finite sum is called
Option A:	Finite error
Option B:	Infinite error
Option C:	Truncation error
Option D:	Zero error
Q8.	Skewness is equal to
Option A:	(optimal cell size- cell size)/ cell size
Option B:	(optimal cell size- cell size)/ optimal cell size
Option C:	(cell size- optimal cell size)/ optimal cell size
Option D:	(optimal cell size- cell size)
Q9.	Equations of state provide the linkage between _____ and _____
Option A:	Conservative, non-conservative equation
Option B:	Eulerian, Lagrangian equations
Option C:	Energy equation, mass and momentum equations
Option D:	Differential, Integral equations
Q10.	The Neumann and Dirichlet boundary conditions are _____ and _____ in mathematical terms.
Option A:	value specified, flux specified
Option B:	flux specified, value specified
Option C:	flux specified, gradient specified
Option D:	value specified, time specified
Q11.	While applying the constant pressure boundary condition, which of these is done?
Option A:	Pressure is set to 0
Option B:	Pressure correction is set to 1
Option C:	Pressure correction is set to zero
Option D:	Pressure is set to 1
Q12.	The governing equations of CFD are _____ partial differential equations.
Option A:	Linear
Option B:	Quasi-linear
Option C:	Non-linear
Option D:	Non-homogeneous
Q13.	In a control volume adjacent to the boundary, the flux crossing the boundary is _____ in the discretized equation.
Option A:	set to some arbitrary constant
Option B:	set to zero
Option C:	introduced as a source term
Option D:	introduced as a convective flux

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Q14.	Boundedness is ensured in the steady-state diffusion problem _____
Option A:	only when the source term is non-negative
Option B:	only when the source term is negative
Option C:	only when the source term is non-zero
Option D:	only when the source term is zero
Q15.	Thomas algorithm is a _____
Option A:	Linear equations solver
Option B:	Quadratic equations solver
Option C:	Discretization method
Option D:	Linear least square system
Q16.	Which of these is a characteristic feature of turbulent flows
Option A:	wholly unpredictable
Option B:	well-defined periodicity in fluctuations
Option C:	high diffusivity
Option D:	do not obey Navier-Stokes equations
Q17.	The upwind scheme is dependent on the
Option A:	Convection term
Option B:	Peclet number
Option C:	Flow direction
Option D:	Gradient
Q18.	The central differencing scheme becomes inconsistent when the Peclet number
Option A:	is higher than 2
Option B:	is less than 2
Option C:	is higher than 5
Option D:	is less than 5
Q19.	What is the order of accuracy of the hybrid differencing scheme?
Option A:	Fourth-order
Option B:	Third-order
Option C:	Second-order
Option D:	First-order
Q20.	Which feature of the coefficient matrix is a desirable for boundedness.
Option A:	Non-diagonal dominance
Option B:	Singularity
Option C:	Sparsity
Option D:	Diagonal dominance
Q21.	State the condition obtained by applying the correction to the continuity equation.
Option A:	When the mass flow rate reaches an exact solution, the correction field becomes zero
Option B:	When the velocity reaches an exact solution, the correction field becomes zero
Option C:	When the mass flow rate reaches an exact solution, the correction field becomes

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	infinity
Option D:	When the velocity reaches an exact solution, the correction field becomes infinity
Q22.	Which of these equations are used in the SIMPLE algorithm?
Option A:	Momentum and energy equations
Option B:	Energy equation and equation of state
Option C:	Equation of state and continuity equation
Option D:	Continuity and momentum equations
Q23.	Which of these methods is not used for turbulence modelling?
Option A:	RANS
Option B:	SIMPLE
Option C:	DNS
Option D:	LES
Q24.	Reynolds averaging makes the conservation equations
Option A:	non-conservative
Option B:	non-linear
Option C:	unstable
Option D:	inconsistent
Q25.	How many additional terms are present in the x-momentum equation of Reynolds-Averaged Navier-Stokes equations?
Option A:	No additional terms
Option B:	Six additional terms
Option C:	Three additional terms
Option D:	Two additional terms

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