

**University of Mumbai**  
**Online Examination 2020**

Program: BE Chemical Engineering

Curriculum Scheme: Revised 2012

Examination: Final Year Semester VII

Course Code: CHE704

Course Name: Advance Process Simulation (Elective)

Time: 1 hour

Max. Marks: 50

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

Q1	<b>What is the work done for an ideal gas isothermal process?</b>
Option A:	Zero
Option B:	Equal to heat transferred
Option C:	Equal to change in internal energy
Option D:	Cannot say
Q2	<b>Which one is the process simulator mode used for solving flowsheet</b>
Option A:	Equation oriented
Option B:	Optimization mode
Option C:	Numerical mode
Option D:	Partition mode
Q3.	<b>In Modular Mode Approach while solving a flowsheet</b>
Option A:	Entire Flowsheet is Solved.
Option B:	The Units are Encapsulated.
Option C:	Flowsheet topology and unit equations are combined
Option D:	Stream Tearing is not used.
Q4.	<b>Parameter estimation on model development using regression is based on?</b>
Option A:	Maximisation of difference between model predictions and data.
Option B:	Model predictions are varying exponential as data calculated.
Option C:	Minimisation of difference between model predictions and data
Option D:	Model predictions are square of the data.
Q5	<b>In Levenberg-Marquardt method, the value of the parameter that adjusts the direction and length of the step is :</b>
Option A:	0.25
Option B:	-0.5
Option C:	-1

Option D:	Non Negative
Q6.	<b>Which of the following is NOT required for using Newton's method for optimization?</b>
Option A:	The lower bound for the search region
Option B:	Twice differentiable optimization function
Option C:	The function to be optimized
Option D:	A good initial estimate that is reasonably close to the optimal
Q7	<b>Mathematical models allow us to calculate</b>
Option A:	different quantities
Option B:	area only
Option C:	speed only
Option D:	distance and time
Q8.	<b>For a distributed process model?</b>
Option A:	Variables vary with respect to time.
Option B:	Variables depends on spatial position.
Option C:	Variable is independent of spatial position.
Option D:	Variable depends on time and spatial position
Q9.	<b>What is order of reaction?</b>
Option A:	The sum of exponents of concentration
Option B:	Product of exponents of concentration
Option C:	The difference of exponents of concentration
Option D:	The division of exponents of concentration
Q10	<b>Which algorithm is used to find the partitions and precedence ordering in a flow sheet?</b>
Option A:	Newton method algorithm
Option B:	Armijo line search
Option C:	Sargent and Westerberg algorithm
Option D:	Broyden method algorithm
Q11	<b>First order system is defined as :</b>
Option A:	Number of poles at origin
Option B:	Order of the differential equation
Option C:	Total number of poles of equation
Option D:	Total number of poles and order of equation
Q12.	<b>What are the degrees of freedom?</b>
Option A:	Total variables in the process
Option B:	Total species in the process
Option C:	Total reactions in the process
Option D:	Total products in the process

Q13	<p><b>For which component Following mass balance equation is written in William Otto Flow sheet</b></p> $F_{\text{eff}}^A = (F_1^A + F_R^A) - (k_1 X_A X_B) V \rho$
Option A:	Component A
Option B:	Component R
Option C:	Component B
Option D:	Component P
Q14	<b>Linear models exhibit the important property of :</b>
Option A:	Superposition
Option B:	No superposition
Option C:	Non-linearity
Option D:	Geometric similarity
Q15	<b>Which of the following methods has the fastest rate of convergence?</b>
Option A:	Bisection method
Option B:	Newton's method
Option C:	Secant method
Option D:	Direct substitution method
Q16	<b>Dominant Eigenvalue method is used for :</b>
Option A:	Numerical integration
Option B:	Solution of ordinary differential equations
Option C:	Solution of partial differential equations
Option D:	Solution of nonlinear algebraic equations
Q17.	<b>Powell dogleg method involves steps which follow a combination of the steepest descent and Newton steps which is :</b>
Option A:	Logarithmic
Option B:	Non-linear
Option C:	Linear
Option D:	Exponential
Q18.	<b>Antoine constants (while using natural logarithm, Temperature in K and Pressure in mm Hg in Antoine equation) for Benzene are, A = 15.9008, B = 2788.51 and C = -52.36. Then what will be the vapor pressure of benzene at 50°C.</b>
Option A:	269.73 mm Hg
Option B:	$2.4 \times 10^{11}$ mm Hg
Option C:	4778.61 mm Hg
Option D:	395738.26 mm Hg
Q19.	<b>Parameter estimation on model development using regression is based on?</b>
Option A:	Maximisation of difference between model predictions and data.

Option B:	Model predictions are varying exponential as data calculated
Option C:	Minimisation of difference between model predictions and data.
Option D:	Model predictions are square of the data.
Q20.	<b>In Modular Mode Approach while solving a flowsheet</b>
Option A:	Entire Flowsheet is Solved.
Option B:	The Units are Encapsulated.
Option C:	Flowsheet topology and unit equations are combined
Option D:	Stream Tearing is not used.
Q21	<b>Which of the following statements is true for Secant method?</b>
Option A:	It has quadratic rate of convergence
Option B:	It can be used to solve nonlinear algebraic equations
Option C:	It cannot be used to solve nonlinear algebraic equations
Option D:	It is used for numerical integration
Q22	<b>Which of the following is NOT required for using Newton's method for optimization?</b>
Option A:	The lower bound for the search region
Option B:	Twice differentiable optimization function
Option C:	The function to be optimized
Option D:	A good initial estimate that is reasonably close to the optimal
Q23	<b>Which of the following is not applicable to direct substitution method?</b>
Option A:	It can be used to solve nonlinear algebraic equations
Option B:	It requires calculation of derivatives
Option C:	It does not require calculation of derivatives
Option D:	It has a slow rate of convergence
Q24	<b>Broyden method is used for :</b>
Option A:	Solution of partial differential equations
Option B:	Numerical integration
Option C:	Solution of nonlinear algebraic equations
Option D:	Solution of ordinary differential equations
Q25	<b>The search direction in Newton's method for solving nonlinear algebraic equations involves calculation of :</b>
Option A:	Hessian matrix
Option B:	Inverse of Hessian matrix
Option C:	Inverse of Jacobian matrix
Option D:	Transpose of Hessian matrix

**University of Mumbai**  
**Online Examination 2020**

Program: BE Chemical Engineering

Curriculum Scheme: Revised 2012

Examination: Final Year Semester VII

Course Code: CHE704

Course Name: Advanced Process Simulation (Elective)

Time: 1 hour

Max. Marks: 50

---

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