

University of Mumbai
Online Examination 2020

Program: BE Chemical Engineering

Curriculum Scheme: Revised 2012

Examination: Final Year Semester VII

Course Code: CHC701

Course Name: Process Equipment Design

Time: 1 hour

Max. Marks: 50

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

Q1.	Triangular pitch tube layout as compared to square pitch in a shell and tube heat exchanger
Option A:	Permits the use of less tubes in a given shell diameter
Option B:	Facilitates comparatively easier external cleaning because of large clearance
Option C:	Permits the use of more tubes in a given shell diameter
Option D:	Facilitates comparatively easier external cleaning because of large clearance and Permits the use of less tubes in a given shell diameter
Q2.	In a multipass shell and tube heat exchanger, the problem of differential expansion between the shell and tube passes is taken care of by using a
Option A:	U Bend
Option B:	Floating head tube sheet
Option C:	Either U bend or floating head tube sheet
Option D:	Neither U bend or floating head tube sheet
Q3.	In a multipass shell and tube heat exchanger, the baffles on shell side is

	primarily provided
Option A:	Reducing scale deposition
Option B:	Increasing pressure drop
Option C:	Fixing the tubes
Option D:	Creating turbulence
Q4.	Floating head heat exchangers are used for the
Option A:	Heat transfer between corrosive fluids
Option B:	Cases where temperature difference between the shell and the tubes is more (>50°C)
Option C:	Co-current heat transfer systems
Option D:	Counter-current heat transfer systems
Q5.	Which of the following is the most common type of baffle used in industrial shell and tube heat exchanger?
Option A:	75% cut segmental baffle
Option B:	25% cut segmental baffle
Option C:	Orifice baffle
Option D:	Disk and doughnut baffle
Q6.	Baffle spacing is generally _____ the I.D. of the shell.
Option A:	More than
Option B:	Not greater than
Option C:	Not less than one fifth of
Option D:	Not greater than and not less than one fifth of

Q7.	Ratio of tube length to shell diameter for a shell and tube heat exchanger is
Option A:	8 : 1 to 12 : 1 for both liquid-liquid and gas-gas heat exchangers
Option B:	4 : 1 to 8 : 1 for liquid-liquid exchanger.
Option C:	< 4 : 1 for gas-gas exchangers
Option D:	4 : 1 to 8 : 1 for liquid-liquid exchanger and < 4 : 1 for gas-gas exchangers
Q8.	Baffles are provided in a shell and tube heat exchanger to increase the turbulence and velocity of the shell side fluid. Which of the following shaped baffles does not fall in the category of transverse baffle?
Option A:	Segmental baffle
Option B:	Flat plate extending across the wall
Option C:	Disk type baffle
Option D:	Helical type baffle
Q9.	Short tube vertical evaporators are also known as _____
Option A:	Plate type Evaporators
Option B:	Calendria Evaporators
Option C:	Basket evaporators
Option D:	Falling film evaporators
Q10.	The heating medium, steam in the case of short tube evaporator, is used in _____
Option A:	Shell side
Option B:	Tube side

Option C:	Same side as that of the fluid
Option D:	Any preferable side
Q11.	What is the average tube length of long tube evaporators?
Option A:	4-10ft
Option B:	4-10m
Option C:	1-2ft
Option D:	More than 10m
Q12.	Long tube evaporators find their use in which one of the following most commonly?
Option A:	Feedstock concentration
Option B:	Food industries
Option C:	Pharmaceuticals
Option D:	Acid concentration
Q13.	The selection and thickness of the top head is based on the
Option A:	external pressure
Option B:	internal pressure or vacuum
Option C:	internal Temperature
Option D:	operating temperature
Q14.	The shear loading is _____ with the apex at the base.
Option A:	trapezoidal

Option B:	square
Option C:	triangular
Option D:	rectangular
Q15.	The seismic forces act to produce _____ in self supporting vertical vessels
Option A:	horizontal shear
Option B:	vertical shear
Option C:	parallel shear
Option D:	opposite shear
Q16.	The circumferential ,axial and radial stresses are exerted in the wall of a tall vertical vessel is due to
Option A:	temperature in the vessel
Option B:	higher concentration of liquid
Option C:	pressure or vacuum in the vessel
Option D:	lower concentration of liquid
Q17.	Following type of head is not used for high pressure vessel
Option A:	delta ring closure
Option B:	double cone seal ring closure
Option C:	the bridgeman closure
Option D:	Flat closure
Q18.	In the design of high pressure vessel, following equation is used

Option A:	Lames equation
Option B:	Ideal gas equation
Option C:	Vander wall equation
Option D:	Principal stress equation
Q19.	Following is not a theory of failure
Option A:	maximum shear stress theory
Option B:	maximum principal stress theory
Option C:	maximum distortion energy theory
Option D:	maximum radial stress theory
Q20.	16. A closed vessel is to be designed to withstand an internal pressure of 50 Mpa having ID of 430 mm. Yield strength = 300 Mpa Estimate the wall thickness required by Distortion energy theory using a factor of safety 1.5.
Option A:	56
Option B:	78
Option C:	89
Option D:	44
Q21.	Using above example calculate the internal diameter of the cylinder assuming the clearance of 40 mm
Option A:	332 mm
Option B:	272 mm
Option C:	413 mm
Option D:	269 mm

Q22.	A vessel with internal diameter of 250mm is to be designed for internal pressure of 120 MN/m ² . A steel having a yield point of 450 MN/m ² is used. Calculate the wall thickness required by Maximum strain theory with a factor of safety, 1.5.
Option A:	78 mm
Option B:	55 mm
Option C:	67 mm
Option D:	91 mm
Q23.	Prestressing can not be achieved by
Option A:	Wire wound method
Option B:	Shrink fit method
Option C:	Wrapping of sheets
Option D:	Tension stress method
Q24.	In instrument tagging <code>XYXCZZLL</code> , X indicates
Option A:	Type of instrument
Option B:	Variable to be measured
Option C:	Area of instrument in plant
Option D:	Unit number
Q25.	In instrument tagging <code>XYXCZZLL</code> , C indicates
Option A:	Type of instrument
Option B:	Variable to be measured

Option C:	Area of instrument in plant
Option D:	Unit number

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	C
Q3.	D
Q4	B
Q5	B
Q6	D
Q7	D
Q8.	B
Q9.	B
Q10.	A
Q11.	B
Q12.	B

Q13.	B
Q14.	C
Q15.	A
Q16.	C
Q17.	D
Q18.	A
Q19.	D
Q20.	C
Q21.	A
Q22.	A
Q23.	D
Q24.	B
Q25.	C

