University of Mumbai
Online Examination 2020

Program: BE Chemical Engineering

Curriculum Scheme: Revised 2012

Examination: Third Year Semester V

Course Code: CHC501

Course Name: Chemical Engineering Thermodynamics-II

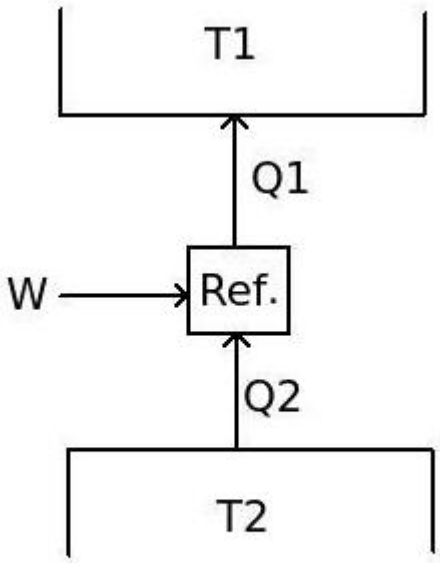
Time: 1 hour Max. Marks: 50

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

Q1.	What is the heat of reaction for $C_6H_6 + 3H_2 \rightarrow C_6H_{12}$, if heat of formation of C_6H_6, H_2, and C_6H_{12} are 25 J, 5 J and 50 J respectively?
Option A:	10 J
Option B:	20 J
Option C:	30 J
Option D:	35 J
Q2.	The heat of reaction
Option A:	Depends on the pressure only
Option B:	Depends on the mechanism of reaction only
Option C:	Depends on both pressure and mechanism of reaction
Option D:	Is independent of the mechanism of reaction
Q3.	What is the heat of reaction for $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$, if heat of formation of C_2H_4, O_2, CO_2, and H_2O are 10 J, 5 J, 6 J and 2 J respectively?
Option A:	-4.5 J/mole
Option B:	-2 J
Option C:	0
Option D:	4 J
Q4.	Gibbs-Duhem equation is applicable to _____ thermodynamics.
Option A:	ideal gas
Option B:	non-ideal gas
Option C:	Solution

Option D:	vapour phase
Q5.	Raoult's law is applicable to _____ solutions.
Option A:	ideal
Option B:	non-ideal
Option C:	only aqueous
Option D:	only organic
Q6.	_____ properties have no meaning for pure species.
Option A:	Extensive
Option B:	Excess
Option C:	Molar
Option D:	Intensive
Q7.	Modified Raoult's law is applicable to _____ solutions.
Option A:	Ideal
Option B:	neither ideal and non-ideal
Option C:	both ideal and non-ideal
Option D:	non-ideal
Q8.	For _____ boiling azeotrope the boiling temperature of the azeotrope is higher than the low boiler and the high boiler.
Option A:	minimum
Option B:	maximum
Option C:	both minimum and maximum
Option D:	neither minimum or maximum
Q9.	The excess volume and the volume change of mixing are _____.
Option A:	Equal
Option B:	not equal
Option C:	always negative
Option D:	always negative
Q10.	For an _____ gas mixture, the partial fugacity is equal to the partial pressure of the component.
Option A:	Ideal
Option B:	non-ideal
Option C:	ideal and non-ideal
Option D:	neither ideal nor non-ideal
Q11.	The necessary and sufficient condition for equilibrium between two phases is :

Option A:	Concentration of each component should be same in the two phases
Option B:	The temperature of each phase should be the same
Option C:	The pressure should be the same in the two phases
Option D:	The chemical potential of each component should be the same in the two phases.
Q12.	The equilibrium will shift in the endothermic direction if the
Option A:	temperature is raised
Option B:	temperature is decreased
Option C:	either increased or decreased
Option D:	temperature remains constant
Q13.	If standard free energy change is zero, then equilibrium constant(K)
Option A:	K = 0
Option B:	K =1
Option C:	K > 1
Option D:	K < 1
Q14.	The equilibrium can be expected to shift in the exothermic direction if the
Option A:	temperature is lowered
Option B:	temperature is increased
Option C:	temperature remains constant
Option D:	temperature increased and then decreased
Q15.	When standard free energy change is greater than 40000KJ/Kmole
Option A:	Reaction is highly spontaneous
Option B:	Reaction very unfavorable
Option C:	Reaction is slow
Option D:	Reaction is moderate
Q16.	Catalyst present in reaction
Option A:	Changes position of equilibrium
Option B:	Does not changes position of equilibrium
Option C:	Changes position of equilibrium and Increases rate of reaction
Option D:	Have no effect on reaction
Q17.	Calculate the pressure for the reaction $A+4B \rightarrow 2D$ if initial moles of A are 2 moles, B is 10 moles K=2.303 and conversion is
Option A:	0.5. atm
Option B:	0.434118 atm
Option C:	0.68 atm
Option D:	0.8 atm
Q18.	A chemical reaction will occur spontaneously at constant pressure and

	temperature, if the free energy change is
Option A:	Zero
Option B:	Positive
Option C:	Negative
Option D:	Very low
Q19.	Which refrigerant is widely used in refrigeration facilities of food as cooling of fresh vegetables, dairy products, meat and fish and similar process industries?
Option A:	sulphur dioxide
Option B:	ethyl chloride
Option C:	Propane
Option D:	ammonia
Q20.	What is the disadvantage of ammonia using as a refrigerant?
Option A:	ammonia cannot be detected in case of leakage
Option B:	ammonia has a bad effect on ozone layer
Option C:	ammonia is toxic in nature
Option D:	ammonia has higher energy cost
Q21.	How is the COP of a refrigerator calculated?  *Refrigerator COP*
Option A:	[COP]Ref. = Q1 / W
Option B:	[COP]Ref. = Q2 / W
Option C:	[COP]Ref. = W / Q1
Option D:	[COP]Ref. = W / Q2

Q22.	In a reversible chemical reaction (where, Δn = number of moles of products-number of moles of reactants)
Option A:	Addition of inert gas favors the backward reaction, when Δn is positive.
Option B:	Pressure has no effect on equilibrium, when Δn > 0.
Option C:	Addition of inert gas has no effect on the equilibrium constant at constant volume for any value of Δn (+ ve, – ve or zero).
Option D:	pressure has effect on equilibrium, when Δn > 0
Q23.	free energy change at equilibrium is
Option A:	0
Option B:	<1
Option C:	>1
Option D:	1
Q24.	Which of the following is an intensive property?
Option A:	Chemical potential
Option B:	Entropy
Option C:	enthalpy
Option D:	Heat
Q25.	Which is the correct relation for normal boiling point in Joback method
Option A:	$T_b(K) = 100 + \sum T_{b,i}$
Option B:	$T_b(K) = 20 + \sum T_{b,i}$
Option C:	$T_b(K) = 40 + \sum T_{b,i}$
Option D:	$T_b(K) = 198.2 + \sum T_{b,i}$

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

Q25.	D