

University of Mumbai
Examination 2020 under cluster PCOE

Program: Chemical Engineering

Curriculum Scheme: Rev 2012

Examination: Third Year Semester V

Course Code:CHC501 and Course Name: Chemical Engineering Thermodynamics-II

Time: 1 hour

Max. Marks: 50

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

Q1.	What is the heat of reaction for $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$, if heat of formation of H_2 , O_2 , and H_2O are 2 J, 5 J, and 10 J respectively?
Option A:	2 J
Option B:	5 J
Option C:	8 J
Option D:	11 J
Q2.	For endothermic reactions, what is the heat of reaction?
Option A:	Positive
Option B:	Negative
Option C:	Zero
Option D:	One
Q3.	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.
Q4.	A solution exhibiting positive deviation from ideality :
Option A:	Always forms a minimum boiling azeotrope
Option B:	Always forms a maximum boiling azeotrope
Option C:	Has a total pressure that is less than that predicted by Raoult's law
Option D:	When formed from its constituents there is an absorption of heat.
Q5.	Which one of the following statements is true with reference to the maximum boiling azeotropes?
Option A:	There is a maximum on the vapour-pressure curve
Option B:	The solution exhibits positive deviation from ideality
Option C:	The solution exhibits negative deviation from ideality
Option D:	The activity coefficients are greater than unity.
Q6.	The constant boiling mixtures are called _____.
Option A:	Amalgams
Option B:	Alloys
Option C:	Azeotropes
Option D:	Colloids
Q7.	Raoult's law is applicable to _____ solutions.
Option A:	Ideal

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Option B:	Non-ideal
Option C:	Only aqueous
Option D:	Only organic
Q8.	For the standard state of pure component at the solution pressure, the activity of a component in an ideal solution is equal to :
Option A:	Its fugacity in the solution
Option B:	Its mole fraction in the solution
Option C:	Its partial pressure
Option D:	Its chemical potential
Q9.	Molar properties are _____ properties.
Option A:	intensive
Option B:	extensive
Option C:	only gas phase
Option D:	only liquid phase
Q10.	Which one of the following statements is not valid for an ideal solution?
Option A:	There is no volume change on mixing
Option B:	There is no enthalpy change on mixing
Option C:	There is no entropy change on mixing
Option D:	Fugacity is directly proportional to concentration
Q11.	Gibbs-Duhem equation is applicable to _____ thermodynamics.
Option A:	ideal gas
Option B:	non-ideal gas
Option C:	solution
Option D:	vapour phase
Q12.	Equilibrium constant decreases as the temperature
Option A:	Increases, for an exothermic reaction.
Option B:	Decreases, for an exothermic reaction.
Option C:	Increases, for an endothermic reaction.
Option D:	Decreases, for an endothermic reaction
Q13.	Consider the reversible reaction at equilibrium at 392°C: $2A(g) + B(g) \rightleftharpoons C(g)$ The partial pressures are found to be: A: 6.70 atm, B: 10.1 atm, C: 3.60 atm. Evaluate K_p for this reaction.
Option A:	7.94×10^{-3}
Option B:	0.146
Option C:	0.0532
Option D:	54.5
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

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Option D:	Temperature increased and then decreased
Q15.	The inerts present in the system will have no effect on the degree of completion if
Option A:	n is zero, that is, if there is no change in the number of moles during a reaction.
Option B:	n is equal to one
Option C:	$n < 0$
Option D:	$n > 0$
Q16.	The mole fraction of NH_3 in the reaction $N_2 + 3H_2 \rightarrow 2NH_3$ if initial moles of nitrogen is 20 moles and hydrogen is 60 moles and conversion is 80% what is the mole fraction of NH_3
Option A:	0.020408
Option B:	0.244898
Option C:	0.734694
Option D:	0.562
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.	What is the main reason behind subcooling of liquid refrigerant at the condenser outlet in vapour compression refrigeration system?
Option A:	to decrease the refrigerating effect
Option B:	to increase the mass of vapour formed during expansion process
Option C:	to reduce vapour bubbles which obstruct the flow of liquid refrigerant
Option D:	to reduce pressure of refrigerant at outlet of condensor
Q19.	The vapour absorption refrigeration system is
Option A:	more noisy than the vapour compression refrigeration system
Option B:	it depends upon plant capacity
Option C:	equally noisy as the vapour compression refrigeration system
Option D:	more silent than the vapour compression refrigeration system
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.	For obtaining high COP, the pressure range of compressor should be
Option A:	High
Option B:	Low
Option C:	Optimum
Option D:	Any value

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Q22.	Which type of energy is required to expend in vapour absorption refrigeration system?
Option A:	low-grade energy
Option B:	high-grade energy
Option C:	medium-grade energy
Option D:	very very high grade energy
Q23.	The heat required to melt 1 tonne of ice in 12 hours is equivalent to
Option A:	one tonne of refrigeration
Option B:	two tonne of refrigeration
Option C:	half tonne of refrigeration
Option D:	four tonne of refrigeration
Q24.	Enthalpy of reactants is 50 J/Kg and enthalpy of products is 25 J/Kg, what is the heat of reaction?
Option A:	-10 J/Kg
Option B:	10 J/Kg
Option C:	-25 J/Kg
Option D:	25 J/Kg
Q25.	For organic compounds, group contribution method can be used for the estimation of
Option A:	Critical properties
Option B:	Thermal conductivity
Option C:	Specific gravity
Option D:	Specific volume