DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Mid Semester Examination – September 2019

Course: B. Tech in chemical engineering **Semester: V**

Subject Name: chemical engineering thermodynamics-II **Subject Code: BTCHC 501**

Max Marks: 20 **Date:-23/09/2019** **Duration:- 1 Hr.**

Instructions to the Students:

1. Question 1 is compulsory and carries 6 marks
2. Figures to right indicate marks
3. If any data is missing, you may assume it and mention it in your answer sheet
4. Usual symbols apply

		(Level/CO)	Marks
			6
Q. 1	**Pick the correct alternative for the following question**		
	1.Necessary and sufficient condition for equilibrium between two phases is a. Concentration of each component should be same in two phases b.The pressure should be same in two phases c.The temperature should be same in two phases d.The chemical potential of each component should be same in two phases	Understanding	
	2. at constant temperature and pressure ,the decrease in free energy is a measure of a. the maximum work b. the maximum net work c. the unavailable energy d. the loss in capacity to do work	Understanding	
	3. Chemical potential is a. an extensive property b. an intensive property c. a path property d.a reference property	Understanding	
	4. which one of the following is incorrect with respect to partial molar properties? a. they are intensive properties b.they are always positive c. they represent the contribution of individual component to the solution properties d. they vary with composition of solution	Understanding	
	5.the value of activity coefficient for an ideal solution is a. one b.zero c. three d. four	Remembering	
	6.the equation $dU = T\,dS - P\,dV$ is applicable to infinitesimal changes occurring in a. an open system of constant composition b. a closed system of constant composition c. an open system with change in composition d. a closed system with change in composition	Understanding	
			3 X 2
Q.2	**Solve Any Two of the following.**		
(A)	Derive Gibbs Duhem's equation from fundamentals.	Remembering	
(B)	What is modified Roult's law? How we can use it in vapor liquid calculation?	Remembering	

	(C)	n-heptane and tolune form ideal solution .at 373 K, their vapour pressur are 106 74 kPa respectively. Determine the composition of the liquid and vapour in equilibrium at 373 K and 101.3kPa.	Analyzing	
	Q. 3	**Solve Any One of the following.**		**8**
	(A)	State the Roult's law. Show that it is a simplified form of Lewis –Randall rule.	Understanding	
	(B)	Will it be possible to prepare 0.1 m^3 of alcohol-water solution by mixing 0.03 m^3 alcohol with 0.07m^3 pure water? If not possible, what volume should have been mixed in order to prepare a mixture of same strength and of required volume ? Density of ethanol and water are 789 and 997 respectively. Partial molar volume of ethanol and water are 53.6* 10^{-3} m^3 /mol and 18*10^{-3} m^3 /mol respectively at the desired composition	Analyzing	
		*** End ***		