

# Model Question Paper-1/2 with effect from 2022-23 (CBCS Scheme)

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## Fourth Semester B.E. Degree Examination Chemical Engineering Thermodynamics

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.  
02.

Module -1			*Bloom's Taxonomy Level	Marks
Q.01	a	Derive first law of thermodynamics for flow process	L2	10
	b	Differentiate between Intensive and Extensive properties with suitable examples	L2	5
	c	Define Enthalpy, Heat Capacity and Internal Energy.	L1	5
<b>OR</b>				
Q.02	a	A system consisting of some fluid is stirred in a tank. The rate of work done on the system by the stirrer is 2.25 hp. The heat generated due to stirring is dissipated to the surroundings. If the heat transferred to the surroundings is 3400 kJ/h, determine the change in internal energy.	L3	10
	b	Water flows over a waterfall 100m in height consider 1 kg of water and assume that no energy is exchanged between the 1 kg and its surroundings, what is the potential energy of the water at top of the falls with respect to the base of the falls? What is the kinetic energy of the water just before it strikes bottom?	L3	10
<b>Module-2</b>				
Q. 03	a	With a neat sketch explain generalized compressibility chart.	L2	10
	b	Derive the equation for Clausius inequality.	L2	10
<b>OR</b>				
Q.04	a	10 kg water at 375 K is mixed adiabatically with 30 kg water at 275 K. what is the change in entropy? Assume specific heat of water is 4.2 kJ/kg.K and is independent of temperature.	L3	10
	b	Explain PV diagram with neat sketch.	L2	6
	c	Explain Vander waal's equation and its constant	L2	4
<b>Module-3</b>				
Q. 05	a	Derive Maxwell's equation	L2	8
	b	Discuss the fundamental property relations for a homogeneous fluid of constant compositions	L2	7
	c	Explain general statements of second law.	L2	5
<b>OR</b>				
Q. 06	a	Explain any one thermodynamic diagram with sketch.	L2	8
	b	Classify the thermodynamic properties and list the properties under each group.	L2	8
	c	State Hess's law of constant heat summation.	L2	4
<b>Module-4</b>				
Q. 07	a	Derive Lewis-Fugacity rule.	L2	8
	b	Derive equations for enthalpy change of mixing and entropy change of mixing.	L2	7
	c	State Henry's Law	L2	5
<b>OR</b>				
Q. 08	a	Derive Gibbs Duhem equations	L2	10
	b	Derive Clapeyron equation for change in enthalpy with phase change	L2	10
<b>Module-5</b>				
Q. 09	a	Discuss the criteria for phase equilibria		7
	b	Explain any two consistency tests for determining VLE data accuracy	L2	8
	c	Discuss the criterion of stability	L2	5

<b>OR</b>				
Q. 10	a	Discuss the effect of Pressure on Equilibrium Constant	L2	7
	b	Discuss the factors affecting Equilibrium Conversion	L2	7
	c	Discuss Phase rule	L2	6

\*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.