University of Mumbai

Examination 2020 under cluster PCOE (Lead College Short name)

Program: Chemical Engineering

Curriculum Scheme: Rev2016

Examination: Second Year Semester III

Course Code: CHC304and Course Name: CET-I

Time: 1 hour Max. Marks: 50

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

Q1.	Enthalpy '*H*' is defined as
Option A:	$H = E - PV$
Option B:	$H = F - TS$
Option C:	$H - E = PV$
Option D:	H-S =PV
Q2.	In an adiabatic process, the
Option A:	heat transfer is zero.
Option B:	temperature change is zero.
Option C:	work done is a path function.
Option D:	enthalpy remains constant.
Q3.	Extensive properties of a thermodynamic system depend upon the _____ of the system.
Option A:	specific volume
Option B:	temperature
Option C:	mass
Option D:	pressure
Q4.	Work done is a
Option A:	property of the system
Option B:	path function
Option C:	point function
Option D:	state description of a system
Q5.	Internal energy change of a system over one complete cycle in a cyclic process is
Option A:	zero
Option B:	+ve
Option C:	-ve
Option D:	dependent on the path
Q6.	Maximum work that could be secured by expanding the gas over a given pressure range is the _____ work.
Option A:	isothermal
Option B:	adiabatic
Option C:	isentropic
Option D:	isenthalpic
Q7.	The Exergy(Availability) of a given system is defined as the ____ work that is obtainable in a process in which system comes to equilibrium with its

	surroundings.
Option A:	useful work
Option B:	maximum useful work
Option C:	minimum useful work
Option D:	Surrounding work
Q8.	The quantity [To*(ΔSsystem + ΔSsurroundings)] represents an increase in
Option A:	available energy
Option B:	unavailable energy
Option C:	exergy
Option D:	Kinetic energy
Q9.	A flow of air at 1000 kPa, 300 K is throttled to 500 kPa. What is the irreversibility?
Option A:	59.6 kJ/kg
Option B:	39.6 kJ/kg
Option C:	49.6 kJ/kg
Option D:	29.6 kJ/kg
Q10.	Example of reversible process could be
Option A:	Free expansion of gas
Option B:	Mixing of non identical gases
Option C:	Non viscous fluid flow
Option D:	Spontaneous chemical reaction
Q11.	Which of the following is not true?
Option A:	work is a high grade energy
Option B:	heat is a low grade energy
Option C:	complete conversion of low grade energy into high grade energy in a cycle is impossible
Option D:	work is a low grade energy
Q12.	Efficiency of a heat engine is defined as
Option A:	total heat output / net work input
Option B:	total heat input / net work output
Option C:	net work output / total heat input
Option D:	net work input / total heat output
Q13.	A heat engine receives 6 kW from a source at 250°C and rejects heat at 30°C with W. = 0 kW. Does this satisfy the inequality of Clausius?
Option A:	Yes
Option B:	No
Option C:	Cannot be said
Option D:	none of the mentioned
Q14.	A heat pump is used to meet the heating requirements of a house and maintain it at 20°C. On a day when the outdoor air temperature drops to 2°C, the house is estimated to lose heat at a rate of 80,000 kJ/h. If the heat pump under these

	conditions has a COP of 2.5, determine the power consumed by the heat pump.
Option A:	32000 kJ/h
Option B:	33000 kJ/h
Option C:	34000 kJ/h
Option D:	35000 kJ/h
Q15.	Which of the following is true?
Option A:	for an isolated system, dS>=0
Option B:	for an irreversible process, dS<0
Option C:	for a reversible process, dS>0
Option D:	for an isolated system, dS<=0
Q16.	Clausius summarized the first and second laws of thermodynamics as
Option A:	the energy of the world is constant
Option B:	the entropy of the world tends towards a maximum
Option C:	both of the mentioned
Option D:	the entropy of the world tends towards a minimum
Q17.	The value of universal gas constant is
Option A:	8.134
Option B:	8.314
Option C:	8.413
Option D:	7.314
Q18.	The law of corresponding states is a relation among
Option A:	reduced pressure and reduced temperature
Option B:	reduced volume and reduced temperature
Option C:	reduced volume and reduced pressure
Option D:	reduced pressure, reduced temperature and reduced volume
Q19.	When does a real gas obey the ideal gas equation closely?
Option A:	at high pressure and low temperature
Option B:	at low pressure and high temperature
Option C:	at low pressure and temperature
Option D:	at high pressure and temperature
Q20.	Compressibility factor Z is given by
Option A:	RT/pv
Option B:	pv/RT
Option C:	$(RT/pv)^2$
Option D:	$(pv/RT)^2$
Q21.	Which of the following is not a Maxwell equation?
Option A:	$(\partial T/\partial V) = -(\partial p/\partial S)$
Option B:	$(\partial T/\partial p) = -(\partial V/\partial S)$
Option C:	$(\partial p/\partial T) = (\partial S/\partial V)$
Option D:	$(\partial V/\partial T) = -(\partial S/\partial p)$

Q22.	The Mollier diagram is used whenever one uses constant
Option A:	Enthalpy calculations
Option B:	Entropy calculations
Option C:	both of the mentioned
Option D:	Gibbs free energy calculations
Q23.	Residual properties are the difference between the real gas properties to ideal gas properties:
Option A:	at same temperature, pressure & volume
Option B:	at same pressure & volume
Option C:	at same temperature & volume
Option D:	at same temperature & pressure
Q24.	What is the inversion curve in Joule-Thomson expansion?
Option A:	the locus of all points at which Joule-Thomson coefficient is zero
Option B:	the locus of all points at which Joule-Thomson coefficient is negative
Option C:	the locus of all points at which Joule-Thomson coefficient is positive
Option D:	the locus of all points at which Joule-Thomson coefficient is either positive or negative
Q25.	What must be the initial temperature of gas for achieving cooling effect in Joule-Thomson expansion?
Option A:	the initial temperature must be above the maximum inversion temperature
Option B:	the initial temperature must be below the maximum inversion temperature
Option C:	the initial temperature must be equal to the maximum inversion temperature
Option D:	the maximum inversion temperature has nothing to do with cooling effect in Joule-Kelvin expansion