INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MECHANICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	THERMODYANMICS
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Course Faculty	:	Dr. P SrinvasaRao, Professor Mr. A Venuprasad, Assistant Professor

OBJECTIVES:

I	Understand the laws of thermodynamics and determine thermodynamic properties, gas laws.
II	Knowledge of properties during various phases of pure substances, mixtures, usage of steam tablesand Mollier chart, psychometric charts.
III	Understand the direction law and concept of increase in entropy of universe.
IV	Understand the working of ideal air standard, vapor cycles and evaluate their performance in opensystems like steam power plants, internal combustion engines, gas turbines and refrigerationsystems.

DEFINITIONS AND TERMINOLOGYQUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		MODULE-I				
1	What Thermodynamics?	Thermodynamics is a branch of science which deals with the energy changes accompanying physical and chemical transformations. It is not concerned with the total energy of a body, but with energy changes accompanying a given process or transformation. Thermodynamics is concerned in nature.	Understand	CO1	CLO1	AMEB04.01
2	Define System?	A portion of universe which is under investigation, e.g., portion of test tube where reaction is taking place, is called system	Understand	CO1	CLO1	AMEB04.01
3	Define surroundings?	The rest of the universe which might be in a position to exchange energy and matter with the system is called the surroundings.	Remember	CO1	CLO1	AMEB04.01
4	What is boundary?	The system is separated from the surroundings by a boundary which may be real or imaginary.	Understand	CO1	CLO2	AMEB04.01
5	What is homogeneous	A system is said to be homogeneous when it is	Understand	CO1	CLO 1	AMEB04.01

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	system?	completely uniform throughout, for example, a pure solid or liquid or a solution or a mixture of gases. In other words, a homogeneous system consists of only one phase.				
6	Define Isolated system?	Isolated system is one that can transfer neither matter nor energy to and from, its surroundings.	Remember	CO1	CLO 2	AMEB04.02
7	Define closed system?	The boundary is sealed but not insulated. Therefore, A closed system is one which cannot transfer matter but can transfer energy in the form of heat, work and radiation to and from its surroundings	Understand	CO1	CLO 2	AMEB04.02
8	Define open system?	An open system is one which can transfer both energy and matter to and from its surroundings.	Remember	CO1	CLO 2	AMEB04.02
9	What is macroscopic System?	A system is said to be macroscopic when it consists of a large number of molecules, atoms or ions.	Remember	CO1	CLO 2	AMEB04.02
10	What are macroscopic properties?	The properties associated with a macroscopic system are called macroscopic properties. These properties are pressure, volume, temperature, composition, density, viscosity, surface tension, refractive index, colour etc.	Remember	CO1	CLO 3	AMEB04.03
11	What is state of system?	When macroscopic properties of a system have definite values, the system is said to be in a definite state..	Understand	CO1	CLO 3	AMEB04.03
12	What is state variables	The state of a system changes with the change in any of the macroscopic properties, these are called state variables	Understand	CO1	CLO 3	AMEB04.03
13	What is state extensive property?	An extensive property of a system is that which depends upon the amount of the substance or substances present in the system. The examples are mass, volume, energy, heat capacity, enthalpy, entropy, free change etc.	Remember	CO1	CLO 3	AMEB04.03
14	Define Isolated system?	Isolated system is one that can transfer neither matter nor energy to and from, its surroundings.	Understand		CLO1	AMEB04.03
15	What intensive property?	An intensive property of a system is that which is independent of the amount of the substance present in the syste1′n.The examples are temperature, pressure, density, viscosity, refractive index, surface tension and specific heat.	Understand	CO1	CLO 3	AMEB04.03
16	Define Mechanical equilibrium?	A system is said to be-tin mechanical equilibrium if no mechanical work is done by one part of the system on another part of the system. This is possible if	Understand	CO1	CLO 4	AMEB04.04

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		the pressure remains the same throughout in all parts of the system.				
17	Define Chemical equilibrium?	A system is said to be in chemical equilibrium if the composition of the various phases in the system remains the same throughout.	Understand	CO1	CLO 4	AMEB04.04
18	What is a process?	It Whenever the state of a system changes, it is said to have undergone a process. Thus a process may be defined as the operation by which a system changes from one state to another.	Understand	CO1	CLO 4	AMEB04.04
19	What is a Isothermal process?	T remains constant): It is the process in which the temperature of the system remains constant during each step. In such a process the systems are in thermal contact with a constant temperature and both exchange heat with surroundings i.e. both maintain this temperature (DeltaT = 0).	Understand	CO1	CLO 1	AMEB04.01
20	What is a Adiabatic process? (Thermally insulated from the surroundings)	A process in which no heat is exchanged between the system and surroundings is called adiabatic process ($Q = O$). System in which such processes occur are thermally insulated from the surroundings.	Understand	CO1	CLO 1	AMEB04.01
21	What is a Zeroth law of thermodynamics?	Zeroth law of thermodynamics states that if system A is in thermal equilibrium with system B, and system B is in thermal equilibrium with system C, then system C is also in thermal equilibrium with system A ($T_A = T_B = T_C$).	Remember	CO1	CLO 1	AMEB04.01
22	Define Isobaric process (P remains constant)?	It is the process in which the pressure of the system remains constant during each step of the system ($\Delta P = O$).	Understand	CO1	CLO 1	AMEB04.01
23	Define Cyclic process?	The process which brings aback a system to its original state after a series of changes is called a cyclic process.	Understand	CO1	CLO 1	AMEB04.01
24	What is Reversible Processes?	A thermodynamic reversible process is one that takes place infinitesimally slowly and its direction at any point can be reversed by an infinitesimally change in the state of the system.	Understand	CO1	CLO 2	AMEB04.02
25	What is Irreversible Processes?	When a process goes from the initial state to the final state in a single step and cannot be carried in the reverse order, it is to be an irreversible process.	Remember	CO1	CLO 2	AMEB04.02
26	What is a first law of thermodynamics?	First law of thermodynamics states that in closed system the internal energy can be changed by work or heat only, i.e., $\Delta U = q+w$.	Understand	CO1	CLO 2	AMEB04.02
27	What is	If as system contains a large	Remember	CO1	CLO 2	AMEB04.02

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	Macroscopic system and its properties?	number of chemical species such as atoms, ions, and molecules, it is called macroscopic system.				
28	What is Isochoric process?	It is a process during which the volume of the system is kept constant.	Remember	CO1	CLO 2	AMEB04.02
29	Define Isobaric process?	It is a process during which the pressure of the system is kept constant.	Remember	CO1	CLO 3	AMEB04.03
30	Reversible processes:	A process which is carried out infinitesimally slowly so that all changes occurring in the direct process can be exactly reversed and the system remains almost in a state of equilibrium with the surroundings at every stage of the process.	Understand	CO1	CLO 3	AMEB04.03
		MODULE-II				
1	What is a Second law of thermodynamics?	Second law of thermodynamics states that in isolated systems the entropy increases in spontaneous processes, i.e., $\Delta S > 0$; in reversible process at equilibrium it is constant, i.e., $\Delta S = 0$. or It is impossible to convert heat completely into work. or Heat cannot spontaneously flow from a material at lower temperature to a material at higher temperature.	Understand	CO1	CLO 6	AMEB04.06
2	Define enthalpy ?	Enthalpy (H, J) H=U+pV, where U is the internal energy, p pressure and V volume. Its change gives the heat at constant pressure when there is no other work.	Understand	CO1	CLO 6	AMEB04.06
3	What is heat capacity?	Heat capacity (C, J/K) at constant volume: $C_V = \partial U \partial T$ V and at constant pressure: $C_p = \partial H \partial T$ p where U denotes the internal energy, T the temperature, and H the enthalpy.	Understand	CO1	CLO 6	AMEB04.06
4	What is a reversible process?	Reversible process is a process in which the system is always infinitesimally close to equilibrium. Such a process can never be observed, it is only of theoretical interest.	Understand	CO1	CLO 6	AMEB04.06
5	Define enthalpy?	Enthalpy of reaction is the change in the enthalpy during a reaction.	Understand	CO2	CLO 6	AMEB04.06
6	What is a standard molar enthalpy?	Standard molar enthalpy of formation The enthalpy change when 1 mole of a compound is synthesized from its elements in their standard states of one bar at some temperature.	Understand	CO2	CLO 6	AMEB04.06
7	Define Hess' law?	Hess' law states that the change in the enthalpy of a reaction is the sum of the enthalpies of reactions from which the reaction can be built.	Understand	CO2	CLO 6	AMEB04.06
8	Define entropy?	Entropy (S, J/K) is a thermodynamic quantity that	Understand	CO2	CLO 6	AMEB04.06

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		expresses the degree of disorder or randomness in a system at the molecular level dS=δqrev/T.				
9	What is Helmholtz energy?	Helmholtz energy (A, J) defined as A=U-TS, where U is the internal energy, T is the thermodynamic temperature and S is the entropy. The change in Helmholtz energy at constant volume and temperature gives the maximal work available. In a closed system at constant volume and temperature the Helmholtz energy decreases during a spontaneous process.	Understand	CO2	CLO 6	AMEB04.06
10	What is Gibbs energy?	Gibbs energy (G, J) defined as G=H-TS, where H denotes enthalpy, T the thermodynamic temperature and S the entropy. The change in Gibbs energy at constant pressure and temperature gives the maximal work available. In a closed system at constant pressure and temperature the Gibbs energy decreases during a spontaneous process.	Remember	CO2	CLO 7	AMEB04.07
11	What is Raoult's law?	Raoult's law for any component pi = xi p * i , where pi is the vapor pressure of the component and p∗ i is the vapor pressure of the pure component and xi is the mole fraction of the component in the solution.	Remember	CO2	CLO 7	AMEB04.07
12	What is ideal dilute solution?	Ideal dilute solution a solution in which the solvent obeys Raoult's law and the solute obeys Henry's law	Understand	CO2	CLO 7	AMEB04.07
13	What is activity coefficient?	Activity coefficient ai = γixi , where γi is the activity coefficient of the ith compound	Remember	CO2	CLO 7	AMEB04.07
14	What is molar concentration?	Molarity or molar concentration (c, mol/dm3)cB = nB/Vsolution, where nB denotes the amount of substance of the solute and Vsolution the volume of the solution.	Understand	CO2	CLO 8	AMEB04.08
15	Define colligative properties?	Colligative properties are properties independent of the nature of the compounds and depend on the numbers of the solute particles only. e.g. osmosis, boiling point elevation, freezing point depression, vapor pressure lowerin	Remember	CO2	CLO 8	AMEB04.08
16	Define Osmosis movement?	Osmosis movement of the solvent through a semipermeable membrane from a dilute solution to a more concentrated on	Remember	CO2	CLO 8	AMEB04.08
17	What is Adiabatic Efficiency?	Adiabatic Efficiency of a Compressor - The ratio of the work input required to raise the pressure of a gas to a specified	Understand	CO2	CLO 8	AMEB04.08

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		value in an isentropic manner to the actual work input.				
18	What is Adiabatic Efficiency of a Nozzle?	Adiabatic Efficiency of a Nozzle - The ratio of the actual kinetic energy of the fluid at the nozzle exit to the kinetic energy value at the exit of an isentropic nozzle for the same inlet state and exit pressure.	Understand	CO2	CLO 8	AMEB04.08
19	What is Adiabatic Efficiency of a Turbine?	Adiabatic Efficiency of a Turbine - The ratio of the actual work output of the turbine to the work output that would be achieved if the process between the inlet state and the exit state was isentropic.	Understand	CO2	CLO 5	AMEB04.05
20	Define Air-Standard Cycle?	Air-Standard Cycle - A cycle for which the air-standard assumptions are applicable.	Understand	CO2	CLO 5	AMEB04.05
21	Define Availability?	Availability - The maximum useful work that can be obtained from a system at a given state in a specified environment.	Understand	CO2	CLO 5	AMEB04.05
22	What is Binary Vapor Cycle?	Binary Vapor Cycle - A power cycle that is a combination of two cycles, one in a higher temperature region and the other in a lower temperature region.	Understand	CO2	CLO 8	AMEB04.05
23	Define Boundary?	Boundary - A real or imaginary surface that separates a system from its surroundings.	Understand	CO2	CLO 8	AMEB04.05
24	Define Carnot Cycle?	Carnot Cycle - The Carnot cycle is composed of four reversible processes. Two of the processes are isothermal and two are adiabatic. The Carnot cycle can be executed in either a closed or a steady-flow system	Understand	CO2	CLO 6	AMEB04.06
25	Define Carnot Heat Engine?	Carnot Heat Engine - A Carnot heat engine is a hypothetical heat engine that operates on the Carnot cycle.	Remember	CO2	CLO 8	AMEB04.08
26	Define Carnot Principles?	Carnot Principles - (1) The efficiency of an irreversible heat engine is always less than the efficiency of a reversible one operating between the same two reservoirs.	Understand	CO2	CLO 8	AMEB04.08
27	What is Carnot Heat Pump?	Carnot Refrigerator or Carnot Heat Pump - A refrigerator or heat pump that operates on the reversed Carnot cycle.	Understand	CO2	CLO 8	AMEB04.08
28	What is Clausius Inequality?	Clausius Inequality - The Clausius inequality states that the cyclic integral of dQ/T (change in heat over temperature) is always less than or equal to zero.	Understand	CO2	CLO 5	AMEB04.05
29	Define Clausius	Clausius Statement - States that it is	Remember	CO2	CLO 8	AMEB04.08

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	Statement?	impossible to construct a device that operates in a cycle and produces no effect other than the transfer of heat from a lower temperature body to a higher temperature body.				
30	What is Closed Feedwater Heater?	Closed Feedwater Heater - A device that is often used in vapor power plants. In a closed feedwater heater, heat is transferred from steam extracted from a turbine to feedwater entering a boiler. The steam and feedwater do not mix.	Understand	CO2	CLO 5	AMEB04.05
		MODULE-III				
1	What is Closed System?	A system with fixed mass. Heat, work energy, and volume are not necessarily fixed.	Understand	CO4	CLO 14	AMEB04.14
2	What is Coefficient of Performance of a Heat Pump?	Coefficient of Performance of a Heat Pump - A measure of the efficiency of a heat pump. The coefficient of performance of a heat pump is defined as the fraction of the desired output over the required input of the heat pump.	Remember	CO4	CLO 16	AMEB04.16
3	What is COP of a Refrigerator?	Coefficient of Performance of a Refrigerator - Coefficient of performance of a refrigerator is the efficiency of a refrigerator and is defined as the fraction of the desired output over the required input of the refrigerator.	Remember	CO3	CLO 13	AMEB04.13
4	What is Cold-Air-Standard Assumption?	Cold-Air-Standard Assumption - Used to simplify the analysis of gas cycles. Includes all of the air-standard assumptions in addition to the assumption that the working fluid (air) has constant specific heats.	Remember	CO3	CLO 13	AMEB04.13
5	Define Compression Ratio?	Compression Ratio - The ratio of the maximum volume to the minimum volume formed in the cylinder of a reciprocating engine.	Understand	CO3	CLO 13	AMEB04.13
6	Define Conservation of Energy Principle?	Conservation of Energy Principle (for a general steady-flow system with multiple inlets and exits) - The total energy crossing boundary as heat and work per unit time equals the total energy transported out of control volume with mass per unit time minus total energy transported into control volume with mass per unit time.	Remember	CO4	CLO 14	AMEB04.14
7	What is Conservation of Mass Principle?	Conservation of Mass Principle (for a control volume) - The net change in mass within control volume equals the total mass	Understand	CO4	CLO 14	AMEB04.14

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		entering control volume minus total mass leaving control volume.				
8	Define Cutoff Ratio?	Cutoff Ratio - The ratio of the cylinder volumes before and after the combustion process in a diesel engine.	Remember	CO4	CLO 14	AMEB04.14
9	What is Cyclic Process?	Cyclic Process - A process in which the initial and final states are identical.	Remember	CO4	CLO 14	AMEB04.14
10	What is Dead State?	Dead State - A state that is in thermodynamic equilibrium with its surroundings.	Remember	CO4	CLO 15	AMEB04.15
11	What is Diffuser	Diffuser - A device that increases the pressure of a fluid by decreasing the velocity of the fluid.	Understand	CO4	CLO 15	AMEB04.15
12	Define Entropy	Entropy - A measure of molecular disorder.	Understand	CO4	CLO 15	AMEB04.15
13	What is Entropy Balance for Closed Systems?	Entropy Balance for Closed Systems - The entropy change of a closed system during a process is equal to the sum of the entropy transferred through the system boundary by heat transfer and the entropy generated within the system boundaries as a result of irreversibilities.	Remember	CO4	CLO 14	AMEB04.14
14	What is Entropy Balance for Control Volumes?	Entropy Balance for Control Volumes - The rate of the entropy change within the control volume (dScv/dt) during a process is equal to the sum of the rate of entropy transfer through the control volume boundary by heat transfer, the net rate of entropy transport into the control volume by mass flow, and the rate of entropy generation within the boundaries of the control volume as a result of irreversibilities.	Understand	CO4	CLO 15	AMEB04.15
15	What is Entropy Generation?	Entropy Generation - A measure of the irreversibilities or imperfections which occurduring a cycle.	Understand	CO4	CLO 15	AMEB04.15
16	What is Extensive Property?	Extensive Property - A property dependent on the size or extent of the system. (Most extensive properties are denoted by uppercase letters.)	Understand	CO4	CLO 16	AMEB04.16
17	What is Externally Reversible?	Externally Reversible - A process is called externally reversible if no irreversibilities occur outside the system boundaries during the process.	Understand	CO4	CLO 16	AMEB04.16
18	What is Flow Work?	Flow Work (or Flow Energy) - The work required to push mass into or	Remember	CO4	CLO 15	AMEB04.15

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		out of the control volume. Flow work is necessary for maintaining a continuous flow through a control volume.				
19	What is Heat Engine?	A heat engine is a device used to convert heat to work.	Understand	CO4	CLO 14	AMEB04.14
20	What is Heat Pump?	Heat Pump - A heat pump is a device that transfers heat from a low-temperature medium to a high-temperature medium.	Understand	CO4	CLO 14	AMEB04.14
21	Define Heat Regeneration?	Heat Regeneration - A process during which heat is transferred to a thermal energy storage device (regenerator) during one part of the cycle and is transferred back to theworking fluid during another part of the cycle.	Remember	CO4	CLO 15	AMEB04.15
22	Define Heat Reservoir?	Heat Reservoir - A heat reservoir is a thermal energy reservoir that supplies or absorbs energy in the form of heat. Both sources and sinks are heat reservoirs.	Remember	CO4	CLO 15	AMEB04.15
23	Define Ideal Cycle?	Ideal Cycle - A model cycle which resembles an actual cycle but contains no internally irreversible processes.	Understand	CO4	CLO 15	AMEB04.15
24	What is Ideal Cycle?	Ideal Gas Law - An equation of state that is generally accurate only at low pressure and/or high temperature. The ideal gas law states that: $PV = nRT$ where P = pressure, V = volume, n = number of moles, R = universal gas constant, and T = temperature.	Remember	CO4	CLO 14	AMEB04.14
25	Define Ideal Rankine Cycle?	Ideal Rankine Cycle - An ideal Rankine cycle does not involve any internalirreversibilities and consists of the following four processes: 1-2, isentropiccompression in a pump; 2-3, heat addition in a boiler at constant pressure; 3-4,isentropic expansion in a turbine; 4-1, heat rejection in a condenser at constant pressure.	Understand	CO4	CLO 14	AMEB04.14
26	What is Increase of Entropy Principle?	Increase of Entropy Principle - States that the total entropy change associated with a process must be positive or zero.	Remember	CO4	CLO 14	AMEB04.14
27	What is Intensive Property?	Intensive Property - A property which does not depend on mass.	Remember	CO4	CLO 14	AMEB04.14
28	What is Internal Energy?	Internal Energy - A property whose value is the sum of all the microscopic forms of	Remember	CO4	CLO 15	AMEB04.15

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		energy.				
29	What is Isentropic Process?	Internally Reversible Adiabatic Process (Isentropic Process) - A process that involves no heat transfer (adiabatic) and no irreversibilities within the system (internally reversible). The entropy of a fixed mass must remain constant during an isentropic process.	Understand	CO4	CLO 15	AMEB04.15
30	Define Internally Reversible?	Internally Reversible - A process where no irreversibilities occur within the system boundaries.	Understand	CO4	CLO 15	AMEB04.15
MODULE-IV						
1	What is Internally Reversible?	Internally Reversible - A process in which no irreversibilities occur within the system boundaries.	Remember	CO4	CLO 17	AMEB04.17
2	Define Irreversible Process?	Irreversible Process - A process that leaves a trace on the surroundings when reversed.	Remember	CO4	CLO 17	AMEB04.17
3	Define Irreversibility?	Irreversibility - Any difference between the reversible work and useful work.	Remember	CO4	CLO 17	AMEB04.17
4	Define Isentropic Processes?	Isentropic Processes of Pure Substances - $s_2 = s_1$	Remember	CO4	CLO 17	AMEB04.17
5	Define Isentropic?	Isentropic Processes of Solids and Liquids - $T_2 = T_1$	Remember	CO4	CLO 17	AMEB04.17
6	Define Isobaric?	Isobaric - Describes a process for which the pressure is constant.	Remember	CO4	CLO 17	AMEB04.17
7	Define Isochoric?	Isochoric - Describes a process for which the volume is constant.	Understand	CO4	CLO 17	AMEB04.17
8	Define Isolated System?	Isolated System - A special case in which energy does not cross the boundary of the system.	Remember	CO4	CLO 16	AMEB04.16
9	Define Isothermal?	Isothermal - Describes a process for which the temperature is constant.	Remember	CO4	CLO 16	AMEB04.16
10	What is Kelvin-Planck?	Kelvin-Planck Statement of Second Law - States that no system can produce a net amount of work while operating in a cycle and exchanging heat with a single thermal energy reservoir.	Remember	CO4	CLO 16	AMEB04.16
11	Define Kelvin Scale?	Kelvin Scale - An absolute thermodynamic temperature scale first proposed by Lord Kelvin. In a reversible process, the ratio of the heat associated with the high temperature to the heat associated with the low temperature is equal to the ratio of the high temperature over the low temperature.	Remember	CO4	CLO 17	AMEB04.17
12	What is Mass Flow Rate?	Mass Flow Rate - The amount of mass flowing through a cross	Understand	CO4	CLO 17	AMEB04.17

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		sectional area per unit time.				
13	Define Mixing Chamber?	An area where two or more fluids mix together.	Understand	CO4	CLO 16	AMEB04.16
14	What is Multistage Compression with Intercooling?	Multistage Compression with Intercooling - A technique where a gas is compressed in stages and cooled between each stage by passing the gas through a heat exchanger called an intercooler.	Understand	CO4	CLO 16	AMEB04.16
15	Define Nozzle ?	A device that increases the velocity of a fluid at the expense of pressure.	Understand	CO4	CLO 17	AMEB04.17
16	What is Open feedwater heater?	An open feedwater heater is a mixing chamber where steam extracted from a turbine mixes with feedwater entering a boiler.	Understand	CO4	CLO 17	AMEB04.17
17	What is Open System or Control Volume ?	A selected region in space, often used to study mass flow. Both mass and energy can cross the boundary of an open system.	Understand	CO4	CLO 17	AMEB04.17
18	Define Path?	Path - The series of states a system passes through during a process.	Understand	CO4	CLO 17	AMEB04.17
19	What is PMM?	Perpetual-Motion Machine - A perpetual-motion machine is a device that violates either the first or the second law of thermodynamics.	Remember	CO4	CLO 17	AMEB04.17
20	What is PMM1?	Perpetual-Motion Machine of the First Kind (PMM1) - A perpetual-motion machine of the first kind is a device that violates the first law of thermodynamics (by creating energy).	Remember	CO4	CLO 17	AMEB04.17
21	Define PMM2?	Perpetual-Motion Machine of the Second Kind (PMM2) - A perpetual-motion machine of the second kind is a device that violates the second law of thermodynamics.	Understand	CO4	CLO 16	AMEB04.16
22	What is Pressure ratio?	The ratio of high pressure to low pressure in a Brayton cycle.	Remember	CO4	CLO 16	AMEB04.16
23	Define Pump ?	A device that functions like a compressor, but handles liquids instead of gases.	Remember	CO4	CLO 16	AMEB04.16
24	Define Pure Substance?	A substance that has a single composition throughout.	Remember	CO4	CLO 17	AMEB04.17
25	What is Refrigerator?	A device that transfers heat from a low temperature medium to a high temperature medium.	Remember	CO4	CLO 16	AMEB04.16
26	What is Regeneration?	A process in which a feedwater heater uses steam extracted from a turbine to preheat water entering a boiler. Regeneration is often used in power plants.	Understand	CO4	CLO 16	AMEB04.16
27	What is Reversible Work?	The maximum amount of useful work that can be obtained as a system undergoes a process	Remember	CO4	CLO 16	AMEB04.16

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		between specified initial and final states.				
28	Define State Postulate?	States that the state of a system can be completely specified by two independent, intensive properties.	Remember	CO4	CLO 15	AMEB04.15
29	Define Source?	A source is a reservoir that supplies energy in the form of heat.	Remember	CO4	CLO 16	AMEB04.16
30	Define Nozzle ?	A device that increases the velocity of a fluid at the expense of pressure.	Understand	CO4	CLO 17	AMEB04.17
MODULE - V						
1	What is Stream Availability?	The availability of a fluid stream.	Remember	CO4	CLO 17	AMEB04.17
2	Define Surroundings -?	The mass or region outside of a system.	Understand	CO4	CLO 17	AMEB04.17
3	Define Surroundings Work ?	The work done by or against the surroundings during a process.	Understand	CO4	CLO 17	AMEB04.17
4	Define Thermal Efficiency?	Thermal efficiency is the fraction of the heat input that isconverted to net work output. Thermal efficiency is a measure of the performance of a heat engine	Understand	CO4	CLO 15	AMEB04.15
5	What is Thermal Energy Reservoir?	A thermal energy reservoir is a hypothetical body with arelatively large thermal energy capacity (mass times specific heat) that can supply or absorb finite amounts of heat without undergoing any change in temperature.	Understand	CO4	CLO 17	AMEB04.17
6	What Thermodynamic temperature Scale?	A temperature scale that is independent of theproperties of the substances that are used to measure temperature.	Understand	CO4	CLO 15	AMEB04.15
7	Define Thermodynamic Equilibrium?	Thermodynamic Equilibrium - Occurs when the same temperature exists throughout thesystem.	Remember	CO4	CLO 16	AMEB04.16
8	Define Third Law of Thermodynamics ?	States that the entropy of a pure crystalline substanceat absolute zero temperature is zero.	Remember	CO5	CLO 18	AMEB04.18
9	What is Throttling Valve ?	Any kind of flow-restricting device that causes a significant essuredrop in the working fluid. The pressure drop is often accompanied by a large drop intemperature. Throttling valves are often used in refrigeration and air-conditioningapplications.	Understand	CO5	CLO 18	AMEB04.18
10	What is Totally Reversible ?	Totally Reversible - A process is totally reversible if it involves no irreversibilities within the system or its surroundings.	Understand	CO4	CLO 17	AMEB04.17
11	What is Trap?	Trap - A trap is a device which allows liquid to be throttled to a lower pressure region but traps any vapor.	Understand	CO5	CLO 18	AMEB04.18
12	What is Utilization factor?	Utilization factor - Utilization factor is the ratio of the sum of net	Understand	CO5	CLO 18	AMEB04.18

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		work output plusprocess heat delivered over the total heat input of a cogeneration plant.				
13	Define Volume Flow Rate?	Volume Flow Rate - The volume of a fluid flowing through a cross sectional area per unit time.	Understand	CO5	CLO 18	AMEB04.07
14	What is Working Fluid?	Working Fluid - A fluid to and from which heat is transferred in a cyclic device.	Understand	CO5	CLO 18	AMEB04.18
15	What is Actual Useful Work?	Actual Useful Work (Useful Work)- Its value is the difference between the actual work and the surroundings work.	Understand	CO5	CLO 17	AMEB04.17
16	Define Unsteady-Flow Process?	Unsteady-Flow Process (or Transient-Flow Process) - The process which involves changes within the control volume with time.	Understand	CO4	CLO 17	AMEB04.17
17	What is Uniform-Flow Process?	Uniform-Flow Process - An unsteady-flow process with the following idealizations: (1)At any instant during the process, the state of the control volume is uniform (i.e., it is the same throughout). The state of the control volume may change with time, but it will do so uniformly.	Understand	CO4	CLO 15	AMEB04.15
18	Define Otto cycle?	An Otto cycle is an idealized thermodynamic cycle that describes the functioning of a typical spark ignition piston engine. It is the thermodynamic cycle most commonly found in automobile engines	Understand	CO4	CLO 17	AMEB04.17
19	What is K in Otto cycle?	The fuel is then injected such that the ignition process occurs at a constant pressure. In the ideal Otto cycle the fuel-air mixture is introduced during the induction stroke and compressed to a much lower compression ratio (around 8:1) and is then ignited by a spark	Understand	CO4	CLO 15	AMEB04.15
20	What is the Otto cycle engine?	An Otto cycle is an idealized thermodynamic cycle that describes the functioning of a typical spark ignition piston engine.	Remember	CO4	CLO 16	AMEB04.16
21	What is meant by Brayton cycle?	Brayton cycle. A thermodynamic cycle using constant pressure, heat addition and rejection. Fuel and a compressor are used to heat and increase the pressure of a gas; the gas expands and spins the blades of a turbine, which, when connected to a generator, generates electricity	Remember	CO5	CLO 18	AMEB04.18
22	What is reverse Joule cycle?	The Brayton cycle is a thermodynamic cycle that describes the workings of a constant pressure	Understand	CO5	CLO 19	AMEB04.19

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		heat engine. ... Edit : Apparently, the Brayton cycle and the Joule cycle are almost the same. The reversed Joule cycle is actually known as Bell-coleman cycle. Its purpose is to move heat, rather than produce work.				
23	What is gas cycle?	A thermodynamic cycle is a sequence or series of processes performed on a system, that eventually returns the system to its original tate. Gas power cycles are thermodynamic cycles, which use air, as the working fluid	Understand	CO4	CLO 19	AMEB04.19
24	What is Vapour cycle?	A power cycle continuously converts heat(energy released. by the burning of fuel) into work , in which a working fluid. repeatedly performs a succession of processes.	Understand	CO5	CLO 18	AMEB04.18
25	What is binary Vapour cycle?	The vapor exiting the turbine is then condensed by cold air radiators or cold water and cycled back through the heat exchanger. A binary vapor cycle is defined in thermodynamics as a power cycle that is a combination of two cycles, one in a high temperature region and the other in a lower temperature region.	Understand	CO5	CLO 19	AMEB04.19
26	What is engine temperature ratio?	The nozzle then converts the high pressure and temperature into high velocity. ... The engine temperature ratio (ETR) is defined to be the total temperature ratioacross the engine. Using our station numbering system, ETR is the ratio of nozzle total temperature T_{t8} to compressor face total temperature T_{t2}.	Understand	CO4	CLO 20	AMEB04.20
27	What does pressure ratio mean?	In aeronautical engineering, overall pressure ratio, or overall compression ratio, isthe ratio of the stagnation pressure as measured at the front and rear of the compressor of a gas turbine engine. ... Overall compression ratio also means the overall cycle pressure ratio which includes intake ram.	Understand	CO5	CLO 20	AMEB04.20
28	What is the critical pressure ratio?	The maximum gas flow through a nozzle is determined by critical pressure. critical pressure ratio is the pressure ratio where the flow is accelerated to a velocity equal to the local velocity of sound in the fluid.	Understand	CO4	CLO 20	AMEB04.20
29	What is Bell Coleman cycle?	Bell Coleman Cycle. The Bell Coleman Cycle is a	Understand	CO5	CLO 20	AMEB04.20

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		refrigeration cycle where the working fluid is a gas that is compressed and expanded, but does not change phase				
30	What is the Otto cycle engine?	An Otto cycle is an idealized thermodynamic cycle that describes the functioning of a typical spark ignition piston engine.	Remember	CO4	CLO 16	AMEB04.16

Signature of the Faculty

Signature of HOD