INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

AERONAUTICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY

Course Name	:	**THERMODYNAMICS**
Course Code	:	**AME003**
Program	:	**B.Tech**
Semester	:	**IV**
Branch	:	**Aeronautical Engineering**
Section	:	**A, B**
Academic Year	:	**2018– 2019**
Course Faculty	:	**Ms. Ch.Ragha Leena, Assistant Professor, AE** **R Sabari Vihar, Assistant Professor, AE**

OBJECTIVES

I	To help students to consider in depth the terminology and nomenclature used in the syllabus.
II	To focus on the meaning of new words / terminology/nomenclature

DEFINITIONS AND TERMINOLOGYQUESTION BANK

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
UNIT - I					
1	What is adiabatic process?	A process in which no heat crosses the boundary of the system is called an adiabatic process.	Understand	2	AME003.02
2	What is thermodynamic cycle?	A system process is said to go through a thermodynamic cycle when the final state of the process is identical with the initial state of the process.	Understand	1	AME003.01
3	What is property of system?	Every system has certain characteristics by which its physical condition may be described. Eg. Volume, temperature, pressure etc.	Understand	2	AME003.02
4	Define control mass.	A thermodynamic analysis of a system can be performed on a fixed amount of matter.	Remember	1	AME003.01
4	Define control volume.	Volume in space of special interest for particular analysis.	Remember	1	AME003.01
5	What is statistical thermodynamics?	The behavior of the gas is described by summing up the behavior of each molecule.	Understand	2	AME003.02
6	What is phase?	A quantity of matter homogeneous throughout in chemical composition and physical structure.	Remember	10	AME003.10
7	What is intensive property?	The properties are independent of the mass in the system e.g. pressure, temperature etc.	Remember	2	AME003.02
8	What is extensive property?	The properties are dependent of mass in the system e.g. volume, energy etc.	Remember	2	AME003.02
9	What is gauge pressure?	The pressure relative to the atmosphere.	Remember	2	AME003.02
10	Define absolute pressure.	The pressure relative to a perfect vacuum.	Remember	2	AME003.02
12	Define specific heat.	The amount of heat required to raise a unit mass of substance through a unit rise in temperature.	Remember	1	AME003.01
13	Define latent heat of sublimation.	Amount of heat transferred to convert unit mass of solid to vapor or vice versa.	Remember	1	AME003.01
14	Define latent heat of fusion.	The amount of heat transferred to melt the unit mass of solid into liquid or to freeze unit mass of liquid to solid.	Remember	1	AME003.01
15	Define thermodynamic system.	A volume of space containing the item chosen for thermodynamics analysis.	Remember	1	AME003.01
16	Define thermodynamic process.	The path of thermodynamics states that a system passes through as it goes from an initial state to a final state.	Remember	1	AME003.01

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
17	What is internal energy?	It is the energy contained within the system, excluding the kinetic energy of motion, of the system as a whole and the potential energy of the system as a whole due to external force fields. It keeps account of the gains and losses of energy of the system that are due to changes in its internal state	Understand	2	AME003.02
18	Define PMM1.	There can be no machine which would continuously supply mechanical work without some other form of energy disappearing continuously.	Remember	1	AME003.01
19	What is a system?	A small part of the universe to which we will apply the laws of thermodynamics. We call this subset a system.	Remember	CLO 1	AME003.01
20	What is a Closed system?	A system in which no mass is permitted to cross the system boundary.	Remember	CLO 1	AME003.01
21	What is a Open system?	Open system is one in which mass crosses the system boundary in either direction from the system to surroundings or vice versa.	Remember	CLO 1	AME003.01
22	What is a isolated system?	Isolated system is one in which there is no interaction between system and the surroundings. It is of fixed mass and energy, and hence there is no mass and energy transfer across the system boundary.	Remember	CLO 1	AME003.01
23	What is macroscopic approach?	In macroscopic approach, certain quantity of matter is considered, without a concern on the events occurring at the molecular level.	Remember	CLO 1	AME003.01
24	What is microscopic approach?	In microscopic approach, the effects at molecular level are considered.	Remember	CLO 1	AME003.01
25	Define Quasi static process.	A quasi-static process is one in which the deviation from thermodynamic equilibrium is infinitesimal, all states of the system passes through are equilibrium states	Remember	CLO1	AME003.01
26	Define temperature.	Temperature is a property of a system which determines the degree of hotness and is a relative term.	Remember	CLO 1	AME003.01
27	Explain Thermal equilibrium?	Two systems are said to be equal in temperature, when there is no change in their respective observable properties when they are brought together. In other words, “when two systems are at the same temperature they are in thermal equilibrium”	Understand	CLO 1	AME003.01
28	What is a perfect gas?	An ideal gas, also known as a perfect gas. is a gas that acts according to an idealized relationship between volume, pressure, and temperature.	Remember	CLO 1	AME003.01
29	What is thermometric property?	The thermometer makes use of a physical property of a thermometric substance which changes continuously with temperature. The physical property is referred to as thermometric property.	Remember	CLO 1	AME003.01
30	What is flow work?	It is the work required to push the fluid into or out of the control volume. Flow work is necessary for maintaining the continuous flow through control volume.	Remember	CLO 1	AME003.01
31	Define enthalpy.	A thermodynamic quantity equivalent to the total heat content of a system is called enthalpy. $H = U + pV,$ Where, H is the enthalpy of the system,	Remember	CLO 1	AME003.01

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
		U is the internal energy of the system, p is the pressure of the system, V is the volume of the system			
32	Define is specific heat.	The amount of heat required to raise a unit mass of a substance through a unit rise in temperature.	Remember	CLO 2	AME003.02
33	Define latent heat.	The amount of heat transfer required to cause a phase change in unit mass of a substance at a constant pressure and temperature.	Remember	CLO 2	AME003.02
34	What is continuum?	A continuous sequence in which adjacent elements are not perceptibly different from each other, but the extremes are quite distinct is called as continuum.	Remember	CLO 2	AME003.02
35	What is a cyclic process?	When a system returns to its original state after completing a series of change, then it is known that a cyclic is completed.	Remember	CLO 2	AME003.02
36	What is a non cyclic process?	When a system doesn't returns to its original state because of irreversibility's present in system like friction, then such type of process is known as non- cyclic process.	Remember	CLO 2	AME003.02
37	What is 'Path'?	The series of states a system passes through during a process is called as path.	Remember	CLO 2	AME003.02
UNIT – II					
1	What is heat engine?	A system that converts heat or thermal energy and chemical energy to mechanical energy which can then be used to do mechanical work.	Understand	3	AME003.03
2	Define PMM2.	A perpetual motion machine of the second kind, or PMM2 is one which converts all the heat input into work while working in a cycle. A PMM2 has a thermal efficiency of 1.	Remember	3	AME003.03
3	What is Clausius statement?	It is impossible to construct a device that operated in a cycle and produces no effect other than the transfer of heat from a lower temperature body to a higher temperature body.	Understand	6	AME003.06
4	What is Kelvin Planck statement?	It is impossible to construct a heat engine which will operate continuously and convert all the heat it draws from a reservoir into work	Understand	6	AME003.06
5	What is isentropic process?	An idealized thermodynamic process that is both adiabatic and reversible. The work transfers of the system are frictionless and there is no transfer of heat or matter.	Understand	1	AME003.01
6	What is thermal efficiency?	The fraction of the heat input that is converted to net work output is a measure of a heat engine.	Understand	2	AME003.02
7	What is reversible process?	It is defined as a process that can be reversed without leaving any trace on the surroundings. That is, both the system and the surroundings are returned to their initial states at the end of the reverse process.	Understand	8	AME003.08
8	What is available energy?	The maximum work output obtainable from a certain heat input in a cyclic heat engine or the available part of the energy supplied.	Understand	8	AME003.08

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
9	Define availability.	It is defined as the maximum useful work (total work minus pdV work) that is obtainable in a process in which the system comes to equilibrium with its surroundings.	Remember	8	AME003.08
10	Define second law efficiency.	It is defined as the ratio of the minimum available energy which must be consumed to do a task divided by the actual amount of available energy consumed in performing the task.	Remember	7	AME003.07
11	What is Carnot cycle?	An ideal reversible closed thermodynamic cycle in which the working substance goes through the four successive operations of isothermal expansion to a desired point, adiabatic expansion to a desired point, isothermal compression and adiabatic compression back to its initial state.	Understand	7	AME003.07
12	What is dead state?	A system is said to be in the dead state when it is in thermodynamic equilibrium with the environment. At the dead state, a system is at the temperature and pressure of its environment (in thermal and mechanical equilibrium); it has no kinetic or potential energy relative to the environment (zero velocity and zero elevation above a reference level); and it does not react with the environment (chemically inert).	Understand	7	AME003.07
13	Define COP.	The coefficient of performance or COP of a heat pump, refrigerator or air conditioning system is a ratio of useful heating or cooling provided to work required. Higher COPs equate to lower operating costs. The COP usually exceeds 1, especially in heat pumps because, instead of just converting to heat, it pumps additional heat from a heat source to where the heat is required.	Remember	3	AME003.03
14	What is entropy?	A measure of the level of disorder of a system is entropy, represented by S. For a thermodynamic system involved in a heat transfer of size Q at a temperature T , a change in entropy can be measured by $\Delta S = Q/T$	Understand	6	AME003.06
15	What is a thermal energy reservoir?	A large body of infinite heat capacity, which is capable of absorbing or rejecting an unlimited quantity of heat without suffering appreciable changes in its thermodynamic coordinates.	Understand	3	AME003.03
16	What is a steady flow process?	Steady flow process is a process where: the fluid properties can change from point to point in the control volume but remains the same at any fixed point during the whole process. A steady-flow process is characterized by the following: 1) No properties within the control volume change with time. That is m_{cv} = constant and E_{cv} = constant	Remember	CLO 5	AME003.02

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
		2) No properties change at the boundaries with time. Thus, the fluid properties at an inlet or exit will remain the same during the whole process. They can be different at different opens. The heat and work interactions between a steady-flow system and its surroundings do not change with time.			
17	What are homogeneous system?	A system is homogeneous when it is completely uniform throughout, i.e. consists of one phase only	Remember	CLO 2	AME003.02
18	What are heterogeneous system?	A system is heterogeneous when it is not uniform throughout, i.e. it consists of two or more phases, e.g., a mixture of two solids or two or more immiscible liquids, a solid in contact with a liquid	Remember	CLO 2	AME003.02
19	What are state variables?	The macroscopic properties of a system are state variables since change in any of these properties, causes the system to change into another state	Remember	CLO 2	AME003.02
20	Define exothermic process.	The process in which heat is given out to the surroundings is called exothermic process. In this process, products are more stable than reactants because they have lower energy.	Remember	CLO 2	AME003.02
21	What is a State function?	The thermodynamic property which depends upon initial and final state of the system d not on the means how the state is reached are state functions, e.g., E, H, S, G are state functions	Remember	CLO 2	AME003.02
22	What is a thermal energy reservoir?	A large body of infinite heat capacity, which is capable of absorbing or rejecting an unlimited quantity of heat without suffering appreciable changes in its thermodynamic coordinates.	Remember	CLO 3	AME003.03
23	What is a heat pump?	A heat pump is a device that transfers heat energy from a source of heat to what is called a heat sink. Heat pumps move thermal energy in the opposite direction of spontaneous heat transfer, by absorbing heat from a cold space and releasing it to a warmer one	Remember	CLO 3	AME003.03
24	Explain entropy?	A measure of the level of disorder of a system is entropy, represented by S. For a thermodynamic system involved in a heat transfer of size Q at a temperature T , a change in entropy can be measured by: $\triangle S = Q/T$	Understand	CLO 2	AME003.02
25	What is a reversible processes?	A thermodynamic process is reversible if the process can return back in such a that both the system and the surroundings return to their original states, with no other change anywhere else in the universe. It means both system and surroundings are returned to their initial states at the end of the reverse process.	Remember	CLO 7	AME003.07
26	What is a irreversible process?	An irreversible process is a thermodynamic process that departs from equilibrium. In terms of pressure and volume, it occurs when the pressure (or the volume) of a system	Remember	CLO 7	AME003.07

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
		changes dramatically and instantaneously that the volume (or the pressure) do not have the time to reach equilibrium.			
27	Explain internally irreversible process?	The process is internally reversible if no irreversibility's occur within the boundaries of the system. In these processes, a system undergoes through a series of equilibrium states, and when the process reverses, the system passes through exactly the same equilibrium states while returning to its initial state.	Understand	CLO 7	AME003.07
28	Explain externally irreversible process?	In externally reversible process no irreversibility's occur outside the system boundaries during the process.	Understand	CLO 7	AME003.07
29	What is Gibbs function?	Gibbs function is also known free enthalpy to distinguish it from Helmholtz free energy is a thermodynamic potential that can be used to calculate the maximum of reversible work that may be performed by a thermodynamic system at a constant temperature and pressure	Remember	CLO 9	AME003.09
30	Explain Clausius theorem?	The Clausius theorem is a mathematical explanation of the second law of thermodynamics. Also referred to as the "inequality of Clausius", explain the relationship between the heat flow in a system and the entropy of the system and its surroundings.	Understand	CLO 4	AME003.04
31	What is Clausius in equality?	The Clausius in equality states that the cyclic integral of dQ/T is always less than or equal to zero	Remember	CLO 4	AME003.04
32	What is heat transfer rate?	A measured amount of heat transferred (ΔQ) over a measured amount of time (Δt) $H = \frac{kA\Delta T}{L}$, where: ΔT: temperature difference between the ends of the object, k: thermal conductivity of the material, L: material length, and A: material cross-sectional area.	Remember	CLO 2	AME003.02
UNIT – III					
1	Define critical point.	It is defined as the point at which the saturated liquid and saturated vapor states are identical	Remember	10	AME003.10
2	Define enthalpy of vaporization.	The amount of energy needed to vaporize a unit mass of saturated liquid at a given temperature or pressure. It decreases as the temperature or pressure increases and becomes zero at the critical point.	Remember	11	AME003.11
3	Define superheated vapor.	Vapor that is obtained by raising the temperature of a substance above the saturation temperature while maintaining a constant pressure.	Remember	10	AME003.10
4	Define equation of a state.	Any equation that relates the pressure, temperature, and specific volume of a substance	Remember	10	AME003.10
5	What is compressibility factor?	The deviation from ideal-gas behavior at a given temperature and pressure can accurately be accounted for by the introduction of a correction factor called the compressibility factor.	Understand	11	AME003.11

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
6	What is steam table?	The thermodynamic data that contain the properties of water or steam. It is normally used to obtain the following properties using steam pressure for saturated steam temperature and saturated temperature for saturated steam pressure. It is also widely used for a particular enthalpy and volume.	Understand	11	AME003.11
7	Define free expansion.	It is an irreversible process in thermodynamics in which a volume of gas is kept in one side of a thermally isolated container, with the other side of the container being evacuated. The partition between the two parts of the container is then opened and the gas fills the whole container.	Remember	10	AME003.10
8	What is Mollier chart?	It is a graphic representation of the relationship between air, temperature, moisture content and enthalpy.	Understand	11	AME003.11
9	What is throttling process?	Throttling is a process in which the flow of fluid is restricted by closing the valve partially. In this process enthalpy remains constant and work done is zero.	Understand	11	AME003.11
10	Define pure substance.	A pure substance is one composed of a single chemical species, which may exist in more than one phase. Different phases of a substance have the same chemical composition but different physical structures, such as solid, liquid, and gas.	Remember	10	AME003.10
12	Define saturation temperature.	Phase change occurs at constant pressure and temperature. A pure liquid at a given pressure will transform into vapor only at a particular temperature.	Remember	11	AME003.11
13	Define critical temperature.	The temperature of a gas in its critical state, above which it cannot be liquefied by pressure alone.	Remember	11	AME003.11
14	Define compressed liquid.	The temperature of a liquid is less than the saturation temperature at the given pressure.	Remember	10	AME003.10
15	What is throttling calorimeter?	An instrument utilizing the principle of constant enthalpy expansion for the measurement of the moisture content of steam drawn from a steam pipe through sampling nozzle enters the calorimeter through a throttling orifice and moves into a well-insulated expansion chamber in which its temperature is measured.	Understand	13	AME003.13
16	What is ice point?	The temperature at which pure ice coexisted in equilibrium with air saturated water at one atmosphere pressure.	Remember	10	AME003.10
17	Define pure substance.	A pure substance is one composed of a single chemical species, which may exist in more than one phase. Different phases of a substance have the same chemical composition but different physical structures, such as solid, liquid, and gas.	Remember	CLO 10	AME003.10
18	What is an ideal gas?	An ideal gas is defined as one in which all collisions between atoms or molecules are perfectly elastic and in which there are no intermolecular attractive forces.	Remember	CLO 10	AME003.10
19	What is a perfect gas?	A perfect gas is a theoretical gas that differs from real gases in a way that makes certain calculations easier to handle. Its behavior is more simplified compared to an ideal gas.	Remember	CLO 10	AME003.10
20	What is a real gas?	This gas does not obey the ideal gas law. Because inter molecular forces and volume occupied by the gas molecules are considered.	Remember	CLO 10	AME003.10

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
21	Define triple point.	In chemistry and physics, the triple point is the temperature and pressure at which solid, liquid, and vapor phases of a particular substance coexist in equilibrium.	Remember	CLO 10	AME003.10
22	Define critical point.	Critical point is defined as a point of a liquid where is no distinction between saturated liquid and saturated vapour state.	Remember	CLO 10	AME003.10
23	What is a T-S diagram?	A T-S diagram most frequently used to analyze energy transfer system cycles. This is because the work done by or on the system and the heat added to or removed from the system can be visualized on the T-S diagram.	Remember	CLO 11	AME003.11
24	What is a H-S chart?	H-S chart is also known as an enthalpy–entropy chart plots the total heat against entropy, describing the enthalpy of a thermodynamic system.	Remember	CLO 11	AME003.11
25	What is phase change?	The term phase transition (or phase change) is most commonly used to describe transitions between solid, liquid, and gaseous states of matter	Remember	CLO 10	AME003.10
26	Define molar mass.	The molar mass M is a physical property defined as the mass of a given substance divided by the amount of substance. molar mass of a substance is the total weight of that substance for one mole of that substance.	Remember	CLO 10	AME003.10
27	Define saturation vapor pressure.	At a given temperature, the gaseous state coexists with the solid or liquid phase in equilibrium at given temperature.	Remember	CLO 10	AME003.10
28	What is Boltzmann constant?	The universal gas constant divided by Avogadro's number N is called the Boltzmann constant and is denoted by K.	Remember	CLO 10	AME003.10
29	Define Molar heat.	It is defined as the quantity of heat required to raise the temperature of one mole of a gas through one degree.	Remember	CLO 10	AME003.10
30	Define wet steam.	The mixture of dry steam and moisture is called wet steam.	Remember	CLO 11	AME003.11
31	What is dryness fraction?	The quality of wet steam is defined by the dryness fraction. It is denoted by ‘x’ and x = Mass of dry steam / Mass of dry steam + Mass of wet steam	Remember	CLO 11	AME003.11
32	What is a steam calorimeter?	A device which uses the mass of steam condensed on a body is used to calculate the amount of heat supplied.	Remember	CLO 11	AME003.11
UNIT - IV					
1	Define specific humidity.	It is defined as the mass of water vapor per unit mass of dry air in a mixture of air and water vapor.	Remember	11	AME003.11
2	What is dew point?	The temperature at which water vapor starts condensing.	Understand	11	AME003.11
3	What is dry bulb temperature?	The temperature recorded by the thermometer with a dry bulb.	Understand	11	AME003.11
4	What is wet bulb temperature?	The temperature recorded by a thermometer when the bulb is enveloped by a cotton wick saturated with water.	Understand	11	AME003.11

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
5	What is dry air?	It is a mechanical mixture of the gases: oxygen, nitrogen, carbon dioxide, hydrogen, argon, neon, krypton, helium, ozone and xenon.	Understand	11	AME003.11
6	Define relative humidity.	It is defined as the ratio of partial pressure of water vapor in a mixture to the saturation pressure of pure water.	Remember	11	AME003.11
7	What is psychrometer?	It is an instrument which measures both the dry bulb and the wet bulb temperatures of air.	Understand	13	AME003.13
8	What is psychrometric chart?	It is a graphical plot with specific humidity and partial pressure of water vapor as ordinates and dry bulb temperature as abscissa. The volume of the mixture, wet bulb temperature, relative humidity and enthalpy of the mixture appear as parameters. Any two of these properties fix the condition of the mixture.	Understand	13	AME003.13
9	What is saturated air?	Air that contains the maximum amount of water vapor that is possible at the given temperature and pressure, i.e. air in which the relative humidity is 100%.	Understand	13	AME003.13
10	What is adiabatic saturation?	Temperature at which water converts into air by the process of evaporation adiabatically.	Understand	13	AME003.13
11	Define partial pressure.	The pressure that would be exerted by one of the gases in a mixture if it occupied the same volume on its own.	Remember	10	AME003.10
12	What is degree of saturation?	The ratio of the humidity ratio of moist air to the humidity ratio of saturated moist air at the same temperature and pressure.	Understand	10	AME003.10
13	What is gravimetric analysis?	It is a technique through which the amount of an analyte (the ion being analyzed) can be determined through the measurement of mass.	Understand	10	AME003.10
14	What is volumetric analysis?	Quantitative analytical method involves the measurement of volume of a solution of known concentration which is used to determine the concentration of the analyte	Understand	10	AME003.10
15	Define enthalpy.	A property of a thermodynamic system, is equal to the system's internal energy plus the product of its pressure and volume.	Remember	8	AME003.08
16	What is gravimetric analysis?	Gravimetric methods of analysis are used where weights of reactants and products of chemical reactions are reproducible, stable and reflect the presence of constituents which are important in the establishment of identity.	Remember	CLO 11	AME003.11
17	What is volumetric analysis?	The quantitative analysis of liquids or solutions by comparing the volumes that react with known volumes of standard reagents	Remember	CLO 11	AME003.11
18	Define volume fraction.	Volume fraction (φ) is defined as the volume of a constituent Vi divided by the volume of all constituents of the mixture V prior to mixing	Remember	CLO 11	AME003.11
19	What is ‘Psychrometrics’?	‘Psychrometrics’ is given to the study of properties of air-water vapour mixtures?	Remember	CLO 13	AME003.13
20	What is Dry Bulb Temperature (DBT)?	The dry-bulb temperature (DBT) is the temperature of air measured by a thermometer freely exposed to the air, but shielded from radiation and moisture. DBT is the temperature that is usually thought of as air temperature, and it is the true	Remember	CLO 13	AME003.13

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
		thermodynamic temperature. It indicates the amount of heat in the air and is directly proportional to the mean kinetic energy of the air molecules.			
21	What is Wet Bulb temperature (WBT)?	The wet-bulb temperature (WBT) is the temperature read by a thermometer covered in water-soaked cloth (wet-bulb thermometer) over which air is passed at 100% relative humidity.	Remember	CLO 13	AME003.13
22	What is Dew point temperature?	The dew point is the temperature to which air must be cooled to become saturated with water vapour. When further cooled, the airborne water vapor will condense to form liquid water (dew).	Remember	CLO 13	AME003.13
23	What is 'Specific humidity'?	Specific humidity, mass of water vapour in a unit mass of moist air, usually expressed as grams of vapour per kilogram of air, or, in air conditioning, as grains per pound.	Remember	CLO 13	AME003.13
24	What is 'Relative humidity'?	Relative humidity (RH) is the ratio of the partial pressure of water vapor to the equilibrium vapor pressure of water at a given temperature.	Remember	CLO 13	AME003.13
25	Define degree of saturation.	Degree of saturation is the percentage of water that occupies the pore spaces present in soil and is said to be degree of saturation.	Remember	CLO 13	AME003.13
26	What is adiabatic saturation temperature?	Adiabatic saturation temperature refers to a temperature at which water converts into air by the process of evaporation adiabatically.	Remember	CLO 13	AME003.13
27	What is Degree of saturation?	The degree of saturation(μ) is the ratio of the humidity ratio W to the humidity ratio of a saturated mixture Ws at the same temperature and pressure	Remember	CLO 13	AME003.13
28	What is Avogadro's constant?	Avogadro's constant is the number of constituent particles, usually atoms or molecules, that are contained in the amount of substance given by one mole.	Remember	CLO 12	AME003.12
29	What are hygroscopic substances?	Hygroscopic substance is the substance that readily attracts water from its surroundings, either by absorption or by adsorption. Examples: Honey, glycerin, ethanol	Remember	CLO 12	AME003.12
30	What is sensible heating and sensible cooling?	Heating or cooling without change in humidity is defined as Sensible heating and Sensible cooling.	Remember	CLO 13	AME003.13
UNIT - V					
1	What is a intercooler?	An intercooler is any mechanical device used to cool a fluid, including liquids or gases, between stages of a multi-stage compression process.	Remember	CLO 14	AME003.14
2	What is a thermodynamic cycle?	A thermodynamic cycle consists of a linked sequence of thermodynamic processes that involve transfer of heat and work into and out of the system, while varying pressure, temperature, and other state variables within the system, and that eventually returns the system to its initial state.	Remember	CLO 14	AME003.14
3	What are power cycles?	Power cycles are cycles which convert some heat input into a mechanical work output.	Remember	CLO 14	AME003.14

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
4	What is a polytropic process?	The polytropic process equation can describe multiple expansion and compression processes which include heat transfer. A polytropic process is a thermodynamic process that obeys the relation: $pV^n = C$ where p is the pressure, V is volume, n is the polytropic index , and C is a constant.	Remember	CLO 14	AME003.14
5	What is a refrigerant?	A refrigerant is a substance or mixture, usually a fluid, used in a heat pump and refrigeration cycle. In most cycles it undergoes phase transitions from a liquid to a gas and back again. Many working fluids have been used for such purposes. Refrigerants used in various applications are ammonia, sulfur dioxide, and non-halogenated hydrocarbons such as propane.	Remember	CLO 14	AME003.14
6	Explain thermal efficiency.	The thermal efficiency (η_{th}) is a dimensionless performance measure of a device that uses thermal energy. For a heat engine, thermal efficiency is the fraction of the energy added by heat (primary energy) that is converted to net work output (secondary energy). For a heat engine, thermal efficiency is the fraction of the energy added by heat (primary energy) that is converted to net work output (secondary energy). In the case of a refrigeration or heat pump cycle, thermal efficiency is the ratio of net heat output for heating, or removal for cooling, to energy input (the coefficient of performance).	Understand	CLO 14	AME003.14
7	What is mean effective pressure?	A parameter used by engineers to describe the performance of reciprocating piston engines is known as the mean effective pressure. It is a measure of an engine's capacity to do work that is independent of engine displacement. $MEP = \frac{\text{Net Work for one cycle}}{\text{Displacement volume}}$	Remember	CLO 14	AME003.14
8	What are Colligative properties?	Colligative properties are properties independent of the nature of the compounds and depend on the numbers of the solute particles only. Ex: boiling point elevation, freezing point depression, vapor pressure lowering, etc.	Remember	CLO 14	AME003.14
9	Explain the term cut off ratio.	The ratio of the cylinder volumes before and after the combustion process in a diesel engine.	Understand	CLO 14	AME003.14
10	What is 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	CLO 14	AME003.14
11	Explain the term 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.	Understand	CLO 14	AME003.14
12	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	CLO 14	AME003.14
13	What is utilization factor?	Utilization factor is the ratio of the sum of net work output plus process heat delivered over the total heat input of a cogeneration plant.	Remember	CLO 14	AME003.14

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
14	What is efficiency of Carnot cycle?	Carnot cycle efficiency = $\frac{T1 - T2}{T1}$	Remember	CLO 14	AME003.14
15	What is a Binary cycle?	A binary cycle power plant is a type of geothermal power plant that allows cooler geothermal reservoirs to be used than is necessary for dry steam and flash steam plants.	Remember	CLO 14	AME003.14
16	What is spark ignition engine?	Internal combustion engine, generally a petrol engine, where the combustion process of the air-fuel mixture is ignited by a spark from a spark plug.	Understand	14	AME003.14
17	What is detonation?	Rapid and uncontrolled combustion, especially in the cylinder of a spark ignition engine which is operating with a fuel with inadequate octane.	Understand	14	AME003.14
18	What is regenerator?	Heat exchanger where heat from the hot fluid is intermittently stored in a thermal storage medium before it is transferred to the cold fluid.	Understand	14	AME003.14
19	Define compression stroke.	The piston moves upward compressing the air fuel mixture.	Remember	14	AME003.14
20	Define back work ratio.	The ratio of compressor work to the turbine work	Remember	14	AME003.14
21	What is propulsive efficiency?	The desired output in a turbojet engine is the power produced to propel the aircraft and the required input is the heating value of the fuel.	Understand	14	AME003.14
22	What is propulsive force?	The power developed from the thrust of the engine.	Understand	14	AME003.14
23	Define bypass ratio.	The ratio of the mass flow rate of air bypassing the combustion chamber to that of air flowing through it.	Remember	14	AME003.14
24	What is recuperator?	a form of heat exchanger in which hot waste gases from a furnace are conducted continuously along a system of flues where they impart heat to incoming air or gaseous fuel.	Understand	14	AME003.14
25	What is Brayton cycle?	It is used for gas turbines only when both the compression and expansion processes take place in rotating machinery.	Understand	14	AME003.14
26	Define mean effective pressure.	A quantity relating to the operation of a reciprocating engine and is a valuable measure of an engine's capacity to do work that is independent of engine displacement.	Remember	14	AME003.14
27	Define cut off ratio.	It is the ratio of the volume after combustion to the volume before combustion.	Remember	14	AME003.14
28	What is dual cycle?	It is a thermodynamic cycle that combines the Otto cycle and the Diesel cycle. In the dual cycle, combustion occurs partly at constant volume and partly at constant pressure.	Understand	14	AME003.14
29	Define compression ratio.	The ratio of the maximum to minimum volume in the cylinder of an internal combustion engine.	Remember	14	AME003.14
30	Define indicated power.	It is defined as the power produced due to combustion of fuel within the cylinder in an IC Engine. It is essentially the sum of the Friction and the Brake Powers.	Remember	14	AME003.14

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
31	Define brake power.	The actual power output of the engine as measured by a dynamometer.	Remember	14	AME003.14
32	Define friction power.	The difference between the indicated and brake power.	Remember	14	AME003.14

Signature of the Faculty **Signature of the HOD**