



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

AERONAUTICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

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| Course Name | : | ENGINEERING CHEMISTRY |
| Course Code | : | AHSB03 |
| Program | : | B.Tech |
| Semester | : | II |
| Branch | : | Aeronautical Engineering |
| Section | : | A&B |
| Course Faculty | : | Dr. V Anitha Rani |

COURSE OBJECTIVES:

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|--|--|
| The course should enable the students to: | |
| 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 TERMINOLOGY QUESTION BANK

| S.No | QUESTION | ANSWER | Blooms Level | CO | CLO | CLO Code |
|-----------------|--|--|--------------|------|-------|-----------|
| MODULE-I | | | | | | |
| 1 | Define voltaic cell? | A Voltaic Cell is an electrochemical cell that uses spontaneous redox reactions to generate electricity. | Remember | CO 1 | CLO 1 | AHSB03.01 |
| 2 | What is electrolytic cell ? | Electrolytic cells convert electrical energy into chemical potential energy. The process is known as electrolysis. The purpose of this is usually to convert reactants into more useful products. | Remember | CO 1 | CLO 1 | AHSB03.01 |
| 3 | What is electrode potential? | The tendency of an electrode to lose or gain electrons, when it is in contact with its own ions. | Remember | CO 1 | CLO 1 | AHSB03.01 |
| 4 | What is electrochemical series? | When the elements are arranged in increasing order of their electrode potential, a series is called electrochemical series. | Understand | CO 1 | CLO 1 | AHSB03.01 |
| 5 | Why is salt bridge used in the construction of a cell? | They allow the movement of ions from one solution to another without mixing of the two solutions and complete the electrical circuit. To maintain the electrical neutrality of the solutions in the two half cell. | Understand | CO 1 | CLO 1 | AHSB03.01 |
| 6 | Define reference electrode? | An electrode whose electrode potential is accurately known or | Remember | CO 1 | CLO 1 | AHSB03.01 |

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| | | whose electrode potential has been arbitrarily fixed. or Reference electrode is an electrode of standard potential with which we can compare the potential of another electrode. | | | | |
| 7 | Define Battery? | The term battery is a group of two or more electric cells connected together electrically in series. | Remember | CO 1 | CLO 2 | AHSB03.02 |
| 8 | What is an irreversible cell? | The cell in which the cell reaction is not reversible. | | | | |
| 9 | what is a reversible cell? | The cells in which the cell reaction is reversed by passing direct current in opposite direction. | Remember | CO 1 | CLO 2 | AHSB03.02 |
| 10 | Wire mesh corrodes faster at the joints. Why? | The joints of wire mesh under stressed so these becomes anodic .At these anodic parts, oxidation takes place and the metal is corroded fast, while the cathodic parts remain unaffected. | Understand | CO 1 | CLO 3 | AHSB03.03 |
| 11 | Define corrosion? | Any process of deterioration and consequent loss of solid metallic materials through an unwanted chemical or electrochemical attack by its environment, starting at its surface is called corrosion. | Remember | CO 1 | CLO 3 | AHSB03.03 |
| 12 | What is galvanic corrosion? | When two dissimilar metals are electrically connected and exposed to an electrolyte, the metal higher in electrochemical series undergoes corrosion. | Remember | CO 1 | CLO 3 | AHSB03.03 |
| 13 | Define electro less plating? | Electro less plating is a process of depositing a noble metal on a catalytically active surface of a less noble metal by employing a suitable reducing agent without using electrical energy. | Remember | CO 1 | CLO 3 | AHSB03.03 |
| 14 | which types of metal oxide film cause rapid and continues corrosion? | The metal oxide film with Fine grained tightly adhering , impervious oxide film, and highly unstable oxide film. | Understand | CO 1 | CLO 3 | AHSB03.03 |
| 15 | which types of metal oxide film prevents corrosion? | The metal oxide film with Fine grained tightly adhering , impervious oxide film, and highly unstable oxide film. | Understand | CO 1 | CLO 3 | AHSB03.03 |
| MODULE-II | | | | | | |
| 1 | Define hardness of water ? | Hardness of water is that characteristic, which prevents the lathering of soap. This is due to the presence of salts of calcium, magnesium and other heavy metals dissolved in it. | Remember | CO 2 | CLO 4 | AHSB03.04 |

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| 2 | Define the temporary hardness of water | It is due to presence of dissolved carbonates and bicarbonates of calcium and magnesium. | Remember | CO 2 | CLO 4 | AHSB03.04 |
| 3 | What are various units of hardness of water | Parts per Million [ppm], milligram per litre [mg/L], Clarke's Degree ^[°Cl] , Degree French ^[°Fr] . | Remember | CO 2 | CLO 4 | AHSB03.04 |
| 4 | what is potable water ? | Drinking water also known as "Potable Water". Water which is used for human consumption is called potable water. | Remember | CO 2 | CLO 5 | AHSB03.05 |
| 5 | What is softening of water? | The process whereby we remove or reduce the hardness of water ,irrespective of whether it is temporary or permanent is termed as softening of water. | Understand | CO 2 | CLO 4 | AHSB03.04 |
| 6 | what is sedimentation? | Water is allowed to stand undisturbed for 2 to 5 hours in big setting tanks. | Understand | CO 2 | CLO 5 | AHSB12.05 |
| 7 | Define chlorination? | The process of applying calculated amount of chlorine to water in order to kills the pathogenic bacteria is called "Chlorination". | Remember | CO 2 | CLO 5 | AHSB03.05 |
| 8 | What is break point chlorination ? | The amount of chlorine required to kill bacteria and to remove organic matter is called "break point chlorination". | Understand | CO 2 | CLO 5 | AHSB03.05 |
| 9 | what is reverse osmosis ? | When a pressure in excess to osmotic pressure is applied on a concentrated site then the movement of solvent molecules from concentrated site to dilute site takes place. This is "Reverse Osmosis". | Remember | CO 2 | CLO 5 | AHSB03.05 |
| 10 | Define brackish water? | The water with peculiar (or) salty taste is known as "Brackish Water". | Remember | CO 2 | CLO 5 | AHSB03.05 |
| 11 | What is phosphate conditioning ? | In high pressure boilers, scale formation can be avoided by adding sodium phosphate, which reacts with hardness of water forming non-adherent and easily removable soft sludge of calcium and magnesium phosphates which can be removed by blow-down operation. | Remember | CO 2 | CLO 5 | AHSB03.05 |
| 12 | Define deionized water? | Water coming out from the exchanges is free from cations as well as anions. Ion free water is known as "deionized" or "Dimineralized water". | Remember | CO 2 | CLO 5 | AHSB03.05 |
| 13 | What is internal treatment of hard water | The softening of water carried out inside the boiler is called internal treatment of water. In this process the hardness causing dissolved salts was | Remember | CO 2 | CLO 5 | AHSB03.05 |

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| | | prohibited. | | | | |
| 14 | What is hard water? | Water which does not produce lather with soap solution readily, but forms white curd, is called hard water. | Remember | CO 2 | CLO 4 | AHSB03.04 |
| 15 | What is soft water? | Water which lathers easily on shaking with soap solution, is called soft water. | Understand | CO 2 | CLO 4 | AHSB03.04 |
| MODULE-III | | | | | | |
| 1 | What are atomic orbitals? | Atomic orbital is the region having the highest probability of finding an electron in an atom. The energy levels about the nucleus contain group of these atomic orbitals. | Understand | CO 3 | CLO 7 | AHSB03.07 |
| 2 | Write any two salient features for CFT? | i. Ligands are treated as point charges. ii. There is no interaction between metal orbital's and ligand orbital's. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 3 | Define doping? | Doping is the process of adding impurities to increase conductivity nature of semiconductors. Two of the most important materials silicon can be doped with, are boron and phosphorus. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 4 | What are eg, t _{2g} orbital's in crystal field theory? | The d _{xy} , d _{xz} , and d _{yz} orbitals are collectively called the t _{2g} orbitals, whereas the d _{z²} and d _{x²-y²} orbitals are called the eg orbitals in crystal field theory. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 5 | Define the term bond order ? | Bond order is a measurement of the number of electrons involved in bonds between two atoms in a molecule. It is used as an indicator of the stability of a chemical bond. | Remember | CO 3 | CLO 6 | AHSB03.06 |
| 6 | What are semiconductors? | The gap between valence band and conduction band is small; some electrons jump from valence band to conduction band and thus show some conductivity. Such solids show less conductivity or no conductivity is called semiconductors. | Understand | CO 3 | CLO 7 | AHSB03.07 |
| 7 | What are intrinsic semiconductors? | Intrinsic semiconductors are the one with number of holes and electrons are equal, they do not conduct current, all semiconductors used are intrinsic in nature. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 8 | Define the term Bonding molecular orbital? | The lower energy molecular orbital is called bonding orbital. Since electrons placed in such an orbital increase the stability of the bond. | Understand | CO 3 | CLO 6 | AHSB03.06 |

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| 9 | Define the term anti - bonding molecule orbital? | The antibonding orbital is a type of molecular orbital (MO) that weakens the bond between two atoms and helps to raise the energy of the molecule relative to the separated atoms. Such an orbital has one or more nodes in the bonding region between the nuclei. | Remember | CO 3 | CLO 6 | AHSB03.06 |
| 10 | Define the band structure of solids? | The energy band structure of a solid determines whether it is a conductor, an insulator or a semiconductor. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 11 | what is diamagnetic property? | The transition metals which contain paired electrons depict diamagnetic behavior. The magnetic properties decreases with the decrease in the number of unpaired electrons. | Remember | CO 3 | CLO 6 | AHSB03.06 |
| 12 | Define about n-type semiconductor? | The n-type semiconductor is an excess negatively charged electrons containing semiconductor and obtained by adding extremely small quantity of a pentavalent element impurity. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 13 | How crystal field splitting takes place in tetrahedral complexes? | Tetrahedral complexes are high spin complexes as the energy gap between two sets of orbitals is roughly half of octahedral complexes. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 14 | Define crystal filled stabilization energy? | The crystal field stabilization energy (CFSE) is the stability that results from placing a transition metal ion in the crystal field generated by a set of ligands. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| 15 | How crystal field splitting takes place in octahedral complexes? | In the octahedral complexes, ligand approach along the axes. As a result, the d-orbitals where electron density is oriented along the axes, $d_{x^2-y^2}$ and d_{z^2} are repelled much more by the ligands while the orbitals d_{xy} , d_{yz} , d_{zx} having electron density oriented in between the axes are repelled lesser by the ligands. | Remember | CO 3 | CLO 7 | AHSB03.07 |
| MODULE-IV | | | | | | |
| 1 | What is an electrophile? | The positive or partially positive atom is referred to as an electrophile. | Understand | CO 4 | CLO 9 | AHSB03.09 |
| 2 | Define the term isomer? | Molecule has the same number of atoms of each element, but has a different arrangement of the atoms. Isomers have the | Remember | CO 4 | CLO 9 | AHSB03.09 |

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| | | same molecular formula, but different chemical structures. | | | | |
| 3 | Define nucleophilic substitution reactions? | The reaction in which the electron rich nucleophile selectively bonds with or attacks the positive or partially positive charge of an atom or a group of atoms to replace a leaving group are known as nucleophilic substitution reactions. | Remember | CO 4 | CLO 10 | AHSB03.10 |
| 4 | State Markovnikov's rule. | An enantiomer is a type of stereoisomers that have the same molecular formula and constitutions around the atom but differ in their spatial arrangement of groups around the atom. | Remember | CO 4 | CLO 10 | AHSB03.10 |
| 5 | What are enantiomers? | An enantiomer is a type of stereoisomers that have the same molecular formula and constitutions around the atom but differ in their spatial arrangement of groups around the atom. | Understand | CO 4 | CLO 9 | AHSB03.09 |
| 6 | What are diastereomers? | Diastereomers are stereoisomers that are not mirror images of one another and are non-superimposable on one another. | Understand | CO 4 | CLO 9 | AHSB03.09 |
| 7 | Define the term addition reactions? | An addition reaction is a reaction where two smaller molecules react to form a bigger molecule with no other products. | Remember | CO 4 | CLO 10 | AHSB03.10 |
| 8 | What are substitution reactions? | A substitution reaction occurs when an exchange of elements in the reactants takes place. The initial reactants are transformed or swapped around to give a final product. | Understand | CO 4 | CLO 10 | AHSB03.10 |
| 9 | What are nucleophiles? | A nucleophile is a species (an ion or a molecule) which is strongly attracted to a region of positive charge in something else. | Understand | CO 4 | CLO 10 | AHSB03.10 |
| 10 | State saytzeff's rule. | Dehydro halogenation reactions, the preferred product is that alkene which has the greater number of alkyl groups attached to the doubly bonded carbon atoms. | Remember | CO 4 | CLO 10 | AHSB03.10 |
| 11 | What are elimination reactions? | An elimination reaction occurs when a reactant is broken up into two products. Elimination reactions occur with saturated compounds. | Remember | CO 4 | CLO 10 | AHSB03.10 |

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| 12 | Define the term Stereoisomers? | Stereo isomers refer to isomers which share an identical bond structure but differ with regards to the geometric position of the functional groups and atoms. | Remember | CO 4 | CLO 9 | AHSB03.09 |
| 13 | Define the term optical isomerism? | The type of isomerism in which isomeric compound differ only in the direction in which they rotate the plane polarized light is known as optical isomerism. | Remember | CO 4 | CLO 9 | AHSB03.09 |
| 14 | State Anti Markovnikov's rule. | In an addition reaction of a generic electrophile HX to an alkene or alkyne, the hydrogen atom of HX becomes bonded to the carbon atom that had the least number of hydrogen atoms in the starting alkene or alkyne. | Remember | CO 4 | CLO 9 | AHSB03.09 |
| 15 | Define the term structural isomerism? | isomers having identical molecular formulas but differing in the order in which the individual atoms are connected. | Remember | CO 4 | CLO 9 | AHSB03.09 |

MODULE-V

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|---|---|---|------------|------|--------|-----------|
| 1 | How many types of fuels are there and what are they? | There are three types of fuels. They are solid fuels, liquid fuels and gaseous fuels. | Understand | CO 5 | CLO 12 | AHSB03.12 |
| 2 | What the calorific value of bituminous coal? | The calorific value of bituminous coal is 7500-8000 kcal/kg. The carbon content ranges from 75-80%. | Understand | CO 5 | CLO 12 | AHSB03.12 |
| 3 | What are different varieties of coal formed inside the earth? | Peat, lignite, bituminous coal and anthracite coal. | Understand | CO 5 | CLO 12 | AHSB03.12 |
| 4 | What is fractional distillation process? | Separation of a liquid mixture into fractions differing in boiling point (and hence chemical composition) by means of distillation, typically using a fractionating column. | Understand | CO 5 | CLO13 | AHSB03.13 |
| 5 | What is meant by the term cracking? | The decomposition of higher chain hydrocarbon molecules into simple, low boiling hydrocarbons of lower molecular masses is called as cracking. | Understand | CO 5 | CLO 13 | AHSB03.13 |
| 6 | What is meant by the catalytic cracking? | Catalytic cracking is used for cracking heavy oil fractions of petroleum in presence of suitable catalyst. This method | Understand | CO 5 | CLO 13 | AHSB03.13 |

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| | | produces gasoline of high quality and in high yield. | | | | |
| 7 | What is knocking? | Premature instantaneous ignition of fuel air mixture in an I.C. engine, leading to production of explosive violence is known as knocking. | Remember | CO 5 | CLO 13 | AHSB03.13 |
| 8 | What is meant by octane number? | The percentage of isooctane in a mixture of isooctane and n-heptane which matches the gasoline under test. | Remember | CO 5 | CLO 13 | AHSB03.13 |
| 9 | What is cetane value of a diesel? | The percentage of hexadecane in a mixture of hexadecane and 2-methyl naphthalene which possess the same ignition characteristics as the diesel fuel. | Remember | CO 5 | CLO 13 | AHSB03.13 |
| 10 | What is meant by calorific value? | It is the total quantity of heat liberated when a unit mass or volume of the fuel is burnt completely in presence of sufficient quantity of air or oxygen. | Remember | CO 5 | CLO 15 | AHSB03.15 |
| 11 | What are the units of calorific value? | Calorie, kilo calorie, British thermal unit, Centigrade heat unit. | Remember | CO 5 | CLO 15 | AHSB03.15 |
| 12 | What is meant by gross calorific value (GCV)? | It is the total quantity of heat liberated when one unit of the fuel has been burnt completely and the products of combustion have been cooled to room temperature is called gross calorific value. | Remember | CO 5 | CLO 15 | AHSB03.15 |
| 13 | What is meant by net calorific value(NCV)? | It is net heat evolved when one unit of the fuel has been burnt completely and the products are allowed to escape is called net calorific value. | Remember | CO 5 | CLO 15 | AHSB03.15 |
| 14 | Define a chemical fuel? | A combustible substance containing carbon as the main constituent which on proper burning liberates large amount of heat which can be used economically for domestic as well industrial purposes. | Remember | CO 5 | CLO12 | AHSB03.12 |
| 15 | what is meant by ignition temperature? | The lowest temperature at which the fuel must be preheated so that it starts burning smoothly. | Understand | CO 5 | CLO 12 | AHSB03.12 |

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