

ENGINEERING CHEMISTRY

FUELS

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on “Gaseous Fuels – 1”.

1. Which of the following is a disadvantage of gaseous fuel?

- a) Gaseous fuels are very difficult to operate
- b) Gaseous fuels are highly inflammable
- c) Gaseous fuels cannot be ignited instantly
- d) They produce lot of smoke on combustion

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Answer: b

Explanation: The particles in gaseous fuels are separated from each other, due to which their combustion becomes very easy. This increases the inflammability of the gaseous fuel. Special care should be taken to avoid fire hazards.

2. Which of the following is a major advantage of gaseous fuel over liquid and solid fuel?

- a) Gaseous coal does not form ash
- b) Gaseous coal can be manufactured at a central place
- c) Oxidising and reducing atmospheres can be easily maintained
- d) They are economic than solid and liquid fuels

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Answer: a

Explanation: Ash content is present in the fuel itself. Due to the presence of ash content in solid and liquid fuels, its rate of combustion decreases. Also, a lot of smoke is generated due to the presence of ash content.

3. Which of the following is a primary gaseous fuel?

- a) Water gas
- b) Oil gas
- c) Refinery gas
- d) Liquefied petroleum gas

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Answer: d

Explanation: Primary gaseous fuel are those, which are already present in nature and

secondary gaseous fuels are those which are obtained from primary gaseous fuels. Natural gas is also a primary gaseous fuel.

4. Which of the following compound is present in natural gas?

- a) Urea
- b) Benzoyl peroxide
- c) Methane
- d) Sulphonic acid

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Answer: c

Explanation: Natural gas is mainly composed of methane and small quantities of ethane and other hydrocarbons. Urea consists of nitrogen due to which it is not present in natural gas.

5. Which type of natural gas is called wet natural gas?

- a) Containing lower hydrocarbon with more ethane
- b) Containing higher hydrocarbon with more ethane
- c) Containing lower hydrocarbon with more methane
- d) Containing higher hydrocarbon with more methane

[View Answer](#)

Answer: d

Explanation: If higher hydrocarbons are present along with methane, then the natural gas is called “Rich” or “Wet” natural gas. It is also called “Marsh gas” because it majorly contains methane.

6. From which of the following natural gas is majorly obtained?

- a) From oil fields
- b) From coal fields
- c) From seas
- d) From sun

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Answer: a

Explanation: Most of the natural gas used as fuel is derived from oil fields. However, sometimes, the gas is evaporated from the oil and diffused through rocks, is trapped by impervious dome shaped structure.

7. Which of the following natural gas has the highest ignition temperature?

- a) Natural gas obtained from oil fields
- b) Natural gas obtained from coal fields
- c) Natural gas obtained from rocks
- d) Natural gas obtained from sea

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Answer: c

Explanation: The natural gas produced from rocks by the diffusion of oil constituents a gas field that may be under high pressure. Due to this high pressure, the flow potential of gas increase, which produces static electricity and increases the ignition temperature which is hazardous for us.

8. How much percentile of propane is present in natural gas?

- a) 5.5 %
- b) 3.7 %
- c) 1.8 %
- d) 0.5 %

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Answer: b

Explanation: At an average 88.5 % of methane is present in natural gas. 5.5 % of ethane, 3.7 % of propane and 1.8 % of butane are present in natural gas. The higher hydrocarbons are present at about 0.5 %.

9. H_2S is not present in natural gas.

- a) True
- b) False

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Answer: b

Explanation: H_2S is present in small quantity in natural gas. If it is present in an appreciable amount, then it is called as “Sour” natural gas. At the maximum 15 % of H_2S is found in natural gas till now.

10. Which of the following process is used to recover vapours of liquid hydrocarbons in wet natural gas?

- a) Evaporation

- b) Distillation
- c) Cracking
- d) Adsorption

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Answer: d

Explanation: The vapours of liquid hydrocarbons can be recovered by condensation, absorption in oil and by adsorption on charcoal, silica or alumina gel. The liquid so recovered is called casinghead gasoline.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on “Gaseous Fuels – 2”.

1. Which of the following undesirable component is removed from natural gas?

- a) NO₂
- b) SO₂
- c) N₂
- d) SO₃

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Answer: c

Explanation: The natural gas is processed to remove nitrogen, since it decrease the rate of combustion. Other undesirable products such as water, grit and dust, CO₂ and H₂S are removed from natural gas.

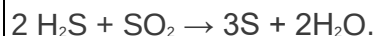
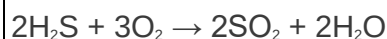
2. Which of the following product can be recovered from natural gas?

- a) Phosphorous
- b) Magnesium
- c) Boron
- d) Sulphur

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Answer: d

Explanation: Sulphur is recovered from H₂S containing natural gas. The reaction involved are:



3. In which region of India maximum natural gas is obtained?

- a) Assam
- b) Mumbai high
- c) Chennai
- d) Trivandrum

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Answer: a

Explanation: India's proved reserves of natural gas are of the order of 40 km³. Most of the natural gas lies in Assam and Gujrat. Mumbai high has less reserves of natural gas.

4. Which of the following gas can be used as natural gas?

- a) Phosgene
- b) Syngas
- c) Sulphur di-oxide
- d) Carbon di-oxide

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Answer: b

Explanation: Syngas is a low and medium-heat gas produced from coal and can be converted into high-heat content gas similar to natural gas. This natural gas produced is also called as substitute natural gas (SNG).

5. At what temperature does the substitute natural gas is prepared?

- a) 1200-1650 °C
- b) 100-400 °C
- c) 500-800 °C
- d) More than 1700 °C

[View Answer](#)

Answer: a

Explanation: The operating pressure in the gasifier, depending upon the process, can be atmospheric to over 6.9 Mpa. The temperature can vary from 800 °C to about 1650 °C.

6. In oil gasification, at what ratio does naphtha and water are mixed?

- a) 2:1
- b) 1:2

- c) 3:4
- d) 4:3

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Answer: b

Explanation: Naphtha and other oils can be converted to SNG. The process uses a mixture of naphtha and steam in the ratio of 1:2 and then gasify it. The gas produced is methanated by the reaction of carbon-dioxides with the hydrogen present.

7. Coke-oven gas has a higher calorific value than the coal gas.
- a) True
 - b) False

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Answer: b

Explanation: Coal gas has slightly higher calorific value than the coke-oven gas. Coal gas is manufactured by heating high volatile matter coal taken in silica retorts to about 1350 °C.

8. During the manufacture of coke-oven gas, which of the following is obtained as a by-product?
- a) Volatile matter
 - b) Metallurgical coke
 - c) Ash content
 - d) Gas

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Answer: d

Explanation: Coke-oven gas is made by heating coking coal in coke-ovens, in which metallurgical coke is obtained as the main product and gas is obtained as by-product. In the manufacture of coal gas, gas is obtained as main product.

9. Which of the following compound is dissolved in oil used in the manufacture of coal gas?
- a) Benzol
 - b) Ethylene
 - c) Sodium Chloride
 - d) Tartaric acid

[View Answer](#)

Answer: a

Explanation: Benzol, toluene and other aromatic compounds are dissolved in the creosote oil which is used in the manufacturing of coal gas. The benzol present in the gas produced can be recovered by passing through active charcoal and silica gel.

10. Which of the following oil is used in preparation of oil gas?

- a) Lubricating oil
- b) Naphtha
- c) Kerosene oil
- d) Coconut oil

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Answer: c

Explanation: Oil gas consists of a mixture of hydrocarbons. It is prepared by cracking of kerosene oil. Naphtha is used for the production of substitute natural gas.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on “Solid Fuels – 1”.

1. Which of the following fuel is formed from industrial waste?

- a) Lignite
- b) Briquetted fuel
- c) Spent tan
- d) Rice husk

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Answer: c

Explanation: Spent tan is a nuclear fuel that has been irradiated in a nuclear reactor. Rice husk is obtained from animal waste and briquetted fuel is compressed block of coal dust.

2. Which of the following industrial waste gas is used in creating jet fuel?

- a) Nitrogen di oxide
- b) Carbon monoxide
- c) Sulphur di oxide
- d) Hydrogen di sulphide

[View Answer](#)

Answer: b

Explanation: Carbon monoxide is fermented through gas fermentation which forms alcohols and then these alcohols formed are converted into jet fuel by the process of dehydration and hydrogenation.

3. Which of the following is a renewable energy resource?

- a) Coal
- b) Cow dung
- c) Charcoal
- d) Wood

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Answer: d

Explanation: Wood is obtained from trees and trees can be replanted easily, so they are a renewable form of energy. Examples of wood-pine, cedar etc.

4. From which alcohol does softwood lignin is derived?

- a) Coniferyl alcohol
- b) Sinapyl alcohol
- c) Ethyl alcohol
- d) 4, 3 tri butyl alcohol

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Answer: a

Explanation: Coniferyl alcohol is a phytochemical which is used as an intermediate in biosynthesis of eugenol. Sinapyl and Coniferyl alcohol can also be used in deriving hardwood lignin.

5. Which of the following fuel is preferred for space heating?

- a) Coal tar
- b) Diesel
- c) Hydrogen gas fuel
- d) Wood

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Answer: d

Explanation: Wood has high flame emissivity (ratio of the energy radiated from a material's surface to the energy radiated from black body at same temperature and wavelength) due to which it is used in space heating.

6. By which process does the wood charcoal is obtained?

- a) Destructive distillation
- b) Steam distillation
- c) Vacuum distillation
- d) Simple distillation

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Answer: a

Explanation: In destructive distillation the decomposition of the feedstock of wood is done by heating at high temperature. The wood charcoal so obtained is of good quality.

7. Which of the following does require wood charcoal for its production?

- a) Steel alloys
- b) Activated carbon
- c) Alloys of tin
- d) Plaster of Paris

[View Answer](#)

Answer: b

Explanation: Activated carbon finds extensive applications for decolourisation, adsorption of gases and vapours and recovery of solvents from gases and air.

8. Which type of coal is generated by the action of fungi and bacteria?

- a) Peat
- b) Bituminous
- c) Lignite
- d) Anthracite

[View Answer](#)

Answer: a

Explanation: It is considered as the first stage of conversion of vegetable debris into coal under water logged conditions by the action of fungi and bacteria. Peat is generally found in high altitude.

9. Which of the following country consist of the largest peat deposit?

- a) India
- b) Canada

- c) USA
- d) Russia

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Answer: d

Explanation: Russia contains 42% of world's peat deposits. Ireland also have a large peat content around 16.2 %.

10. Which of the following content does upland type of peat consist?

- a) Leaves
- b) Twigs
- c) Decomposed heaths and mosses
- d) Sedges and grasses

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Answer: c

Explanation: Upland peat is at the top of the peat which only consists of dead material which are decomposed heaths and mosses.

11. What happens when we carbonise peat?

- a) Charcoal is produced
- b) Coke is produced
- c) Peat is converted into lignite
- d) Peat is converted into bituminous

[View Answer](#)

Answer: b

Explanation: Under proper conditions of temperature and pressure if we carbonise peat then coke and gas is produced. But at low temperatures chars, oils and light spirit are formed.

12. For what purpose does the dried peat is used?

- a) Thermal insulation
- b) Liquid purification
- c) Destructive distillation
- d) For production of calcium carbide

[View Answer](#)

Answer: a

Explanation: Thermal insulation is the reduction of heat transfer between objects in the

range of radiative influence. Dried peat is also used as fuel for steam raising and gas purification.

13. How much moisture content is present in lignite?

- a) 60-75%
- b) 10-25%
- c) 35-50%
- d) 75-100%

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Answer: c

Explanation: Lignite moisture can be brought down to a level of 10-15%. Peat can contains 90% moisture in it.

14. From which of the mining technique lignite can be extracted?

- a) Open cast mining
- b) High wall mining
- c) Drift mining
- d) Slope mining

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Answer: a

Explanation: Open cast mining is used when deposits of commercially used minerals are near the surface of the earth. It is a type of surface process.

15. Which of the following coal have highest volatile matter?

- a) Peat
- b) Lignite
- c) Bituminous
- d) Anthracite

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Answer: b

Explanation: Lignite burns with long smoky flame which states that it contains high volatile matter. Lignite absorbs oxygen readily on exposure to air.

This set of Engineering Chemistry written test Questions & Answers focuses on “Solid Fuels – 2”.

1. In which area/city of India highest lignite deposits are present?

- a) Travancore
- b) Rajasthan
- c) Neyveli
- d) Malabar coast

[View Answer](#)

Answer: c

Explanation: The deposits of lignite in Neyveli are estimated to be about 200 million tonnes. The Neyveli project is under the Lignite Corporation of India which produces millions of tonnes of lignite in India.

2. Which of the following lignite is black in colour?

- a) Earthy coal
- b) Laminated coal
- c) Wood coal
- d) Australian Morewell coal

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Answer: b

Explanation: Schist is a type of laminated lignite coal which when extracted is of black colour rather than brown. The Australian morewell coal is brown in colour and is found in the hazelwood power station in Victoria, Australia.

3. Which product is obtained after the distillation of bituminous coal?

- a) Coal tar
- b) Coke
- c) Charcoal
- d) Coal gas

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Answer: a

Explanation: Bituminous coal burns with a smoky yellow flame which on distillation gives coal tar which is bituminous in nature. Charcoal is produced by the destructive distillation of wood and coke is formed by the carbonisation of peat under certain conditions of temperature and pressure.

4. What amount of carbon is present in sub-bituminous coal in percentile?

- a) 60-75%
- b) 85-90%
- c) 90-93%
- d) 75-83%

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Answer: d

Explanation: These coal are harder than lignite, they are black in colour and possess a dull waxy lustre. The bituminous coal contains 78-90% of carbon in them where as the semi-bituminous coal contains 90-93 % of carbon.

5. Which of the following coal is used widely in the world?

- a) Peat
- b) Lignite
- c) Bituminous

d) Anthracite

[View Answer](#)

Answer: c

Explanation: The largest deposits are of bituminous coal in the earth, its extraction is easier than that of anthracite coal and it does have a moderate ignition temperature. Lignite deposits are also present in large quantities but its ignition temperature is low and that of peat is extremely low.

6. Which of the following forms a group between bituminous coal and anthracite?

- a) Semi-bituminous coal
- b) Sub-bituminous coal
- c) Semi-anthracite coal
- d) Anthracite coal

[View Answer](#)

Answer: a

Explanation: Semi-bituminous have both the characteristics of bituminous coal and anthracite, their carbon content is around 90-93%. The sub-bituminous coal forms a group between lignite and bituminous coal and contains 75-83 % carbon in them.

7. Which of the following areas of bituminous coal have high volatile matter?

- a) Gondwana
- b) Neyveli
- c) Nilgiri hills
- d) Raniganj

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Answer: d

Explanation: The Raniganj coal mines have a total coal reserve of 49.17 billion tonnes which are spread across West Bengal and Jharkhand. It was established in 1975. The Neyveli coal field contains lignite in high quantities and Gondwana coal fields also contain bituminous coal. The Nilgiri Hills have deposits of peat in them.

8. Anthracite coal have a conchoidal fracture.

- a) True
- b) False

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Answer: a

Explanation: Conchoidal fracture represents the way in which a brittle material break with making ripples. Anthracite coal forms a layer due to this fracture. This type of fractures are not formed in other types of coals which include peat, lignite and bituminous coal respectively.

9. Which colour flame does anthracite produces?

- a) Yellow
- b) Blue

- c) Black
- d) Colourless

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Answer: b

Explanation: Due to the low percentage of volatile matter present in anthracite, it produces a very little flame which is blue in colour and is non-smoky. The bituminous coal produces a yellow smoky flame.

10. Why does anthracite is used in drying mal and hops?

- a) Due to its high calorific value
- b) Due to its low volatile matter
- c) Due to low arsenic content present in it
- d) Due to high carbon content present in it

[View Answer](#)

Answer: c

Explanation: Anthracite contains less than 1 % of arsenic due to which it does not affect on the properties of mal and hops during their drying. Due to this reason we do not use semi-bituminous coal for drying mal and hops.

11. Which of the following anthracite coal is used in steel making?

- a) High grade
- b) Standard grade
- c) Ultra high grade
- d) Semi high grade

[View Answer](#)

Answer: a

Explanation: Due to the presence of high carbon content in high grade anthracite, it is used for making steel. Standard grade anthracite is used as domestic fuel in industrial power generation. Ultra high grade anthracite coal are also known as smokeless coal.

12. Which area of India consists of high anthracite content?

- a) Madhya Pradesh
- b) Neyveli
- c) Nilgiri
- d) Darjeeling

[View Answer](#)

Answer: d

Explanation: The Dalingkot coal fields near the foothills of Darjeeling are rich in anthracite deposits. In Madhya Pradesh bituminous deposits are present, which are part of Singrauli coal fields.

13. Why is the calorific value of anthracite less than that of semi-bituminous coal?

- a) Due to high carbon content in it
- b) Due to decrease in hydrogen content

- c) Due to decrease in nitrogen content
- d) Due to decrease in the content of volatile matter

[View Answer](#)

Answer: b

Explanation: Calorific value is directly proportional to the percentile of hydrogen and it does not depend on the percentile of nitrogen. The volatile matter also does not affect the calorific value as they are not obtained after complete combustion.

14. Semi-bituminous coal are harder than anthracite coal.

- a) True
- b) False

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Answer: b

Explanation: Anthracite are the highest grade of coal which consists of 93-98 % carbon is the hardest of all the coal. It has low volatile content. Semi-bituminous coal are softer than anthracite but harder than bituminous coal.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on “Secondary Solid Fuels – 1”.

1. Which of the following is a secondary solid fuel?

- a) Wood
- b) Charcoal
- c) Peat
- d) Anthracite

[View Answer](#)

Answer: b

Explanation: The fuels which are obtained from the solid fuels are called as secondary solid fuel. Charcoal is produced by the destructive distillation of wood. It is in the form of residue. Coke is also a secondary solid fuel.

2. By which type of coal does briquettes are made?

- a) High grade fuel
- b) Ultra high grade coal
- c) Low grade fuel
- d) High grade coal

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Answer: c

Explanation: Briquettes are made by compressing low grade coal with or without binder (5-8% of coal tar or molasses). It helps us to utilize small-sized waste coal produced in mining and hence likely to be an important method as the best coal seems to get depleted.

3. How can we remove volatile matter from briquettes?

- a) By baking them
- b) By cooling them
- c) By heating them
- d) By applying some extra pressure

[View Answer](#)

Answer: a

Explanation: The briquettes produced by mixing of the binder are baked to remove volatile matter present in it. Removing volatile matter from them will increase their calorific value to a certain point.

4. Which product is formed after the process of carbonisation?

- a) Charcoal
- b) Coal tar
- c) Coal gas
- d) Coke

[View Answer](#)

Answer: d

Explanation: When the lignite coal is strongly heated out of contact with air, then coke is formed. Coke is used to smelt iron in the blast furnace process. It has the highest amount of carbon present in it.

5. Which type of coal gets soften on heating?

- a) Caking coal
- b) Coking coal
- c) Anthracite
- d) Semi-bituminous

[View Answer](#)

Answer: a

Explanation: On heating caking coal it gets soften producing a pasty mass which fuses together yielding coherent masses impervious to air. Coals that contains less pasty material are either non-caking or less caking in nature.

6. If the coke formed from the residue of the caking coal is hard, porous and strong then it is called coking coal.

- a) True
- b) False

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Answer: a

Explanation: The so less caking material obtained from the caking coal is coke. All coking coals are caking coals but all caking coals are not coking coals.

7. Which of the following should be present in least amount, so as to give a good metallurgical coke?

- a) Ash content
- b) Moisture content
- c) Volatile matter
- d) Sulphur and phosphorous content

[View Answer](#)

Answer: d

Explanation: Sulphur and phosphorous content in the coke can contaminate the metal and adversely affect its properties. They tend to make the metal brittle. Sulphur content should not be less than 0.5% and phosphorous 0.1%. Moisture should be less than 4% and ash content less than 6%.

8. Why should be a metallurgical coke porous in nature?

- a) To increase its calorific value
- b) To provide contact between carbon and oxygen
- c) To decrease its ash content
- d) For its easy storage

[View Answer](#)

Answer: b

Explanation: When the metallurgical coke is porous then it becomes easy for the carbon present in it to make contact with oxygen so that the combustion process can be done efficiently of the fuel in the furnace. It increases the rate of combustion.

9. What happens when coke breaks into fine particles during the charging of the furnace?

- a) It increases the rate of combustion
- b) It cools down the temperature of furnace
- c) It chokes the air passages
- d) It stops the whole process

[View Answer](#)

Answer: c

Explanation: When the coke break downs into fine particles, it hinders the flow of gases and choke the air passages. This happens due to the incomplete combustion of coke since it is broken into small pieces.

10. Why can coal not be used as a metallurgical fuel?

- a) Because of its less purity
- b) Due to its high calorific value
- c) Due to the high cost of it
- d) Due to the presence of less impurities

[View Answer](#)

Answer: a

Explanation: Coal does not have necessary purity, porosity and strength. Coal can be used as metallurgical fuel only in reverberatory furnaces. This leads to incomplete combustion, thus affecting the metallurgical processes.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Liquid Fuels".

1. How can we obtain liquid coal synthetically?

- a) Carbonisation of coal
- b) Hydrogenation of coal
- c) By heating of coal
- d) By cooling of coal

[View Answer](#)

Answer: b

Explanation: Highly volatile bituminous coal is used for the hydrogenation process. The hydrogenation of bituminous coal produces liquid hydrocarbons which have a number of uses in many processes. It is obtained by the Bergius process.

2. In which processes does the low boiling fractions of petroleum are used?

- a) Petrol engines
- b) Diesel engines
- c) Oil fired furnaces
- d) Kerosene engines

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Answer: a

Explanation: At low boiling fractions of petroleum least amount of impurities are left and since the efficiency petrol engine decreases with the increase in the amount of impurities, these fractions are used in petrol engines. At high boiling fractions, diesel engines and oil fired furnaces are used.

3. Which of the following fuel requires less storage space?

- a) Methane gas
- b) Coal
- c) Cow dung
- d) Kerosene

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Answer: d

Explanation: Liquid fuels require less storage space as compared to solid and gaseous fuel. Kerosene weigh 30% less and occupy 50% less space than coal of equal heating value. Gaseous fuel are weigh very less, but their storage requires a big space.

4. Liquid fuels leave ash content after burning.

- a) True
- b) False

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Answer: b

Explanation: Both liquid and gaseous fuel does not produce ash content after burning as solid fuel. The problem of clinker formation is totally absent in case of liquid fuel.

5. Which type of combustion is seen in liquid fuel?

- a) Uniform and complete combustion
- b) Non-uniform and complete combustion
- c) Uniform and incomplete combustion
- d) Non-uniform and incomplete combustion

[View Answer](#)

Answer: a

Explanation: The rate of combustion in the case of liquid fuels can be controlled easily. Also since there is no ash generation in liquid fuel, it undergoes complete combustion.

6. Which of the following fuel does not requires excess air for its combustion?

- a) Coal
- b) Cow-dunk cake
- c) Diesel
- d) Charcoal

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Answer: c

Explanation: Liquid fuel such as diesel does not require excess air for their combustion, they normally start combustion on catching fire where as in solid fuels excess air is required for the process of combustion. Pulverised coal does not require excess air for combustion.

7. Liquid fuel produces _____ odours on incomplete combustion.

- a) Pleasant
- b) Unpleasant
- c) No odours
- d) Fruity

[View Answer](#)

Answer: b

Explanation: Sometimes due to the presence of impurities, incomplete combustion of liquid fuel occurs which produces very unpleasant odours which can also be hazardous for health. For this process purification method is used.

8. What happens when liquid fuels evaporate?

- a) It increases its calorific value
- b) It reduces the impurities present in it
- c) It increase the ash content present in it
- d) It makes losses and leakages in the container

[View Answer](#)

Answer: d

Explanation: The containers in which the liquid fuels are stored are made of special material

due the possibility of losses due to evaporation and leakage in the containers. The liquid fuels cannot be stored in containers for long time.

9. Which kind of liquid fuels are risky to store?

- a) Flammable and volatile
- b) Inflammable and volatile
- c) Flammable and non-volatile
- d) Inflammable and non-volatile

[View Answer](#)

Answer: b

Explanation: If the temperature of the surrounding increases to a high value, then the inflammable liquid fuels will burn quickly. And the presence of volatile matter will cause the liquid fuels to burn with long flames.

10. Which kind of burners are used for efficient combustion of liquid fuels?

- a) Wesman burner
- b) Dual-fuel burner
- c) Oil burners
- d) Pressure jet burner

[View Answer](#)

Answer: a

Explanation: Wesman burner is used for high efficiency combustion of both liquid and gaseous fuel. Special types of sprayers are also used for efficient combustion of liquid fuels.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Liquified Petroleum Gas (LPG)".

1. At normal ambient temperature and atmospheric pressure, in which form LPG is obtained?

- a) Solid
- b) Gaseous
- c) Liquid
- d) Solid-liquid

[View Answer](#)

Answer: b

Explanation: LPG is a certain mixture of light hydrocarbons derived from petroleum. At normal temperature and pressure it is in gaseous state and later on it is condensed to the liquid state by the application of moderate pressure.

2. Under which compound name does the liquid petroleum gas (LPG) are sold?

- a) Urea
- b) Ethylene
- c) Benzoyl peroxide

d) Butane

[View Answer](#)

Answer: d

Explanation: Propane and butane are present in the largest amounts in LPG. Small quantities of ethane, pentane, ethylene and pentene are also present. Under trade names it is represented as HP, Bharat gas and Indian gas in India.

3. By which process only saturated hydrocarbons are obtained in LPG?

- a) Straight distillation
- b) Thermal Cracking
- c) Hydrocracking
- d) Reforming

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Answer: a

Explanation: The LPG obtained from heavier hydrocarbons by straight distillation process only contains saturated hydrocarbons, where as the LPG obtained from Thermal cracking or hydrocracking contains both saturated and unsaturated hydrocarbons.

4. Which type of LPG is mostly produced in Indian refineries?

- a) Grade A
- b) Grade B
- c) Grade C
- d) Grade D

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Answer: b

Explanation: According to the Bureau of Indian Standards, grade B contains a mixture of butane and propane. This type of LPG are supplied for domestic uses.

5. According to the Bureau of Indian Standards which type of LPG only contains butane in them?

- a) Grade A
- b) Grade B
- c) Grade C
- d) Grade D

[View Answer](#)

Answer: a

Explanation: Grade A consist predominantly of butanes, butylene or mixture of butanes and butylene's. This type of LPG are most suitable for use due to their moderate rate of combustion.

6. In which regions does the LPG containing propane are found?

- a) Hotter region
- b) Monsoon region
- c) Colder region

d) Terrestrial region

[View Answer](#)

Answer: c

Explanation: LPG containing propane is found in the colder region due to less temperature and pressure conditions. These are found towards the north pole of the earth.

7. Liquid petroleum gas (LPG) is corrosive to steel.

a) True

b) False

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Answer: b

Explanation: The sulphur and phosphorous content in LPG are very low due to which these are non-corrosive to steel. This type of fuel is used in industries having large steel supplies.

8. What happens when LPG is inhaled in large concentrations?

a) It kills a person

b) It increases a person's eye sight

c) It does not have any effect on person's health

d) It causes a little anaesthesia

[View Answer](#)

Answer: d

Explanation: Butane and propane are present in large amount in LPG. If inhaled in large quantities, it becomes anaesthetic which can cause a person to fall after some time.

9. What is the odour of Liquid Petroleum Gas (LPG)?

a) It is odourless

b) Fruity smell

c) Undesirable odour

d) Alcoholic smell

[View Answer](#)

Answer: a

Explanation: LPG does not have a characteristic odour. Highly odorous compounds such as ethyl and propyl mercaptans are deliberately mixed so as to help in the detection of any accidental leakage.

10. In which type of industries LPG is used as a fuel?

a) Steel industries

b) Plastic Industries

c) In the production of olefins

d) In the production of coal gas

[View Answer](#)

Answer: c

Explanation: LPG is used as a feedstock for the manufacturing of olefins by the process of pyrolysis. It is also used as a domestic fuel for internal combustion engines.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Knocking".

1. Which compound of fuel is oxidised in the process of knocking?

- a) Coke
- b) Gasoline
- c) Hydrocarbon
- d) Compounds containing sulphur

[View Answer](#)

Answer: c

Explanation: In an internal combustion engine, a mixture of air and petrol vapour is compressed and ignited by an electric spark and the essential chemical reaction is the oxidation of the hydrocarbon molecules.

2. On what factor does the rate of oxidation of a hydrocarbon molecule depend?

- a) On the calorific value of the compound
- b) On the number of carbon atoms
- c) On the rate of combustion
- d) On its moisture content

[View Answer](#)

Answer: b

Explanation: The rate of oxidation of a hydrocarbon molecule depends on the number of carbon atoms in the molecule, on the structure and on the temperature. The rate of oxidation should be moderate.

3. How will be the knocking sound produce in an engine?

- a) Due to an increase in the rate of oxidation of hydrocarbon
- b) Due to a decrease in the rate of oxidation of hydrocarbon
- c) Due to the impurities present in fuel
- d) Due to an increase in the percentile of ethanol molecule

[View Answer](#)

Answer: a

Explanation: In the mixture of air and petrol vapour, there occurs a condition when the rate of oxidation increases to such a value that it starts producing sound in the engine which are called a knock. This decreases the octane rating of gasoline.

4. On what factor does the temperature of the engine depend?

- a) Rate of oxidation
- b) Size of the engine
- c) Compression ratio of the engine

d) Fuel used in the engine

[View Answer](#)

Answer: c

Explanation: Compression ratio is the ratio of the cylinder volume at the end of the suction stroke to the volume at the end of the compression stroke of the piston. Rate of oxidation is depended on the temperature.

5. The power output of engine increases continuously with an increase in the compression ratio.

a) True

b) False

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Answer: b

Explanation: With the help of a variable compression engine, in actual practice, the power increases to a maximum value and then falls rapidly with a further increase in the compression ratio.

6. At what value of compression ratio, a knock can be heard?

a) At the minimum value

b) At the maximum value for power output

c) At the maximum value above the power output

d) In between of lowest and highest value

[View Answer](#)

Answer: c

Explanation: The compression rate, corresponding to the maximum power output is known as a useful compression ratio at which a slight metallic knock can be heard. This knock becomes louder when the compression ratio goes on increasing.

7. Which of the following compound produces the least knocking?

a) Benzyl

b) Paraffin

c) Olefin

d) Diesel

[View Answer](#)

Answer: a

Explanation: Aromatic compounds produces least knocking due to their cyclic structures. Straight chain hydrocarbons produces more knocking due to this effect.

8. How is the knocking tendency increased?

a) Due to the compression ratio of the engine

b) Due to size of the engine

c) Due to the decrease in the engine speed

d) Due to a defect in an engine

[View Answer](#)

Answer: c

Explanation: The knocking tendency is increased by reducing the engine speed and by advancing the ignition of the engine. The engine should work in its original way.

9. Which of the following compound has the least knocking properties?

- a) n-heptane
- b) n-hexane
- c) n-pentane
- d) n-butane

[View Answer](#)

Answer: d

Explanation: The anti-knock properties decreases with an increase in the length of the hydrocarbon chain. The octane number of n-butane, n-pentane, n-hexane and n-heptane are 90, 60, 29 and 0 respectively.

10. Olefins have higher anti-knocking properties than the corresponding _____

- a) Paraffin
- b) Benzene
- c) Toluene
- d) Nitrobenzene

[View Answer](#)

Answer: a

Explanation: The anti-knocking tendency increases as the position of a double bond approaches the centre of the chain. Paraffin consists of a single bond and are straight chained due to which they are less anti-knocking than olefins.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Anti Knocking Agents – 1".

1. How can we increase the octane rating of gasoline?

- a) By addition of fuel of low anti-knock value
- b) By addition of fuel of high anti-knock value
- c) By adding a product of high cetane rating
- d) By heating of the fuel

[View Answer](#)

Answer: b

Explanation: Compounds such as casing-head gasoline, cracked and reformed gasoline, benzol and alcohol are added to increase the octane rating of the fuel. The more will be the octane rating, the less will be the knocking in the engine.

2. Which compound is usually added to decrease the knocking in the engine?

- a) Sulphur

- b) Phosphorous
- c) Tetra ethyl lead
- d) Vanadium penta-oxide

[View Answer](#)

Answer: c

Explanation: The anti-knocking properties of gasoline are usually increased by adding tetra ethyl lead and the process is called as doping. The molecular formula of tetra ethyl lead is $\text{Pb}(\text{C}_2\text{H}_5)_4$.

3. What is the specific gravity of tetra ethyl lead (TEL)?

- a) 1.09
- b) 1
- c) 1.97
- d) 1.62

[View Answer](#)

Answer: d

Explanation: Tetra ethyl lead is a colourless liquid with sweet odour. Specific gravity is the ratio of the mass of a substance to the mass of a reference substance for the same given value. 1.09 is the specific gravity of water.

4. How much ml of tetra ethyl lead (TEL) is added to aviation petrol?

- a) 1 ml/litre
- b) 0.5 ml/litre
- c) 2 ml/ litre
- d) 3 ml/litre

[View Answer](#)

Answer: a

Explanation: About 0.5 ml of TEL per litre is added for motor spirits and about 1ml of TEL per litre is generally added for aviation petrol. Tetra ethyl lead is highly poisonous in nature.

5. Gasoline containing TEL is colourless to indicate its poisonous nature.

- a) True
- b) False

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Answer: b

Explanation: Some colour is added to gasoline to differ from the gasoline, which does not contain TEL, since TEL is poisonous in nature and has to be use safely. TEL should be added safely to gasoline as it can enter the body through cut or bruise.

6. At what temperature does TEL (tetra ethyl lead) starts getting decomposed?

- a) 500 °C
- b) 100 °C
- c) 900 °C

d) 200 °C

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Answer: d

Explanation: TEL (tetra ethyl lead) starts to boil at 200 °C and also starts getting decomposed. At this time it is added to gasoline, so that it can mix uniformly.

7. At most how much ml of TEL can be added, so as to increase the octane rating of aviation fuel?

- a) 15 ml per gallon
- b) 9 ml per gallon
- c) 7 ml per gallon
- d) 5 ml per gallon

[View Answer](#)

Answer: c

Explanation: Generally no applicable increase in octane number can be obtained by using more than 7 ml of TEL per gallon. Hence, not more than 7 ml of TEL per gallon are added for aviation fuel.

8. How is knocking produced in a petrol engine?

- a) Due to the size of the engine
- b) Due to spontaneous combustion in the engine
- c) Due to the presence of less impurities in the fuel
- d) Due to the parts of the engine

[View Answer](#)

Answer: b

Explanation: Knocking in petrol engine is due to the spontaneous ignition of the last positions of the compressed mixture of petrol and air. This process of ignition of the mixture relatively slows the induction period.

9. What is the work of TEL in addition in petrol engine?

- a) It increases its induction period by 200-300 %
- b) It decreases the induction period by 50 %
- c) It increases the induction period by 50-100 %
- d) It increases the induction period by 400-500 %

[View Answer](#)

Answer: a

Explanation: The addition of TEL increases the induction period of the petrol engine by 200-300 % by interaction with the free radicals whereby lead oxide is produced. As soon as the explosive combustion occurs, the lead oxide is rapidly reduced to metallic lead.

10. Which of the following compound is added to the petrol engine to overcome the problems caused by tetra ethyl lead (TEL)?

- a) Methylene dibromide
- b) Ethylene dibromide

c) Propylene dibromide

d) Butylene dibromide

[View Answer](#)

Answer: b

Explanation: Lead is formed as the final product after adding TEL in the petrol engine which is kind of hazardous in nature. To overcome this problem ethylene dibromide is added to the petrol engine so that the product obtained is lead bromide, which is swept out with the exhaust gases.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Octane and Cetane Number".

1. Which of the following compound is considered for calculating the octane number?

a) n-heptane

b) n-hexane

c) iso-octane

d) iso-butane

[View Answer](#)

Answer: c

Explanation: The octane number of a fuel is numerically taken as the percentage of iso-octane in a mixture of iso-octane and n-heptane. The octane number of iso-octane is 100 and of n-heptane is 0.

2. Which of the following compound readily goes under the process of knocking?

a) 2-ethyl butane

b) n-heptane

c) benzene

d) toluene

[View Answer](#)

Answer: b

Explanation: n-heptane is a straight chain hydrocarbon which knocks readily and hence its octane number is zero. Presence of straight chain hydrocarbon in gasoline reduces its rate of combustion.

3. Which of the following compound is considered for calculating the cetane number?

a) α -methyl naphthalene

b) n-hexane

c) iso-octane

d) cetane molecule

[View Answer](#)

Answer: d

Explanation: Cetane, $C_{16}H_{34}$, is a saturated hydrocarbon that has a very short ignition lag as

compared to any commercial diesel fuel. Its cetane number is 100. Cetane number is the percentile of cetane in a mixture of cetane and α -methyl naphthalene.

4. What should be the cetane number of middle speed diesel engine?

- a) At least 35
- b) At least 25
- c) At least 65
- d) At least 45

[View Answer](#)

Answer: a

Explanation: The cetane number of high speed diesel engine should be at least 45, that of middle speed diesel engine should be at least 35 and that of low speed diesel engine should be at least 25.

5. The knocking characteristic of gasoline fuel are expressed in terms of cetane number.

- a) True
- b) False

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Answer: b

Explanation: The knocking characteristics of diesel fuel are expressed in terms of cetane number and that of gasoline fuel is expressed in terms of octane number. The molecule with the highest octane number has a least cetane number.

6. Which of the following substance is used to decrease knocking in diesel fuel?

- a) Tetra ethyl lead
- b) Benzene
- c) Sodium hydroxide
- d) Acetone peroxide

[View Answer](#)

Answer: d

Explanation: The knocking in diesel fuel can be reduced by adding substances like ethyl nitrite, ethyl nitrate, isoamyl nitrate etc. This process also increases the cetane number of diesel fuel.

7. Which of the following is used to reduce the surface tension in diesel fuel?

- a) Chemical additives
- b) Inhibitors
- c) Poly hydrocarbon
- d) Dopes

[View Answer](#)

Answer: a

Explanation: Chemical additives are used to reduce surface tension thus promoting the formation of finer spray. Inhibitors are used to delay or prevent gum formation. Poly hydrocarbons are used to preserve the fluid properties.

8. By which process does the knocking starts in diesel engine?

- a) Due to sudden spontaneous combustion of last portion of fuel
- b) Due to delay in spontaneous combustion of last portion of fuel
- c) Due to the rise in temperature of diesel engine
- d) Due to the parts of diesel engine

[View Answer](#)

Answer: b

Explanation: Due to the presence of impurities in diesel, its spontaneous combustion of the last portion of fuel takes some time. Due to this their produces an uneven sound in the engine which is called knocking.

9. Which of the following exhaust gas produces least harmless components after its combustion?

- a) Carbon monoxide
- b) Ethyne
- c) NO_x
- d) N_2

[View Answer](#)

Answer: d

Explanation: Gases produced by the compression ignition engines are said to be exhaust gases. This engines operate with air-fuel ratios of 14:1 on load and 70:1 on idling.

10. Which of the following has the highest cetane number?

- a) n-heptane
- b) n-hexane
- c) n-pentane
- d) n-butane

[View Answer](#)

Answer: a

Explanation: n-heptane has maximum branched atom due to which it has the highest cetane number of all. This fuel is good for diesel engines.