

# ENGINEERING CHEMISTRY

## POLYMERS

**This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on “Polymerization”.**

1. Which type of polymer will be formed if the substituent group is  $-\text{C}_6\text{H}_5$ ?

- a) Polythene
- b) Polypropylene
- c) Polystyrene
- d) Polyvinyl chloride

2. Select the incorrect statement from the following option.

- a) Addition polymerisation requires the presence of double bond in monomer
- b) No by-product is formed in addition polymerisation
- c) In addition polymerisation, growth of chain is at one active centre
- d) In addition polymerisation, polymer MW rises steadily throughout the reaction

[View Answer](#)

Answer: d

Explanation: In addition polymerisation, high MW polymer is formed at once. All the other options are correct. Addition polymerisation requires the presence of a double bond in monomer and no by-product is formed. In addition polymerisation, growth of chain is at one active centre.

3. Select the incorrect statement from the following option.

- a) Condensation polymerisation requires two reactive functional groups to be present at both ends of the monomer
- b) No by-product is formed in condensation polymerisation
- c) In condensation polymerisation, growth of chain occurs at minimum of the two active centres
- d) In condensation polymerisation, polymer MW rises steadily throughout the reaction

[View Answer](#)

Answer: b

Explanation: Generally a by-product is formed in condensation polymerisation. All the other options are correct.

Condensation polymerisation requires two reactive functional groups to be present at both ends of the monomer and growth of chain occurs at a minimum of the two active centres. In condensation polymerisation, polymer MW rises steadily throughout the reaction.

4. The Ziegler Natta catalyst is formed between \_\_\_\_\_

- a) Triethyl aluminium and titanium halide
- b) Triethyl aluminium and silver halide
- c) Triethyl aluminium and platinum halide
- d) Triethyl aluminium and carbon halide

[View Answer](#)

Answer: a

Explanation: The Ziegler Natta catalyst is formed between triethyl aluminium and titanium halide. It is named after Karl Ziegler and Giulio Natta, used in the synthesis of polymers of 1-alkenes (alpha-olefins).

5. The co-polymers having branched structures in which the monomer segments on the backbone and branches differ are called \_\_\_\_\_

- a) Alternate
- b) Graft
- c) Random
- d) Block

[View Answer](#)

Answer: b

Explanation: The co-polymers having branched structures in which the monomer segments on the backbone and branches differ are called graft.

6. Which of the following act as an initiator in free-radical polymerisation?

- a) Grignard reagent
- b) Lewis acids
- c) Benzoyl peroxide
- d) Potassium amide

7. Which of the following act as a catalyst in anionic polymerisation?

- a) Grignard reagent
- b) Lewis acids
- c) Benzoyl peroxide
- d) AIBN

8. The temperature at which the ionic polymerisation is carried out is \_\_\_\_\_

- a) 100°C

- b) 50°C
- c) -100°C
- d) 0°C

Answer: d

Explanation: The temperature at which the ionic polymerisation is carried out is 0°C. Ionic polymerization is a chain-growth polymerization in which active centers are ions or ion pairs.

9. Radical polymerisation is not sensitive to changes in the polarity.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Radical polymerisation is not sensitive to changes in the polarity. Free radical polymerization is a method of polymerization by which a polymer forms by the successive addition of free radical building blocks.

10. Which of the following monomer cannot be polymerised by radical polymerisation?

- a) Butadiene
- b) Isobutylene
- c) Vinyl chloride
- d) Acrylates

[View Answer](#)

Answer: b

Explanation: Isobutylene monomer can be polymerised by cationic polymerisation. Butadiene, vinyl chloride and acrylates can be polymerised by radical polymerization.

11. The polymerisation in which propagating centers do not undergo either transfer or termination reactions is called \_\_\_\_\_

- a) Addition polymerisation
- b) Co-polymerisation
- c) Living polymerisation
- d) Dead polymerization

[View Answer](#)

Answer: c

Explanation: The polymerisation in which propagating centers do not undergo either transfer or termination reactions is called living polymerisation. Polymerization is a process of

reacting monomer molecules together in a chemical reaction to form polymer chains or three-dimensional networks.

12. In esterification, the nucleophile is \_\_\_\_\_ and the leaving group is \_\_\_\_\_

- a) Alcohol, ester
- b) Ester, alcohol
- c) Water, alcohol
- d) Alcohol, water

[View Answer](#)

Answer: d

Explanation: In esterification, the nucleophile is alcohol and the leaving group is water. Esterification is the general name for a chemical reaction in which two reactants (typically an alcohol and an acid) form an ester as the reaction product.

13. The reverse of esterification is \_\_\_\_\_

- a) Hydrolysis
- b) Condensation
- c) Polymerisation
- d) Centrifugation

[View Answer](#)

Answer: a

Explanation: The reverse of esterification is hydrolysis. Hydrolysis is a reaction involving the breaking of a bond in a molecule using water. The reaction mainly occurs between an ion and water molecules and often changes the pH of a solution.

14. Which of the following is used for making cold drink bottles, magnetic recording tapes and housings for coffee machines?

- a) Ethylene glycol
- b) Polyethylene terephthalate
- c) Hexamethylene diamine
- d) Styrene butadiene

[View Answer](#)

Answer: b

Explanation: Polyethylene terephthalate (PET) is used for making cold drink bottles, magnetic recording tapes and housings for coffee machines. PET consists of polymerized units of the monomer ethylene terephthalate, with repeating ( $C_{10}H_8O_4$ ) units and is commonly recycled.

15. Terephthalic acid and ethylene glycol undergo polyesterification to form PET.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Terephthalic acid and ethylene glycol undergo polyesterification to form PET. It is the most common thermoplastic polymer resin of the polyester family and is used in fibers for clothing, containers, etc.

### **This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on “Polymer Classification”.**

1. A polymer is any substance made up of many repeating units called \_\_\_\_\_

- a) Resins
- b) Plastic
- c) Mers
- d) Blocks

[View Answer](#)

Answer: c

Explanation: A polymer is any substance made up of many repeating units, building blocks called mers. Polymers are made up of many many molecules all strung together to form really long chains.

2. Small molecules which combine to form polymer are called \_\_\_\_\_

- a) Resins
- b) Monomers
- c) Plastic
- d) Blocks

[View Answer](#)

Answer: b

Explanation: Small molecules which combine with each other to form polymer are called monomers. Polymers are made up of many many molecules all strung together to form really long chains.

3. Select the incorrect statement from the following options.

- a) When in form ready for further working, polymers are called resins
- b) The chemical process leading to the formation of polymer is known as polymerisation
- c) The number of monomeric units contained in the polymer is called the degree of polymerisation

d) Due to their small size, polymers are also called micro-molecules

[View Answer](#)

Answer: d

Explanation: Due to their large size, polymers are also called macro-molecules. All the other options are correct. When in form ready for further working, polymers are called resins. The chemical process leading to the formation of polymer is known as polymerisation and the number of monomeric units contained in polymer is called degree of polymerisation.

4. Below threshold degree of polymerisation (DP), the polymer does not possess any strength and exist either as liquid resin or friable powder.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Below threshold degree of polymerisation, the polymer does not possess any strength and exist either as liquid resin or friable powder. The number of monomeric units contained in the polymer is called degree of polymerisation.

5. The optimum DP value of cellulose is \_\_\_\_\_

- a) 150
- b) 250
- c) 400
- d) 500

[View Answer](#)

Answer: b

Explanation: The optimum DP value of cellulose is 250. The number of monomeric units contained in the polymer is called degree of polymerisation (DP).

6. The functionality of ethylene glycol is \_\_\_\_\_

- a) 2
- b) 3
- c) 4
- d) 5

[View Answer](#)

Answer: a

Explanation: The functionality of ethylene glycol is 2. It is a colorless, odorless, viscous dihydroxy alcohol and has a sweet taste, but is poisonous if ingested.

7. Which of the following polymer is not classified under the category of configuration?

- a) Syndiotactic
- b) Atactic
- c) Cross-linked
- d) Isotactic

[View Answer](#)

Answer: c

Explanation: Cross-linked polymer is not classified under the category of configuration. Syndiotactic, atactic and isotactic are classified under the category of configuration. Tacticity is the relative stereochemistry of adjacent chiral centers within a macromolecule.

8. Which of the following is not an example of semi-crystalline polymer?

- a) HDPE
- b) Nylon
- c) Polyesters
- d) LDPE

[View Answer](#)

Answer: d

Explanation: LDPE is not an example of a semi-crystalline polymer. It is an example of a branched amorphous polymer. All the other options are examples of semi-crystalline polymer.

9. Styrene acrylonitrile is an example of \_\_\_\_\_

- a) Co-polymer
- b) Homopolymer
- c) Linear polymer
- d) Amorphous polymer

[View Answer](#)

Answer: a

Explanation: Styrene acrylonitrile resin is a copolymer plastic consisting of styrene and acrylonitrile. It is also known as SAN. It is widely used in place of polystyrene.

10. Which of the following polymer is not classified under the category of end use?

- a) Fibers
- b) Adhesives
- c) Elastomers
- d) Synthetic

[View Answer](#)

Answer: d

Explanation: Synthetic polymer is not classified under the category of end use. It is classified under the category of origin. Fibers, adhesives and elastomers are classified under the category of end use.

11. Select the incorrect statement from the following option.

- a) Thermosets are formed by condensation polymerisation reactions
- b) Thermosets have 3-D, cross-linked network structure

- c) Thermosets soften on heating and stiffen on cooling
- d) Thermosets are generally insoluble in any solvent

[View Answer](#)

Answer: c

Explanation: Thermosets do not soften on heating. All the other options are correct. Thermosets are formed by condensation polymerisation reactions, have 3-D, cross-linked network structure and are generally insoluble in any solvent.

12. Which one of the following is not an example of thermoplastic?

- a) Polyvinyl chloride
- b) Nylon
- c) Polyesters
- d) Epoxy

[View Answer](#)

Answer: d

Explanation: Epoxy is not an example of thermoplastic. It is an example of a thermoset polymer. Polyvinyl chloride, nylon and polyesters are examples of thermoplastic.

13. The weight average molecular weight for PP given its degree of polymerisation as 10,000 will be \_\_\_\_\_

- a) 3,00,000 gm/mol
- b) 4,20,000 gm/mol
- c) 6,70,000 gm/mol
- d) 8,40,000 gm/mol

[View Answer](#)

Answer: b

Explanation: The weight average molecular weight for PP given its degree of polymerisation as 10,000 will be 4,20,000 gm/mol.

14. The cryoscopy refers to \_\_\_\_\_

- a) Osmotic pressure measurement
- b) Elevation in boiling point measurement
- c) Freezing point depression measurement
- d) Increase in solubility measurement

[View Answer](#)

Answer: c

Explanation: The cryoscopy refers to freezing point depression measurement. A technique for determining the molar concentration of a solution by measuring the freezing point.



15. Higher molecular weight polymers are tougher and more heat resistant.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Higher molecular weight polymers are tougher and more heat resistant. Polymeric mixtures are far less miscible than mixtures of small molecule materials.

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

1. The thermoplastic is \_\_\_\_\_

- a) Cross-linked
- b) Insoluble
- c) Amorphous
- d) Held by a covalent bond

[View Answer](#)

Answer: c

Explanation: Thermoplastics are linear or branched, soluble in suitable solvents, amorphous or semi-crystalline and held together by weak vander waal's force or hydrogen bonds.

2. Which of the following is not an example of thermoplastic?

- a) Nylon
- b) Polyester
- c) PVC
- d) Vulcanised rubber

[View Answer](#)

Answer: d

Explanation: The examples of thermoplastic are nylon, polyester, PVC, PE, PP, PVA etc.

3. Polythene is prepared by the process of \_\_\_\_\_ polymerisation of ethylene.

- a) Addition
- b) Condensation
- c) Living
- d) Free-radical

Answer: a

Explanation: Polythene is prepared by the process of addition polymerisation of ethylene.

Polythene is of low strength, hardness and rigidity, but has a high ductility and impact strength as well as low friction.

4. LDPE is prepared by polymerising ethylene at a pressure of \_\_\_\_\_

- a) 100-200 atmospheres
- b) 1000-5000 atmospheres
- c) 10-100 atmospheres
- d) 2-10 atmospheres

[View Answer](#)

Answer: b

5. The crystallinity of LDPE is \_\_\_\_\_

- a) 10%
- b) 30%
- c) 55%
- d) 80-90%

[View Answer](#)

Answer: c

Explanation: The crystallinity of LDPE is low (55%). LDPE is defined by a density range of 0.910–0.940 g/cm<sup>3</sup>.

6. Select the incorrect statement from the following option.

- a) LDPE is chemically inert and has excellent chemical resistance
- b) LDPE is tough and flexible
- c) LDPE is used for making films in general packaging, carrier bags etc
- d) LDPE has high rigidity and is suitable for load bearing applications

[View Answer](#)

Answer: d

Explanation: LDPE has low rigidity and is not suitable for load bearing applications. All other options are correct.

7. LDPE is suitable for the manufacture of pipes for distribution of gas.

- a) True
- b) False

[View Answer](#)

Answer: b

Explanation: LDPE is not suitable for the manufacture of pipes for distribution of gas because it is permeable to gas molecules. LDPE is widely used for manufacturing various containers, dispensing bottles, wash bottles etc.

8. The ethylene is polymerised under in the presence of \_\_\_\_\_

- a) Zeigler Natta catalyst
- b) Supported metal oxide catalyst
- c) Lewis acids catalyst
- d) Friedel crafts catalyst

[View Answer](#)

Answer: a

Explanation: The ethylene is polymerised under 6-7 atmospheric pressure at 60-70°C in the presence of Zeigler Natta catalyst.

9. The softening temperature of HDPE is \_\_\_\_\_

- a) 20°C
- b) 85°C
- c) 135°C
- d) 150°C

[View Answer](#)

Answer: c

Explanation: The softening temperature of HDPE is 135°C. HDPE is known for its large strength-to-density ratio. The density of HDPE can range from 0.93 to 0.97 g/cm<sup>3</sup> or 970 kg/m<sup>3</sup>.

10. Select the incorrect statement from the following option.

- a) HDPE has excellent electrical insulation properties
- b) HDPE is free from odour and toxicity
- c) HDPE can be used for domestic water and gas piping
- d) HDPE possess lower tensile strength compared to LDPE

[View Answer](#)

Answer: d

Explanation: HDPE possess greater tensile strength compared to LDPE. All the other options are correct.

**This set of Engineering Chemistry Interview Questions and Answers focuses on “Thermoplastic Polymers – 2”.**

1. Which of the following act as a catalyst in the preparation of PVC?

- a) Lewis acid
- b) Benzoyl peroxide
- c) Potassium amide
- d) Grignard reagent

[View Answer](#)

Answer: b

Explanation: Benzoyl peroxide act as a catalyst in the preparation of PVC. The product of the polymerization process is unmodified PVC.

2. Select the incorrect statement from the following option.

- a) PVC is colourless, odourless and non-inflammable
- b) PVC has poor oil resistance and resistance to weathering
- c) PVC is used for making bottles for consumable liquids
- d) PVC has superior chemical resistance but is soluble in ethyl chloride

Answer: b

Explanation: PVC has excellent oil resistance and resistance to weathering. It is colorless, odourless and non-inflammable and is used for making bottles for consumable liquids. PVC has poor oil resistance and resistance to weathering.

3. The C-Cl dipole makes PVC a polymeric polar molecule.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: The C-Cl dipole makes PVC a polymeric polar molecule. PVC has excellent oil resistance and resistance to weathering. It is colorless, odourless and non-inflammable.

4. Plasticized PVC is not used for making \_\_\_\_\_

- a) Baby-pants
- b) Bathroom curtaining
- c) Pipes for drainage
- d) Garden hose

[View Answer](#)

Answer: c

Explanation: Plasticised PVC is not used for making pipes for drainage. It is used for making baby-pants, bathroom curtaining and garden hose.

5. Which of the following is also known as lucite?

- a) Teflon
- b) Polyvinyl acetate
- c) Polystyrene

d) Perspex

[View Answer](#)

Answer: d

Explanation: Perspex is also known as lucite. It is a solid transparent plastic made of polymethyl methacrylate.

6. Which of the following is used for making chewing gums?

- a) Perspex
- b) Polyvinyl acetate
- c) Teflon
- d) Polystyrene

[View Answer](#)

Answer: b

Explanation: Polyvinyl acetate is used for making chewing gums. It is also used in handicrafts, envelope and wallpaper adhesives.

7. Which of the following statement is incorrect about the Teflon?

- a) It has high density of the order 2.1 to 2.3 gm/cm<sup>3</sup>
- b) It has excellent electrical insulation properties
- c) It has high coefficient of friction
- d) It is dense and chemically inert

[View Answer](#)

Answer: c

Explanation: Teflon has very low coefficient of friction. All the other options are correct.

8. Which of the following is an application of Teflon?

- a) Coatings of frying pans
- b) Combs and brush handles
- c) Audio cassettes
- d) Optical fibres

[View Answer](#)

Answer: a

Explanation: Coatings of frying pans, non-lubricating bearings, wire and cable insulation etc are some of the applications of Teflon. It is also used as liners in hose assembly.

9. Polystyrene is prepared by \_\_\_\_\_ polymerisation of styrene.

- a) Condensation
- b) Free radical
- c) Anionic
- d) Cationic

[View Answer](#)

Answer: b

Explanation: Polystyrene is prepared by free radical polymerisation of styrene in the presence of benzoyl peroxide as catalyst.

10. The softening temperature of polystyrene is \_\_\_\_\_

- a) 10-20 °C
- b) 30-50 °C
- c) 80-100 °C
- d) 120-150 °C

[View Answer](#)

Answer: c

Explanation: The softening temperature of polystyrene is 80-100 °C. Polystyrene is a vinyl polymer. Structurally, it is a long hydrocarbon chain, with a phenyl group attached to every other carbon atom.

11. Due to the chain stiffening effect of a benzene ring, polystyrene is hard but brittle.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Due to chain stiffening effect of a benzene ring, polystyrene is hard but brittle. Polystyrene is also used for producing disposable plastic cutlery and dinnerware

12. Which of the following is an application of polystyrene?

- a) Insulators for motors
- b) Dome-shaped covers for solar collectors
- c) Laminates for printed circuitry
- d) Containers for talcum powder

[View Answer](#)

Answer: d

Explanation: Containers for talcum powder, combs and brush handles, audio cassettes etc are some of the applications of polystyrene. But it is not used as insulators for motors or covers for solar collectors.

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

1. The neighbouring polymeric chains in thermosets are held together by \_\_\_\_\_

- a) Vander Waal's force
- b) Hydrogen bond
- c) Covalent bond
- d) Electrovalent bond

[View Answer](#)

Answer: c

Explanation: The neighbouring polymeric chains in thermosets are held together by covalent bonds. A covalent bond is bond by the sharing of electrons and has good strength.

2. Select the incorrect statement from the following option.

- a) Thermosets have 3-dimensional, cross-linked network structure
- b) Thermosets cannot be remoulded, reused or reclaimed
- c) Thermosets are hard, strong and brittle
- d) Thermosets are soluble in suitable solvents

[View Answer](#)

Answer: d

Explanation: Thermosets are insoluble in any solvent. They have a 3-D cross-linked network structure and cannot be remoulded, reused or reclaimed. They are hard, strong and brittle.

3. Which of the following is not an example of thermosets?

- a) Epoxy
- b) Teflon
- c) Vulcanised rubber
- d) Bakelite

[View Answer](#)

Answer: b

Explanation: Epoxy, vulcanised rubber, Bakelite are some of the examples of thermosets. Teflon is not an example of thermosets. PTFE (Teflon) is best known for its use in coating non-stick frying pans and other cookware.

4. The condensation product of phenol and formaldehyde is known as \_\_\_\_\_

- a) Phenolic resins
- b) Urea formaldehyde resins
- c) Polyvinyl chloride
- d) Polystyrene

[View Answer](#)

Answer: a

Explanation: The condensation product of phenol and formaldehyde is known as phenolic resins or phenoplasts or PF resins. Phenoplasts include the expanded plastics obtained by introducing a blowing agent (foaming agent).

5. Which of the following condition is not true for the formation of Bakelite?

- a) Excess of phenol
- b) Excess of formaldehyde
- c) Acid catalyst
- d) Heat and curing agent

[View Answer](#)

Answer: b

Explanation: Excess of formaldehyde is not required for the formation of Bakelite. Excess of phenol is required in the formation of Bakelite and it also requires an acid catalyst and heat and curing agent.

6. Which of the following condition is not true for the formation of Resite?

- a) Excess of formaldehyde
- b) Base catalyst
- c) Acid catalyst
- d) Neutral or acidic conditions and heat

[View Answer](#)

Answer: c

Explanation: Acid catalyst is not used for the formation of the Resite. It requires a base catalyst and excess of formaldehyde. It also requires neutral or acidic conditions of heat.

7. Select the incorrect statement from the following option.

- a) Phenolic resins are hard, rigid and strong
- b) Phenolic resins have good abrasion resistance
- c) Phenolic resins are usually dark coloured, pinkish brown
- d) Phenolic resins have poor chemical resistance

[View Answer](#)

Answer: d

Explanation: Phenolic resins have good chemical resistance. All the other options are correct. Phenolic resins are hard, rigid and strong and have good abrasion resistance. They are usually dark coloured, pinkish brown.

8. Which of the following is not an application of phenolic resins?

- a) Finishing of cotton textiles
- b) Distributor heads of car
- c) Domestic plugs and switches
- d) Adhesives for grinding wheels

[View Answer](#)

Answer: a

Explanation: Distributor heads of car, domestic plugs and switches, adhesives for grinding wheels, etc are some of the applications of phenolic resins. It also includes the expanded plastics obtained by introducing a blowing agent (foaming agent).

9. Urea formaldehyde resins are used as adhesives for plywood and furniture.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Urea formaldehyde resins are used as adhesives for plywood and furniture. These resins are used in adhesives, finishes, particle board, MDF, and molded objects. UF



and related amino resins are considered a class of thermosetting resins of which urea-formaldehyde resins make up 80% produced globally.

10. Select the incorrect statement about the Urea formaldehyde resins from the following option.

- a) They are clear and colorless
- b) They have good adhesive characteristics
- c) They have low hardness and tensile strength than PF resins
- d) They have excellent abrasion resistance

[View Answer](#)

Answer: c

Explanation: Urea formaldehyde resins have a better hardness and tensile strength than PF resins. All the other options are correct. They are colorless, clear and have good adhesive characteristics and excellent abrasion resistance.

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

1. Which of the following is not the essential structural requirement of an elastomer?

- a) Long flexible chains
- b) Weak intermolecular forces
- c) Rigidity in structure
- d) Occasional cross-linking

[View Answer](#)

Answer: c

Explanation: Elastomers are a long flexible chain; they are not rigid in nature.

2. Natural rubber is \_\_\_\_\_

- a) Poly isoprene
- b) Ethylene glycol
- c) Butadiene
- d) Acrylonitrile

[View Answer](#)

Answer: a

Explanation: Natural rubber is poly (cis) isoprene. Malaysia is one of the leading producers of rubber.

3. The structural formula of isoprene is \_\_\_\_\_

- a) 2-benzyl-1,3-butadiene
- b) 2-methyl-1,3-butadiene
- c) 3-benzyl-1,2-butadiene

d) 3-methyl-1,2-butadiene

[View Answer](#)

Answer: b

Explanation: The structural formula of isoprene is 2-methyl-1,3-butadiene. It is a common organic compound with the formula  $\text{CH}_2=\text{C}(\text{CH}_3)-\text{CH}=\text{CH}_2$ . In its pure form, it is a colorless volatile liquid. Isoprene is produced by many plants.

4. Select the incorrect statement from the following option.

- a) Raw rubber is weak and have low tensile strength
- b) Raw rubber is attacked by oxidizing agent
- c) In organic solvents, it undergoes swelling and disintegration
- d) Raw rubber is durable

[View Answer](#)

Answer: d

Explanation: Raw rubber is not durable due to its oxidation in air. All the other options are correct.

5. The temperature at which raw rubber is heated for the vulcanisation process is \_\_\_\_\_

- a) 0-10 °C
- b) 10-50 °C
- c) 50-100 °C
- d) 100-140 °C

[View Answer](#)

Answer: d

Explanation: The temperature at which raw rubber is heated for the vulcanisation process is 100-140 °C. A typical vulcanization temperature for a passenger tire is 10 minutes at 177 °C.

6. In the vulcanisation process, the raw rubber is heated with \_\_\_\_\_

- a) Oxygen
- b) Sulphur
- c) Carbon
- d) Calcium

[View Answer](#)

Answer: b

Explanation: In the vulcanisation process, the raw rubber is heated with sulphur. It is a chemical process for converting natural rubber or related polymers into more durable materials via the addition of sulphur or other equivalent curatives or accelerators. These additives modify the polymer by forming cross-links (bridges) between individual polymer chains.

7. The amount of sulphur added determines the extent of stiffness of vulcanised rubber.

- a) True

b) False

[View Answer](#)

Answer: a

Explanation: The amount of sulphur added determines the extent of the stiffness of vulcanised rubber. This sulphur modify the polymer by forming cross-links (bridges) between individual polymer chains.

8. Select the incorrect statement from the following option.

- a) Vulcanised rubber has excellent resilience
- b) Vulcanised rubber has only slight tackiness
- c) Vulcanised rubber has high elasticity
- d) Vulcanised rubber has tensile strength 10 times more than raw rubber

[View Answer](#)

Answer: c

Explanation: Vulcanised rubber has low elasticity and decreases with the extent of vulcanisation. All the other options are correct.

9. The tensile strength(kg/cm<sup>2</sup>) of vulcanised rubber is \_\_\_\_\_

- a) 200
- b) 2000
- c) 500
- d) 5000

[View Answer](#)

Answer: b

Explanation: The tensile strength of vulcanised rubber is 2000 kg/cm<sup>2</sup>. Cross-linking introduced by vulcanization prevents the polymer chains from moving independently.

10. The percentage of butadiene and styrene in Buna-S is \_\_\_\_\_

- a) 50% each
- b) 60% and 40% respectively
- c) 80% and 20% respectively
- d) 75% and 25% respectively

[View Answer](#)

Answer: d

Explanation: The percentage of butadiene and styrene in Buna-S is 75% and 25% respectively. These materials have good abrasion resistance and good aging stability when protected by additives.

This set of Engineering Chemistry Questions and Answers for Freshers focuses on "Elastomers – 2".

1. Which of the following act as a catalyst in the preparation of Buna-S?

- a) Benzoyl peroxide
- b) Hydrogen peroxide
- c) Cumene hydroperoxide
- d) Acrylonitrile

[View Answer](#)

Answer: c

Explanation: Cumene hydroperoxide act as a catalyst in the preparation of Buna-S (Butadiene styrene).

2. Which of the following statement is incorrect about the SBR?

- a) It has low load bearing capacity
- b) It has high abrasion resistance
- c) It swells in oils and solvents
- d) It has low oxidation resistance

[View Answer](#)

Answer: a

Explanation: SBR has high load bearing capacity, high abrasion resistance, swells in oil and solvent and has low oxidation resistance.

3. Which of the following is an application of SBR?

- a) Conveyor belts for food
- b) Lining of tanks
- c) Oil-resistance foam
- d) Printing rollers

[View Answer](#)

Answer: b

Explanation: Lining of tanks, adhesives, gaskets, motor tyres, etc are some of the applications of SBR.

4. Buna-N is prepared by co-polymerisation of butadiene and acrylonitrile in the emulsion system.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Buna-N is prepared by the co-polymerisation of butadiene and acrylonitrile in the emulsion system. Buna-N is nitrile rubber used in the automotive and aeronautical industry to make fuel and oil handling hoses.

5. Which of the following has the best resistance to oils?

- a) Natural rubber
- b) Neoprene
- c) Nitrile rubber

d) Styrene rubber

[View Answer](#)

Answer: c

Explanation: Nitrile rubber has the best resistance to oils among the following options. All the other options have lower resistance to oils.

6. Which of the following is not an application of neoprene?

- a) Conveyor belts
- b) Wire and cable insulation
- c) Adhesives
- d) Printing rollers

[View Answer](#)

Answer: d

Explanation: Conveyor belts, adhesives, wire and cable insulation, shoe-soles, etc are some of the applications of neoprene. Printing rollers is not an application of neoprene.

7. The major constituent of butyl rubber is \_\_\_\_\_

- a) Isobutylene
- b) Isoprene
- c) Chloroprene
- d) Acrylonitrile

[View Answer](#)

Answer: a

Explanation: In butyl rubber, isobutylene constitutes (95-99) % and isoprene constitutes (1-5) %.

8. Which of the following act as a catalyst in the preparation of butyl rubber?

- a) Cumene hydroperoxide
- b) Anhydrous  $\text{AlCl}_3$
- c) Lewis base
- d) Grignard reagent

[View Answer](#)

Answer: b

Explanation: Anhydrous  $\text{AlCl}_3$  acts as a catalyst in the preparation of butyl rubber. Butyl rubber is a synthetic rubber, a co-polymer of isobutylene with isoprene.

9. The solvent used in the preparation of butyl rubber is \_\_\_\_\_

- a) Methyl iodide
- b) Methyl halide
- c) Methyl chloride
- d) Methyl sulphide

[View Answer](#)

Answer: c

Explanation: The solvent used in the preparation of butyl rubber is methyl chloride. Butyl rubber is a synthetic rubber, a copolymer of isobutylene with isoprene.

10. Because of its hydrocarbon nature, butyl rubber is soluble in hydrocarbon solvents but has excellent resistance to polar solvents like alcohol and acetone.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: Because of its hydrocarbon nature, butyl rubber is soluble in hydrocarbon solvents but has excellent resistance to polar solvents like alcohol and acetone. Butyl rubber and halogenated rubber are used for the inner liner that holds the air in the tire.

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

1. The tensile strength of the fiber is \_\_\_\_\_

- a) Very Low
- b) Low
- c) High
- d) Intermediate

[View Answer](#)

Answer: c

Explanation: The tensile strength of the fiber is high and depends upon the strength of the chemical bonds of the polymer chains.

2. Which of the following type of bonding maintains the alignment of chains of the polyester?

- a) Vander Waal's force
- b) Dipole-dipole attraction
- c) Hydrogen bonding
- d) Covalent bonding

[View Answer](#)

Answer: b

Explanation: Dipole-dipole attraction are induced due to the dipole formed by the alignment of negative and positive charges and hence this type of bonding maintains the alignment of chains of the polyester.

3. Nylon-66, PET and PAN all have  $T_g$  around \_\_\_\_\_

- a) 100 °C
- b) 200 °C

c) 300 °C

d) 500 °C

[View Answer](#)

Answer: a

Explanation: Nylon-66, PET and PAN all have  $T_g$  around 100 °C. The glass-transition temperature  $T_g$  of a material characterizes the range of temperatures over which this glass transition occurs. It is always lower than the melting temperature, of the crystalline state of the material, if one exists.

4. Hydrogen bonding is responsible for maintaining the alignment of \_\_\_\_\_

a) Stereoregular chains of isotactic polypropylene

b) Polyesters

c) Polyacrylonitrile

d) Polyamides

[View Answer](#)

Answer: d

Explanation: Hydrogen bonding is responsible for maintaining the alignment of polyamides and polyurethanes. Polyamides are polymer of a type made by the linkage of an amino group of one molecule and a carboxylic acid group of another.

5. Nylon-6 can be prepared by ring opening polymerisation of \_\_\_\_\_

a) Amino caproic acid

b) Caprolactum

c) Adipic acid

d) Terephthalic acid

[View Answer](#)

Answer: b

Explanation: Nylon-6 can be prepared by ring opening polymerisation of caprolactum. Caprolactum has 6 carbons and hence, Nylon-6.

6. Which of the following is the third step for the synthesis of nylon-6?

a) Conversion of cyclohexane into cyclohexanone

b) Ring opening polymerisation of caprolactum

c) Conversion of cyclohexanone-oxime into caprolactum

d) Conversion of cyclohexanone into cyclohexanone-oxime

[View Answer](#)

Answer: c

Explanation: Conversion of cyclohexane into cyclohexanone is the initial step. Then the second step is the conversion of cyclohexanone into cyclohexanone-oxime and then the conversion of cyclohexanone-oxime into caprolactum is the third step for the synthesis of nylon-6. Ring opening polymerisation of caprolactum is the last step.

7. The cyclohexanone is converted into cyclohexanone-oxime by \_\_\_\_\_

a) Treatment with hydroxylamine

- b) Oxidation
- c) Reduction
- d) Backmann rearrangement

[View Answer](#)

Answer: a

Explanation: The cyclohexanone is converted into cyclohexanone-oxime by treatment with hydroxylamine because hydroxylamine act as a catalyst for this reaction. This is the second step for the synthesis of Nylon-6.

8. Nylon-6,6 is made by the condensation polymerisation of hexamethylene diamine and adipic acid in the molar ratio of \_\_\_\_\_

- a) 2 : 3
- b) 1 : 2
- c) 3 : 5
- d) 1 : 1

[View Answer](#)

Answer: d

Explanation: Nylon-6, 6 is made by the condensation polymerisation of hexamethylene diamine and adipic acid in the molar ratio of 1 : 1. Equivalent amounts of hexamethylene diamine and adipic acid are combined with water in a reactor.

9. The nylon-6, 6 have high crystallinity which imparts?

- a) Low strength
- b) Low melting point
- c) Toughness and elasticity
- d) Retention to poor mechanical properties

[View Answer](#)

Answer: c

Explanation: The nylon-6, 6 have high crystallinity which imparts high strength, high melting point, elasticity, toughness and retention to good mechanical properties.

This set of Engineering Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Ion-Exchange Resins".

1. Ion-exchange resin is \_\_\_\_\_

- a) Linear
- b) Low molecular weight
- c) Organic polymer with porous structure
- d) Soluble

[View Answer](#)



Answer: c

Explanation: Ion-exchange resins are cross-linked, insoluble, high molecular weight, organic polymers with a porous structure.

2. Which of the following ion get released from the cation exchange column?

- a)  $H^+$
- b)  $Na^+$
- c)  $K^+$
- d)  $Ca^{+2}$

[View Answer](#)

Answer: a

Explanation: Only  $H^+$  ion get released from the cation exchange column.

3. Which of the following ion get released from the anion exchange column?

- a)  $CO_3^{-2}$
- b)  $OH^-$
- c)  $Cl^-$
- d)  $SO_4^{-2}$

[View Answer](#)

Answer: b

Explanation: Only  $OH^-$  ion get released from the anion exchange column.

4. Ion-free water coming out from the exchanger is known as \_\_\_\_\_

- a) Potable water
- b) Disinfected water
- c) Coagulated water
- d) Demineralised water

[View Answer](#)

Answer: d

Explanation: Ion-free water coming out from the exchanger is known as demineralised water as it is free from all the mineral impurities.

5. Which of the following statement is incorrect about the demineralised water?

- a) It is as pure as distilled water
- b) It is very good for use in high pressure boilers
- c) It is fit for domestic use
- d) It can be made either by distillation or by using cation and anion exchangers

[View Answer](#)

Answer: c

Explanation: Demineralised water is not recommended for domestic use such as drinking purposes. All the other options are correct.

6. The exhausted cation exchange column is regenerated by passing a solution of \_\_\_\_\_

- a) Dil. HCl
- b) Dil. NaCl
- c) Conc. HCl
- d) Conc. NaCl

[View Answer](#)

Answer: a

Explanation: The exhausted cation exchange column is regenerated by passing a solution of dil. HCl. Dil HCl is also known as brine solution.

7. The exhausted anion exchange column is regenerated by passing a solution of \_\_\_\_\_

- a) Dil. KOH
- b) Conc. KOH
- c) Conc. NaOH
- d) Dil. NaOH

[View Answer](#)

Answer: d

Explanation: By passing a solution of dil. NaOH, the exhausted anion exchange column is regenerated.

8. The raw water used for ion-exchange process should be turbid.

- a) True
- b) False

[View Answer](#)

Answer: b

Explanation: The raw water used for ion-exchange process should be non-turbid and free from impurities.

9. In ion-exchange process, the capital cost is \_\_\_\_\_ and the operational expenses are \_\_\_\_\_

- a) Low, high
- b) High, low
- c) High, high
- d) Low, low

[View Answer](#)

Answer: c

Explanation: In ion-exchange process, the capital cost is very high and the operational expenses are also high.

10. The residual hardness in ion-exchange process is \_\_\_\_\_

- a) 0-2 ppm
- b) 5-10 ppm
- c) 10-15 ppm

d) 20-30 ppm

[View Answer](#)

Answer: a

Explanation: The residual hardness in the ion-exchange process is 0-2 ppm. In waters containing more hardness than alkalinity, some hardness remains after treatment.

This set of Applied Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Natural Rubber".

1. The polymers which possess the property of elastic is called rubber.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: The polymers which possess the property of elastic is called the rubber. Temporary deformation takes place.

2. The temporary deformation of rubber takes place after applying the \_\_\_\_\_ stress.

- a) 600e.u
- b) More than 600e.u
- c) 500e.u
- d) more than 500e.u

[View Answer](#)

Answer: b

Explanation: The temporary deformation of the rubber takes place after applying the stress around more than 600e.u. when the stress is applied the chains get partially aligns with respect to the other.

3. The elasticity of the rubber is due to its \_\_\_\_\_

- a) Trigonal planar
- b) Octahedral
- c) Pentagonal bipyramidal
- d) Helix

[View Answer](#)

Answer: d

Explanation: The elasticity of the rubber is due to its helical structure. On releasing the stress, the chains get reverted back to their original coiled state.

4. Isoprene in natural rubber exists in \_\_\_\_\_ geometrical isomeric forms.

- a) 2
- b) 3
- c) 4

d) 5

[View Answer](#)

Answer: a

Explanation: Isoprene in natural rubber exists in two geometrical isomeric forms. They are cis-isoprene and trans-isoprene.

5. Cis-poly isoprene is present in \_\_\_\_\_

- a) Hevea rubber
- b) Guayule rubber
- c) Percha rubber
- d) Gutta rubber

[View Answer](#)

Answer: a

Explanation: Cis-poly isoprene is present in the Hevea rubber and the trans-poly isoprene is present in guayule rubber and percha rubber.

6. The latex is diluted to \_\_\_\_\_ and filtered to remove suspended impurities.

- a) 5-10%
- b) 10-15%
- c) 15-20%
- d) 20-25%

[View Answer](#)

Answer: c

Explanation: The latex is diluted to 15-20% and filtered to remove suspended impurities like pieces of bark, leaves etc.

7. The filtered latex is sent into the tanks and treated with \_\_\_\_\_

- a) Acetic acid
- b) Formaldehyde
- c) Acetaldehyde
- d) Poly isoprene

[View Answer](#)

Answer: a

Explanation: The filtered latex is sent into the tanks and treated with the acetic acid. Instead of acetic acid, sometimes we can also use the formic acid.

8. The rubber coagulates into soft \_\_\_\_\_ colour mass.

- a) Yellow
- b) Light yellow
- c) White
- d) Light pink

[View Answer](#)

9. While producing the crepe rubber, the coagulam is passed between two rollers of about \_\_\_\_\_ wide.

- a) 3mm
- b) 4mm
- c) 50cm
- d) 100cm

[View Answer](#)

Answer: c

Explanation: The coagulum is passed in between the two rollers of about 3mm apart and 50cm wide and extruded in the form of a sheet which resemble the crepe paper, which possess rough surface.

10. While producing the smoked rubber, the filtered latex is fed into long rectangular tanks of \_\_\_\_\_ deep.

- a) 1m
- b) 2m
- c) 50cm
- d) 30cm

[View Answer](#)

Answer: d

Explanation: In one type of processing the filtered latex is fed into long rectangular tanks of 30cm deep and 1m wide.

11. While producing smoked rubber, the latex and reacted with formic acid, the vertical partition plates are inserted and left undisturbed for \_\_\_\_\_

- a) 13 hours
- b) 14 hours
- c) 15 hours
- d) 16 hours

[View Answer](#)

Answer: d

Explanation: After introducing the latex and reacted with formic acid, the vertical partition plates are inserted and left undisturbed for 16 hours.

12. While producing the smoked rubber, the sheets are hanged for about \_\_\_\_\_ in smoked chambers.

- a) 1 day
- b) 2 days
- c) 3 days
- d) 4 days

[View Answer](#)

Answer: d

Explanation: While producing the smoked rubber, the sheets are hanged for about 4 days in smoked chambers. The final roller gives ribbed pattern to the rubber sheet.

13. To produce the smoked rubber, the rubber sheets are hanged in smoked chambers at \_\_\_\_\_

- a) 10-20°C
- b) 20-30°C
- c) 30-40°C
- d) 40-50°C

[View Answer](#)

Answer: d

Explanation: To produce the smoked rubber, the rubber sheets are hanged in smoked chambers at 40-50°C for four days.

14. Solvent extraction process is used to extract \_\_\_\_\_

- a) Crepe rubber
- b) Smoked rubber
- c) Gutta percha
- d) Guayule rubber

[View Answer](#)

Answer: c

Explanation: Solvent extraction process is the method of extracting the gutta percha. It is extracted from the matured leaves of the palagum gutta and dichopsis gutta.

15. In solvent extraction process, the mature leaves are grounded and heated about \_\_\_\_\_

- a) 40°C
- b) 50°C
- c) 60°C
- d) 70°C

[View Answer](#)

Answer: d

Explanation: In solvent extraction process, the mature leaves are grounded and heated about 70°C. It is heated along with water.

This set of Applied Chemistry Multiple Choice Questions & Answers (MCQs) focuses on "Synthetic Rubber".

1. BUNA – S is otherwise called as \_\_\_\_\_

- a) Sodium rubber
- b) Synthesized rubber
- c) Butadiene rubber
- d) Styrene rubber

[View Answer](#)

Answer: d

Explanation: BUNA – S is otherwise called as styrene rubber. It is also called as the government rubber styrene.

2. Ameripol is nothing but \_\_\_\_\_

- a) BUNA – N
- b) BUNA – S
- c) Dacron
- d) Teflon

[View Answer](#)

Answer: b

Explanation: Ameripol is nothing but BUNA – S. BUNA – S stands for the composition of the monomers and catalyst.

3. In BUNA – S, the BU stands for \_\_\_\_\_

- a) Butadiene
- b) Butane
- c) Butaraldehyde
- d) 3-Butanoic acid

[View Answer](#)

4. Styrene rubber is a \_\_\_\_\_

- a) Strong
- b) Weak
- c) Neither strong nor weak
- d) Very weak

[View Answer](#)

Answer: a

Explanation: Styrene rubber is strong and tough polymer. Styrene is from benzene and ethylene in presence of anhydrous aluminium chloride as catalyst.

5. Styrene rubber is vulcanised by \_\_\_\_\_

- a) Sulphurous oxide
- b) Sulphur mono chloride
- c) Sulphur-di-oxide
- d) Carbon

[View Answer](#)

Answer: b

Explanation: Styrene rubber is vulcanised by sulphur mono chloride or sulphur. It resembles natural rubber in processing characteristics and quality of finished products.

6. BUNA- S is a \_\_\_\_\_

- a) Electrical insulator
- b) Electrical conductor
- c) Semi conductor

d) Conducts only at a certain temperature

[View Answer](#)

Answer: a

Explanation: BUNA – S is a good electrical insulator. Butadiene is produced from the acetaldehyde and ethyl alcohol.

7. The BUNA – S is \_\_\_\_\_ chemicals.

- a) Attacked by
- b) Resistant to
- c) Neither resistant nor attacked
- d) Neutral

[View Answer](#)

Answer: b

Explanation: The BUNA – S is resistant to the chemicals and it is swelled by the oils and attacked by the traces of ozone present in atmosphere.

8. Manufacture of tyres can be done by \_\_\_\_\_

- a) BUNA – N
- b) Thiokol rubber
- c) Poly sulphide rubber
- d) BUNA – S

[View Answer](#)

Answer: d

Explanation: Manufacture of tyres can be done by the BUNA – S. It is used in the foot ware industry for making shoe soles and foot ware components.

9. Which of the following can be made by the BUNA – S?

- a) Cable insulations
- b) Coats
- c) Water proof clothes
- d) Cosmetics

[View Answer](#)

Answer: a

Explanation: The cable insulations and the wires can be made by the BUNA -S. Floor files, tank linings in chemical industries and as an adhesive.

10. Which of the following rubber cannot be vulcanised?

- a) BUNA – S
- b) BUNA – N
- c) Thiokol rubber
- d) Teflon

[View Answer](#)



Answer: c

Explanation: The Thiokol rubber is also called as the poly sulphide rubber. The Thiokol rubber cannot be vulcanised and it cannot form hard rubber.

11. The poly sulphide rubber is resistant to \_\_\_\_\_

- a) Ozone
- b) Oils
- c) Chemicals
- d) Nitrogen

[View Answer](#)

Answer: a

Explanation: The poly sulphide rubber is resistant to the ozone. It is also resistance to the mineral oils, fuels, solvents, oxygen and sunlight.

12. The gaskets can be made by \_\_\_\_\_

- a) Gutta-percha
- b) Nitrile rubber
- c) Thiokol rubber
- d) BUNA – S

[View Answer](#)

Answer: c

Explanation: The gaskets can be made by the thiokol rubber. It is made of seals for printing rolls. They are also used for lining houses for conveying gasoline.

13. BUNA – N is a co-polymer of \_\_\_\_\_ and \_\_\_\_\_

- a) Butadiene, acrylonitrile
- b) Sodium poly sulphide, ethylene dichloride
- c) Benzene, ethylene
- d) Acetaldehyde, ethyl alcohol

[View Answer](#)

Answer: a

Explanation: BUNA – N is a co-polymer of the acrylonitrile and butadiene. Thiokol is the co-polymer of the sodium poly sulphide and ethylene dichloride. Styrene is the co-polymer of the benzene and ethylene.

14. BUNA – N can be vulcanised by \_\_\_\_\_

- a) Sulphur
- b) Oxygen

- c) Sulphur dioxide
- d) Sulphurous acid

[View Answer](#)

Answer: a

Explanation: BUNA – N can be vulcanised by the sulphur. BU stands for the butadiene and NA stands for sodium and N stands for acrylonitrile.

15. Vulcanized BUNA – N is resistant to \_\_\_\_\_

- a) High temperatures
- b) Low temperature
- c) Oils
- d) Acids

[View Answer](#)

Answer: a

Explanation: Vulcanised BUNA – N is resistant to the high temperatures. The normal BUNA – N is resistant to the acids, salts, heat and oils.