Date: 23/10/2021

Q1. Which of the following is fibre? Nylone, Neoprene, PVC.

Q2. Based on molecular forces what type of polymer is neoprene?

Q3. Which of the following is a natural polymer? Buna-S, Proteins, PVC.

Q4. Write the name and structure of the monomers of the following polymer: Buna-S.

Q5. Arrange the following polymers in the increasing order of their intermolecular forces: Terylene, polythene, Neoprene.

Q6. Arrange the following polymers in the increasing order of their intermolecular forces: Polystyrene, Terylene, Buna-S.

Q7. What does the part '6,6' man in the name nylon-6,6?

Q8. Name the polymer which is used for making non-stick cooking utensils.

Q9. Is $-(-CH_2-\underset{\displaystyle Cl}{\underset{|}{CH}}-)_n$ a homopolymer or a copolymer?

Q10. Define the term 'polymerisation'.

Q11. Write a distinguishing feature between homopolymer and copolymer.

Q12. Explain the following term giving a suitable example: Elastomers.

Q13. Define the term, 'homopolymerisation' giving an example.

Q14. What is the difference between the two notation: nylon-6 and nylon-6,6?

Q15. What are biodegradable polymers?

Q16. What are biodegradable polymers? Give one example.

Q17. Write the names and structures of the monomer of the following polymer: PHBV.

Q18. What is the primary structural feature necessary for a molecule to make it useful in a condensation polymerisation reaction?

Q19. What does '6,6' indicate in the name nylon-6,6?

Q20. Define thermoplastic and thermosetting polymers. Give one example of each.

Q21. What is the difference between elastomers and fibres? Give one exampe of each.

Q22. Differentiate between molecular structures and behaviours of thermoplastic and thermosetting polymers. Give one example of each type.

Q23. Explain the following terms giving a suitable example for each:

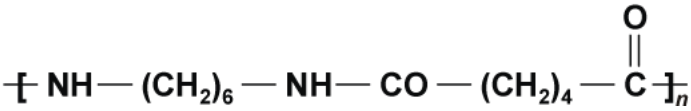
(a) Condensation polymers. (b) Addition polymers.

Q24. Distinguish between homopolymers and copolymers. Give one example of each.

Q25. How are thermosetting polymers different from thermoplastic polymers?

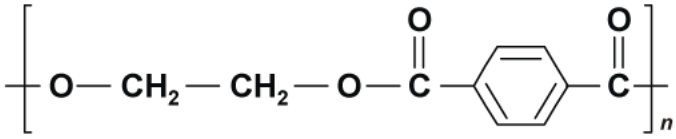
Q26. (a) What is the role of t-butyl peroxide in the polymerisation of ethene?

(b) Identify the monomers in the following polymer:



Q27. (a) What is the role of sulphur in the vulacnisation of rubber?

(b) Identify the monomers in the following polymer:



Q28. Write the names and structures of monomers used for getting the following polymers:

(a) Buna-S. **(b) Nylon-6,6.**

Q29. Give names of the monomers of the following polymers:

(a) Neoprene. **(b) Polystyrene.** **(c) Polypropene.**

Q30. Write the name of monomers used for getting the following polymers:

(a) Teflon. **(b) Buna-N.**

Q31. Write the name of monomers used for getting the following polymers:

(a) Terylene. **(b) Nylon-6,6**

Q32. Explain the term 'copolymerisation' and give two examples of copolymerization.

Q33. Write the names and structures of the monomers of the following polymers:

(a) Neoprene. **(b) Teflon.**

Q34. Write the nemae and structures of the monomers of the following polymers:

(a) Nylone-6,6 **(b) Neoprene.**

Q35. Write the name of monomers used for getting the following polymers:

(a) Bakelite. **(b) Neoprene.**

Q36. Draw the structures of the monomers of the following polymers:

(a) Bakelite **(b) Nylon-6.**

Q37. Draw the molecular structures of the monomers of

(a) PVC **(b) Teflon.**

Q38. Write the name and structure of the monomer of each of th following polymers:

(a) Neoprene. **(b) Buna-S.** **(c) Teflon.**

Q39. Mention two important uses of each of the following:

(a) Bakelite. **(b) Nylon-6.**

Q40. Write down the structure of monomer and one use of the polymer polystyrene.

Q41. Draw the structure of the monomer for each of the following polymers.

(a) Nylon-6. (b) Polypropene.

Q42. Write the names of monomers of the following polymers.

(a) $-\left[-\overset{\overset{O}{\|}}{C}-(CH_2)_5-\overset{\overset{H}{|}}{N}-\right]_n$ (b) $-\left[-CF_2-CF_2-\right]_n$.

Q43. Write the names and structures of the monomers of the following polymers:

(a) Neoprene (b) Nylon-6.

Q44. Draw the structures of the monomer of each of the following polymers.

(a) Polyvinylchloride (PVC) (b) Nylon-6.

Q45. Write the structures of monomers used in the preparation of

(a) Teflon (b) PMMA

Q46. What is step growth polymerisation? Explain the steps involved in this process.

Q47. What are biodegradable and non-biodegradable polymers? Give one example of each class.

Q48. What is a biodegradable polymer? Give an example of a biodegradable aliphatic polyester.

Q49. Differentiate between condensation and addition polymerisations. Give one example each of the resulting polymers.

Q50. What are addition polymers? How are the two types of addition polymers different from each other? Give one example of each type.

Q51. Find the main difference between them

(a) Thermoplastic polymers. (b) Thermosetting polymers.

Q52. Differentiate between thermoplastic and thermosetting polymers. Give one example of each.

Q53. (a) Distinguish between homopolymers and copolymers. Give one example of each.

(b) Is $-\left[-CH_2-CH(C_6H_5)-\right]_n$ a homopolymer or a copolymer? Why?

Q54. Write the mechanism of free radical polymerisation.

Q55. Explain the term co-polymerization and give two examples of copolymers and the reactions for their preparations.

Q56. Write the monomers of the following polymers and classify them as addition or condensation polymers: Teflon, Bakelite and Natural rubber.

Q57. (a) Differentiate between copolymerisation and homopolymerisation. Give one example of each.

(b) What is the role of Benzyl peroxide in preparation of polythene?

Q58. Write the names and structures of the monomers of the following polymers:

(a) Bakelite. (b) Nylon-6. (c) Polythene.

Q59. Write the name of the monomers of the following polymers:

(a) Polytherne. (b) Polyvinyl chloride. (c) Bakelite.

Q60. Write the names and structures of the monomers of the following polymers:

(a) Terylene. (b) Bakelite. (c) Buna-S.

Q61. Write the names and structures of the monomers ofthe following polymers:

(a) Buna-S. (b) Glyptal. (c) Polyvinyl chloride

Q62. Draw te structure of the monomers of the following polymers:

(a) Polythene. (b) PVC. (c) Teflon.

Q63. Mention two important uses for each of the following polymers:

(a) Bakelite (b) Nylon 6,6 (c) PVC.

Q64. Distinguish between addition polymers and condensation polymers. Classify the following into additon and condensation polymers:

(a) Polythene. (b) PTFE. (c) Polybutadine. (d) Bakelite.

Q65. What are biodegradable polymers? Give an example of such a polymer and mention its uses.

Q66. Write chemical equations to form the following:

(a) Nylon-6. (b) Nylon-6,6. (c) Polythene.

Q67. Write the monomers which are used for the synthesis of the following polymers:

(a) Terylene. (b) Polythene. (c) Bakelite.

Indicate the type of polymerisation of each which forms the polymer.

Q68. Write the (a) structure and (b) one use of each of the following polymers:

(i) PVC. (ii) Urea-formaldehyde resin. (iii) Bakelite.

Q69. Give one example each of

(a) addition polymers, (b) condensation polymers, (c) copolymers.

Q70. After the ban on plastic bags, students of one school decided to make the people aware of the harmful effects of plastic bags on environment and Yamuna River. To make the awareness more impactful, they organized rally by joining hands with other schools and distributed paper bags to vegetable vendors, shopkeepers and departmental stores. All students pledged not to use polythene bags in future to save Yamuna Rier.

After reading the above passage, answer the following questions:

(a) What values are shown by the students?

(b) What are biodegradable polymers? Give one example.

(c) Is polythene a condensation or an addition polymer?

Q71. **After the ban of plastic bags, students on one school decided to create awareness among the people about the harmful effects of plastic bags on the environment and the Yamun river. To make it more impactful, they organised a rally by joining hands with other schools and distributed paper bags to vegetable vendors, shopkeepers and departmental stores. All students pledged not to use polythene bags in future to save the Yamuna river.**

After reading the above passage, answer the following questions:

(a) What values are shown by the students?

(b) What are biodegradable polymers? Give one example.

(c) Is polythene a homopolymer or copolymer?

Date: 23/10/2021

S1. Nylon is a fibre.

S2. Elastomer.

S3. Proteins are natural polymers.

S4. Buna-S.

$$\underset{\text{1,3-Butadiene}}{CH_2=CH-CH=CH_2} \quad \text{and} \quad \underset{\text{Styrene}}{C_6H_5CH=CH_2}$$

S5. Neoprene < Polythene < Terylene.

S6. The intermolecular forces are least in case of elastomers like Buna-S while strongest in case of fibres like terylene and in case of thermoplastics like polystrene the intermolecular forces are intermediate in between elastomers and fibres.

Thus, the increasing order of their intermolecular forces is Terylene > Polystyrene > Buna-S.

S7. In nylon 6,6, designation '6,6' mean that both the monomers hexamethylene diamine and adipic acid contain six carbon atoms each.

S8. Teflon $+CF_2-CF_2+_n$.

S9. Homopolymer.

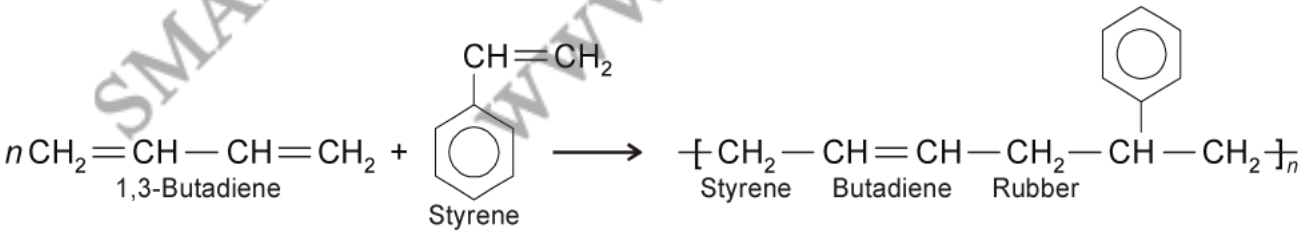
S10. The process of formation of macromolecules/polymers from their respective monomeric units, is called polymerisation.

S11. **Homopolymer:** A polymer made by polymerisation of a single monomer is known as homopolymer and the reaction is called homopolymerisation.

e.g., Polythene made by ethene molecules.

$$\underset{\text{Ethene}}{nCH_2=CH_3} \longrightarrow \underset{\text{Polythene (homopolymer)}}{+CH_2-CH_2+_n}$$

Copolymer: A polymer made by polymerisation of two or more different monomers is called copolymer and the reaction is called copolymerisation. When styrene and butadiene are polymerised together, a polymer called styrene-butadiene rubber is formed



S12. Elastomers are the polymers in which polymer chains are held by weakest intermolecular forces.

S13. A polymer made by polymerisation of a single monomer is known as homopolymer and the process is known as homopolymerisation. For *e.g.*, Polyythene made by polymerisation of thene molecules.

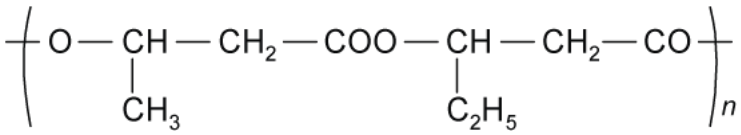
$$\underset{\text{Ethene}}{n CH_2 = CH_3} \longrightarrow \underset{\text{Polythene}}{+ CH_2 - CH_2 +_n}$$

S14. Nylon 6 is obtained from the monomer caprolactam which contains 6 carbon atoms. Nylon 6,6 is a condensation polymer of hexamethylene diamine and adipic acid. Both the monomers have 6 carbon atoms each.

S15. **Biodegradable polymers:** The natural polymer, which disintegrates by itself or by micro-organisms within certain period of time is called biodegradable polymer, *e.g.*, PHBV (poly - β - hydroxybutyrate - co - β - hydroxyvalerate), Nylon 2-nylon 6.

S16. **Biodegradable polymers:** The natural polymer, which disintegrates by itself or by micro-organisms within certain period of time is called biodegradable polymer, *e.g.*, PHBV (poly - β - hydroxybutyrate - co - β - hydroxyvalerate), Nylon 2-nylon 6.

S17. PHBV - Poly - β - hydroxybutyrate - co - β - hydroxyvalerate.

Structure: 

S18. Monomers should possess more than one functional group.

S19. In nylon 6,6, designation '6,6' mean that both the monomers hexamethylene diamine and adipic acid contain six carbon atoms each.

S20. **Thermoplastics:** Thermoplastics are linear or slightly branched polymers which can be repeatedly softened on heating and hardened on cooling and hence can be used again and again without any change in chemical composition and mechanical strength.

Example: Polythene and polystyrene.

Thermosetting polymers: Thermosetting polymers on heating in a mould get hardened and set and cannot be softened again. This hardening on heating is due to cross-linking between different poly,er chains to give a three-dimensional network solid.

Example: Bakelite.

S21. (a) In elastomers polymer chains are held together by weakest intermolecular forces.

These have elastic propertices. e.g., Buna-N, Buna-S.

(b) In fibres polymer chains are held together by strong intermolecular forces like hydrogen bonding.

These have high tensile strength. e.g., Terylene, Nylon 6,6, etc.

S22. **Thermoplastics:** Thermoplastics are linear or slightly branched polymers which can be repeatedly softened on heating and hardened on cooling and hence can be used again and again without any change in chemical composition and mechanical strength.

Example: Polythene and polystyrene.

Thermosetting polymers: Thermosetting polymers on heating in a mould get hardened and set and cannot be softened again. This hardening on heating is due to cross-linking between different poly,er chains to give a three-dimensional network solid.

Example: Bakelite.

S23. (a) **Condensation polymers:** The polymers formed by the condensation of two or more bifunctional monomers are called condensation polymers.

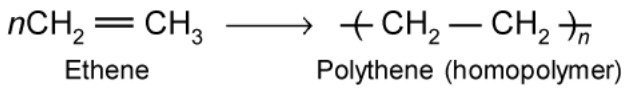
For example: Nylon 6,6, Bakelite.

(b) **Addition polymers:** The polymers formed by the addition reaction of a large number of unsaturated monomers are called addition polymers.

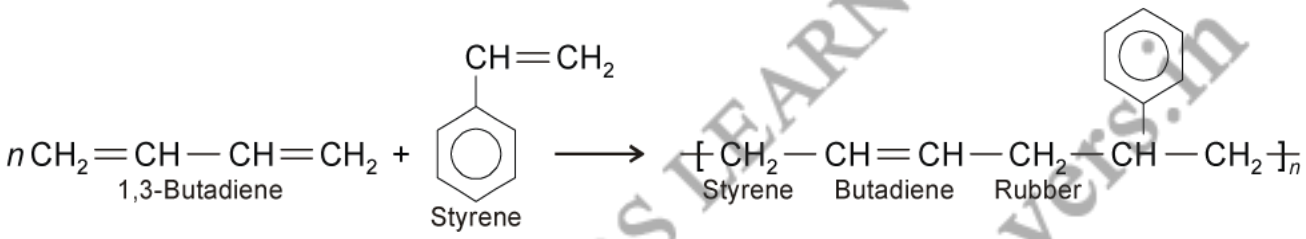
For example: Polythene, polystyrene.

S24. **Homopolymer:** A polymer made by polymerisation of a single monomer is known as homopolymer and the reaction is called homopolymerisation.

e.g., Polythene made by ethene molecules.



Copolymer: A polymer made by polymerisation of two or more different monomers is called copolymer and the reaction is called copolymerisation. When styrene and butadiene are polymerised together, a polymer called styrene-butadiene rubber is formed



S25. **Thermoplastics:** Thermoplastics are linear or slightly branched polymers which can be repeatedly softened on heating and hardened on cooling and hence can be used again and again without any change in chemical composition and mechanical strength.

Example: Polythene and polystyrene.

Thermosetting polymers: Thermosetting polymers on heating in a mould get hardened and set and cannot be softened again. This hardening on heating is due to cross-linking between different poly,er chains to give a three-dimensional network solid.

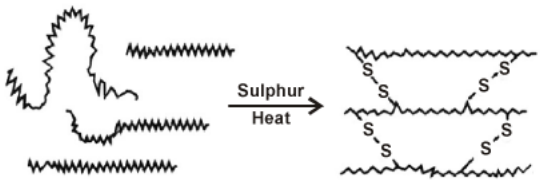
Example: Bakelite.

S26. (a) Polymerisation of ethene requires an initiator to start the polymerisation with free radical mechanism. Thus, peroxide like *t*-butyl peroxide decomposes to give free radical that initiates the reaction.

(b) Hexamethylene diamine and adipic acid.

S27. (a) Vulcanisation is a process of heating natural rubber with sulphur and an appropriate additive to modify its properties.

It gives greater elasticity and ductility. Sulphur forms cross-linked network which gives mechanical strength to the rubber.



(b) Terephthalic acid and ethylene glycol.

S28. (a) Buna-S: $CH_2=CH-CH=CH_2$ (1,3-Butadiene) and $CH=CH_2$ (Styrene)

(b) Nylon 6,6: $HOOC-(CH_2)_4-COOH$ (Adipic acid) and $H_2N-(CH_2)_6-NH_2$ (Hexamethylene diamine)

S29.

Name of polymer	Monomer
Neoprene	Chloroprene
Polystyrene	Styrene
Polypropene	Propene

S30. (a) Teflon: $CF_2=CF_2$ (Tetrafluroethylene)

(b) Buna-N: $CH_2=CH-CH=CH_2$ (1.3-Butadiene) and $CH_2=CHCN$ (Acrylonitrile)

S31. (a) Terephthalic acid and ethylene glycol.

(b) Nylon 6,6: $HOOC-(CH_2)_4-COOH$ (Adipic acid) and $H_2N-(CH_2)_6-NH_2$ (Hexamethylene diamine)

S32. Copolymerization: When the polymers are synthesised by polymerization of two or more than two different monomers then this process is called as copolymerization. Example.

(a) Styrene butadiene rubber (SBR):

$$n\,CH_2=CH-CH=CH_2 + n\,C_6H_5-CH=CH_2 \longrightarrow -[CH_2-CH=CH-CH_2-CH(C_6H_5)-CH_2]_n-$$

1,3-Butadiene + Styrene → Rubber (Styrene Butadiene)

(b) Buna-N:

$$n\,CH_2=CH-CH=CH_2 + n\,CH_2=CHCN \longrightarrow -(CH_2-CH=CH-CH_2-CH_2-CH(CN))_n-$$

1,3-Butadiene + Acrylonitrile → Buta-N

S33.

(a) Neoprene: $CH_2=\underset{\displaystyle Cl}{\underset{|}{C}}-CH=CH_2$

Chloroprene

(b) Teflon: $CF_2=CF_2$

Tetrafluroethylene

S34. (a) Nylon 6,6: $HOOC-(CH_2)_4-COOH$ and $H_2N-(CH_2)_6-NH_2$

Adipic acid Hexamethylene diamine

(b) Neoprene: $CH_2=\underset{\displaystyle Cl}{\underset{|}{C}}-CH=CH_2$

Chloroprene

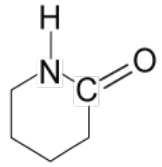
S35. (a) Bakelite: Formaldehyde ($HCHO$) and Phenol (C_6H_5OH).

(b) Neoprene: $CH_2=\underset{\displaystyle Cl}{\underset{|}{C}}-CH=CH_2$

Chloroprene

S36. (a) Bakelite: Formaldehyde ($HCHO$) and Phenol (C_6H_5OH).

(b) Nylon-6:



Caprolactam

S37. (a) Structure of monomer PVC : $CH_2=CHCl$

Vinyl chloride

(b) Teflon: $CF_2=CF_2$

Tetrafluroethylene

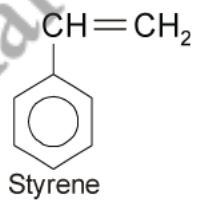
S38.

(a) Neoprene: $CH_2=\underset{\displaystyle Cl}{\underset{|}{C}}-CH=CH_2$

Chloroprene

(b) Buna-S: $CH_2=CH-CH=CH_2$ and

1,3-Butadiene



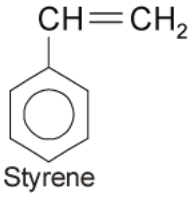
Styrene

(c) Teflon: $CF_2=CF_2$

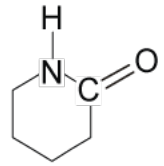
Tetrafluroethylene

S39. (a) Bakelite is used for making combs, electrical switches, handles of various utensils and phonograph records.

(b) Nylon-6 is used for making tyre cords, ropes and fabrics.

S40. Polystyrene: 

Styrene

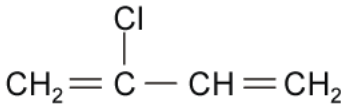
S41. (a) Nylon-6: 

Caprolactam

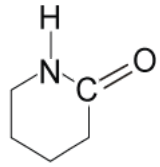
(b) Polypropene: $CH_3 - CH = CH_2$
Propene

S42. (a) Caprolactam (b) Tetrafluoroethene

S43.

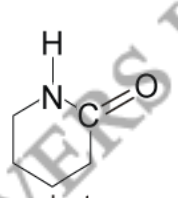
(a) Neoprene: 

Chloroprene

(b) Nylon-6: 

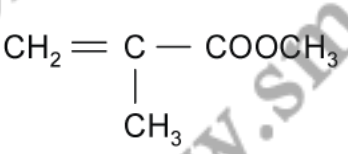
Caprolactam

S44. (a) Structure of monomer PVC : $CH_2 = CHCl$
Vinyl chloride

(b) Nylon-6: 

Caprolactam

S45. (a) Teflon: $CF_2 = CF_2$
Tetrafluroethylene

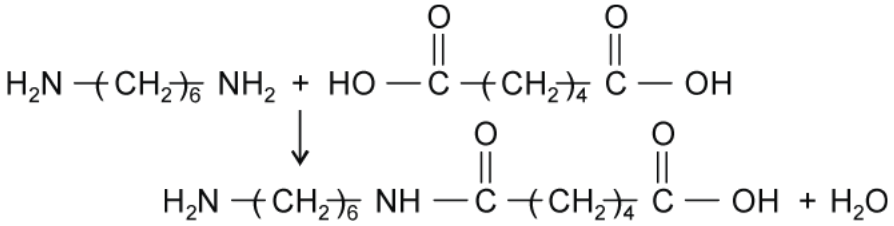
(b) PMMA: 

Methyl methacrylate

S46. Step growth polymerisation involves a repetitive condensation reaction between two bi-functional monomers. Each step produces a distinct functionalised species and in independent of each other.

All condensation polymerisation are step growth polymerisation.

Step: It involves condensation reaction of bi-functional molecules with elimination of smaller molecules like H_2O.



S47.

Biodegradable polymers	Non-biodegradable polymers
The natural polymer, which disintegrates by itself or by micro-organisms within certain period of time is called biodegradable polymer, *e.g.*, PHBV (poly-β-hydroxybutyrate-co-β-hydrosyvalerate), Nylon2-nylon 6.	They generally consist of long chains of carbon and hydrogen atoms. The interatomic bonding of these molecules is very difficult for microbes to break the bonds and digest them. Thus a long period of time is required to decompose them. For *e.g.*, Polythense, PTEE etc.

S48. Biodegradable polymers: The natural polymer, which disintegrates by itself or by micro-organisms within certain period of time is called biodegradable polymer, *e.g.*, PHBV (poly - β - hydroxybutyrate - co - β - hydroxyvalerate), Nylon 2-nylon 6.

S49. Condensation polymers: The polymers formed by the condensation of two or more bifunctional monomers are called condensation polymers.

For example: Nylon 6,6, Bakelite.

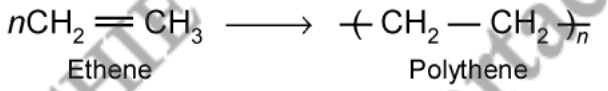
Addition polymers: The polymers formed by the addition reaction of a large number of unsaturated monomers are called addition polymers.

For example: Polythene, polystyrene.

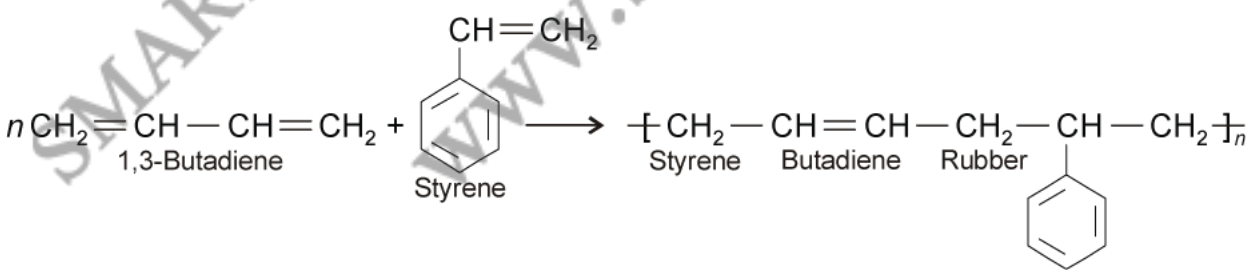
S50. Polymers which are formed by the repeated addition reaction of unsaturated monomer molecules are called the addition polymers.

The two types of addition polymers are:

(a) **Homopolymers:** The addition polymers formed by the polymerisation of a single compound are called homopolymers *e.g.*, polythene.



(b) Copolymers: The polymers made by addition polymerisation from two different compounds are known as copolymers. e.g., Buna-S.



S51. (a) **Thermoplastics:** Thermoplastics are linear or slightly branched polymers which can be repeatedly softened on heating and hardened on cooling and hence can be used again and again without any change in chemical composition and mechanical strength.

Example: Polythene and polystyrene.

(b) **Thermosetting polymers:** Thermosetting polymers on heating in a mould get hardened and set and cannot be softened again. This hardening on heating is due to cross-linking between different poly,er chains to give a three-dimensional network solid.

Example: Bakelite.

S52. Thermoplastics: Thermoplastics are linear or slightly branched polymers which can be repeatedly softened on heating and hardened on cooling and hence can be used again and again without any change in chemical composition and mechanical strength.

Example: Polythene and polystyrene.

Thermosetting polymers: Thermosetting polymers on heating in a mould get hardened and set and cannot be softened again. This hardening on heating is due to cross-linking between different poly,er chains to give a three-dimensional network solid.

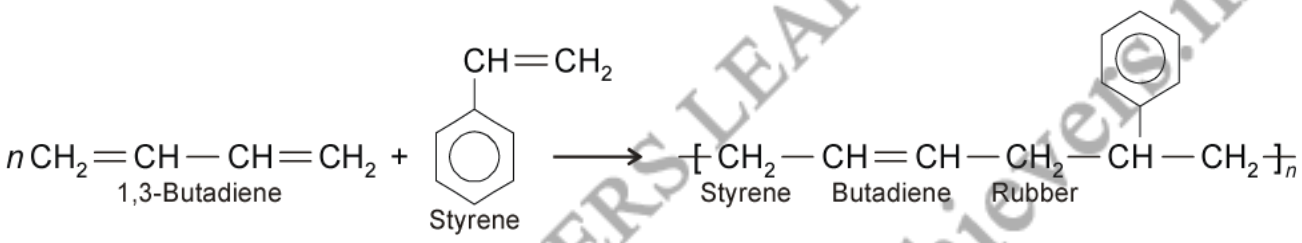
Example: Bakelite.

S53. (a) **Homopolymer:** A polymer made by polymerisation of a single monomer is known as homopolymer and the reaction is called homopolymerisation.

e.g., Polythene made by ethene molecules.

$$n\underset{\text{Ethene}}{CH_2 = CH_3} \longrightarrow \underset{\text{Polythene (homopolymer)}}{-(-CH_2 - CH_2-)_n-}$$

Copolymer: A polymer made by polymerisation of two or more different monomers is called copolymerisation. When styrene and butadiene are polymerised together, a polymer called styrene-butadiene rubber is formed



(b) It is a homopolymer because it is formed by the repetition of single compound i.e., monomer unit $C_6H_5CH = CH_2$.

S54. Chain initiation:

$$\dot{R} + CH_2 = CH_2 \longrightarrow R - CH_2 - \dot{C}H_2$$

Chain propagation:

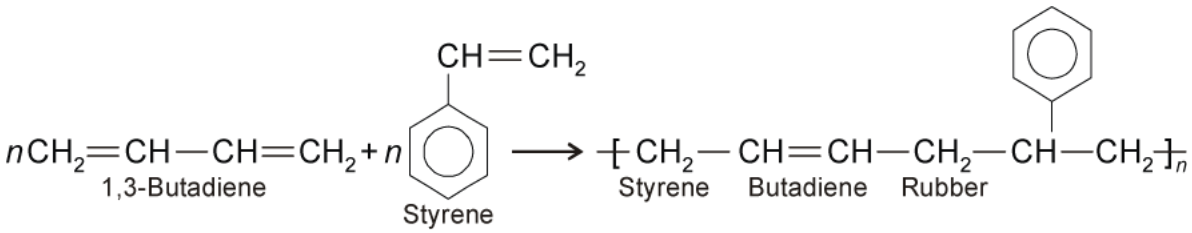
$$R - CH_2 - \dot{C}H_2 + CH_2 = CH_2 \longrightarrow R - CH_2 - CH_2 - CH_2 - \dot{C}H_2$$

Chain termination:

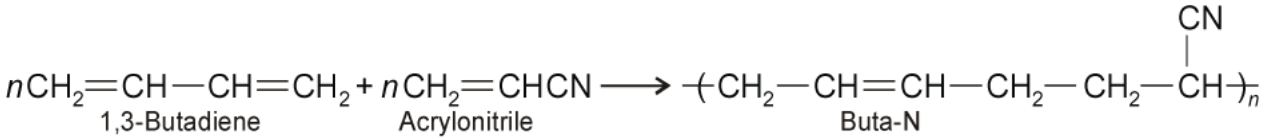
$$R - CH_2 - CH_2 - CH_2 - \dot{C}H_2 + \dot{R} \longrightarrow R - (CH_2)_4 - R$$

S55. Copolymerization: When the polymers are synthesised by polymerization of two or more than two different monomers then this process is called as copolymerization. Example.

(a) Styrene butadiene rubber (SBR):



(b) Buna-N:



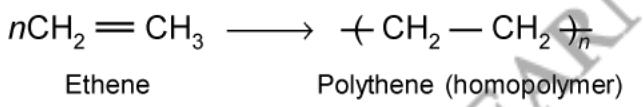
S56. Teflon: $CH_2 = CH_2$: Addition Polymer

Bakelite: HCHO — C$_6$H$_4$ — OH : Condensation Polymer

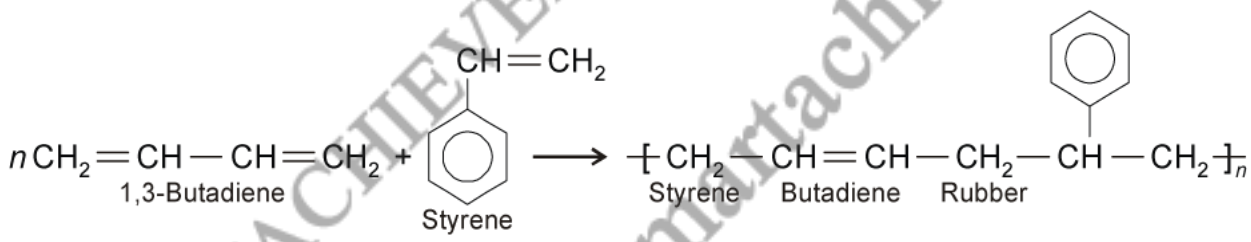
Natural rubber: $CH_2 = C(CH_3) - CH = CH_2$: Addition Polymer

S57. (a) **Homopolymer:** A polymer made by polymerisation of a single monomer is known as homopolymer and the reaction is called homopolymerisation.

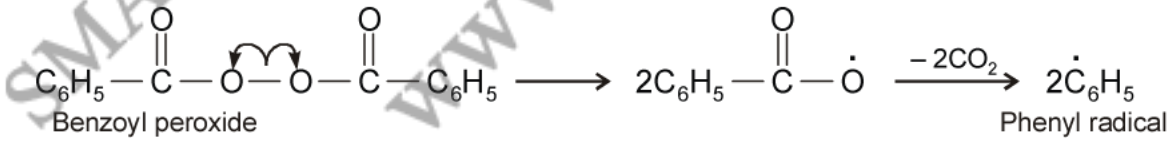
e.g., Polythene made by ethene molecules.



Copolymer: A polymer made by polymerisation of two or more different monomers is called copolymer and the reaction is called copolymerisation. When styrene and butadiene are polymerised together, a polymer called styrene-butadiene rubber is formed

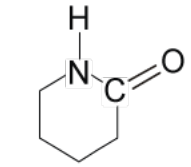


(b) In the preparation of polythene from ethen, benzoyl prtoxide acts as an initiator or free radical generator.



S58. (a) Bakelite: Formaldehyde (HCHO) and Phenol (C_6H_5OH).

(b) Nylon-6:



(c) Polythene: $CH_2 = CH_2$

Ethene

S59. (a) Monomer of polythene is ethene.

(b) Monomer of PVC is vinyl chloride.

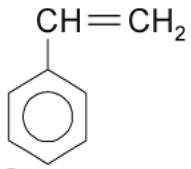
(c) Monomers of bakelite are formaldehyde and phenol.

S60. (a) $HOH_2C - CH_2OH$ and HOOC–(C$_6$H$_4$)–COOH

Ethylene glycol; Terephthalic acid

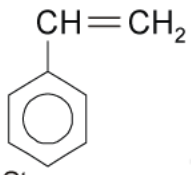
(b) Bakelite: Formaldehyde (HCHO) and Phenol (C_6H_5OH).

(c) Buna-S: $CH_2 = CH - CH = CH_2$ and



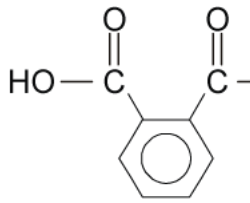
1,3-Butadiene; Styrene

S61. (a) Buna-S: $CH_2 = CH - CH = CH_2$ and



1,3-Butadiene; Styrene

(b) Glyptal:



and $HO - CH_2 - CH_2 - OH$

Phthalic acid; Ethylene glycol

(c) Structure of monomer PVC : $CH_2 = CHCl$

Vinyl chloride

S62. (c) Polythene: $CH_2 = CH_2$

Ethene

(b) Structure of monomer PVC : $CH_2 = CHCl$

Vinyl chloride

(c) Teflon: $CF_2 = CF_2$

Tetrafluroethylene

S63. (a) Bakelite: (i) In electrical switches. (ii) In making handles of various utensils.

(b) Nylon 6,6: (i) In fabrics (ii) in tyre cords

(c) PVC: (i) In hand bags (ii) In water pipes

S64. Differences between addition polymers and condensation polymers are:

Addition polymers: The polymers formed by the addition reaction of a large number of unsaturated monomers are called addition polymers.

For example: Polythene, polystyrene.

Condensation polymers: The polymers formed by the condensation of two or more bifunctional monomers are called condensation polymers.

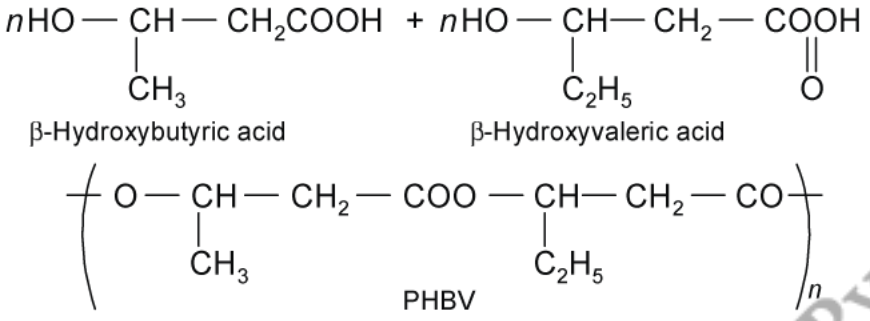
For example: Nylon 6,6, Bakelite.

(a) Polythene : Addition polymer. (b) PTFE : Addition polymer.

(c) Polybutadine : Addition polymer. (d) Bakelite: : Condensation polymer.

S65. Biodegradable polymers: The natural polymer, which disintegrates by itself or by micro-organisms within certain period of time is called biodegradable polymer, *e.g.*, PHBV (poly - β - hydroxybutyrate - co - β - hydroxyvalerate), Nylon 2-nylon 6.

It is a co-polymer of β-hydroxybutyric acid and β-hydroxyvaleric acid.

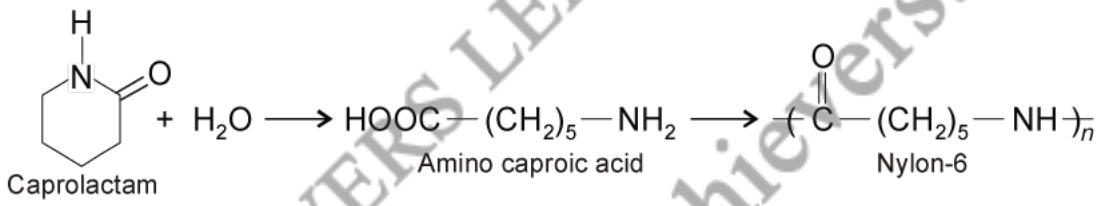


Butyric acid provides stiffness and valeric acid imparts flexibility to the polymer.

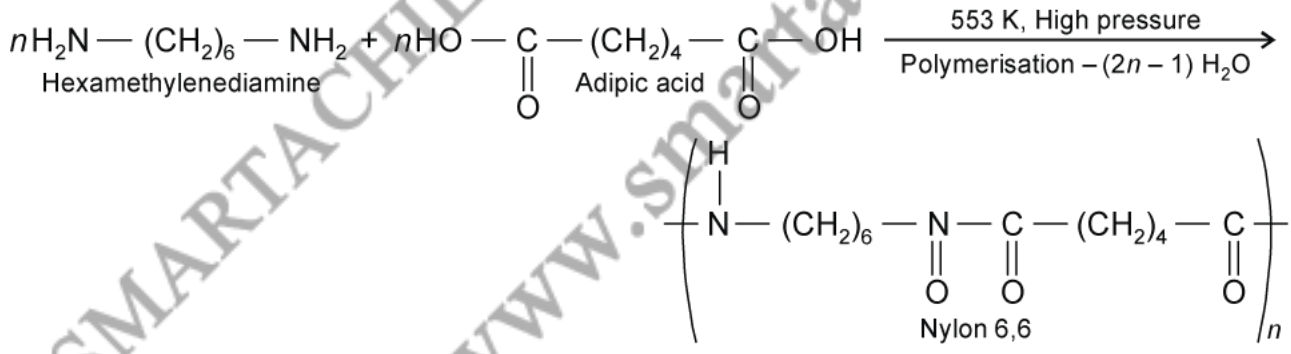
Uses: In packaging orthopaedic devices and control drug release.

A drug is put in capsules of PHBV, which is degraded in the body and drug is released PHBV alsoundergoes bacterial degradation in the environment.

S66. (a) **Nylon-6:** Is is formed by self condensation of caprolactam in the presence of water.



(b) **Nylon-6,6:**

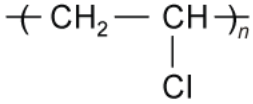


(c) **Polythene:** $n CH_2 = CH_2 \xrightarrow[200°C]{O_2} (-CH_2-CH_2-)_n$

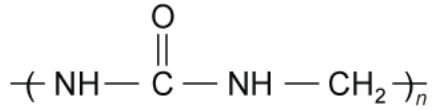
S67. (a) Terylene: Terephthalic acid and ethylene glycol. It is a condensation polymer.

(b) Polythene: Monomer of polythene is ethene. It is an addition polymer.

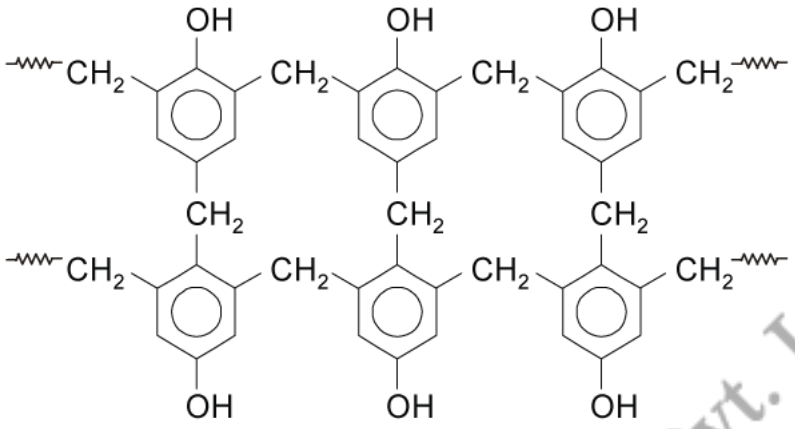
(c) Bakelite: Formaldehyde (HCHO) and Phenol (C_6H_5OH). It is a condensation polymer.

S68. (a) **PVC:** Structure: 

Use in making pipes and raincoats.

(b) **Urea-formaldehyde resin:** Structure: 

Use in making unbreakable crockery.

(c) **Bakelite** Structure: 

Use in making electrical switches and handles of utensils.

S69. (a) Addition polymers: Polythene, rubber.

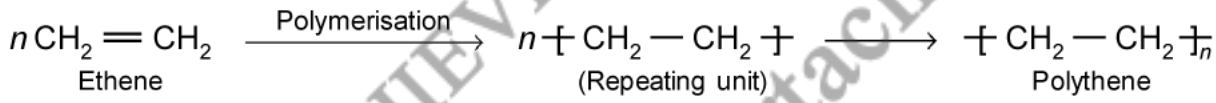
(b) Condensation polymers: Terelene, Nylon 6,6.

(c) Copolymers: SBR, Buna-N.

S70. (a) Students show awareness and responsibility towards the environment.

(b) **Biodegradable polymers:** The natural polymer, which disintegrates by itself or by micro-organisms within certain period of time is called biodegradable polymer, *e.g.*, PHBV (poly-β-hydroxybutyrate-co-β-hydroxyvalerate), Nylon 2-nylon 6.

(c) Polythene is an addition polymer that is formed by addition of ethene molecules.



S71. (a) Students show awareness and responsibility towards the environment.

(b) **Biodegradable polymers:** The natural polymer, which disintegrates by itself or by micro-organisms within certain period of time is called biodegradable polymer, *e.g.*, PHBV (poly-β-hydroxybutyrate-co-β-hydroxyvalerate), Nylon 2-nylon 6.

(c) Polythene is homopolymer because it is formed by the repeatition of single monomer unit *i.e.*, ethene, $CH_2 = CH_2$.