

Polymers

Classification: Natural and synthetic methods of the Polymerisation

- 1. A high molecular weight molecule built from a large number of simple molecules is called a**
 - 1) Monomer
 - 2) Isomer
 - 3) Polymer
 - 4) Tautomer
- 2. A high molecular weight molecule which does not contain repeating structural units is called a**
 - 1) Polymer
 - 2) Macromolecule
 - 3) Both 1 & 2
 - 4) None of the above
- 3. The simple molecules from which a polymer is made are called**
 - 1) Monomers
 - 2) Metamers
 - 3) Rotamers
 - 4) Enantiomers
- 4. Which of the following is not a biopolymer?**
 - 1) Proteins
 - 2) Nucleic acids
 - 3) Cellulose
 - 4) Neoprene
- 5. Which of the following is a synthetic polymer?**
 - 1) Starch
 - 2) Silk
 - 3) Protein
 - 4) Polystyrene
- 6. Homopolymers are made from**
 - 1) Only one type of monomers
 - 2) Two different types of monomers
 - 3) Three different types of monomers
 - 4) Several different types of monomers

7. Amongst the following, a homopolymer is

- | | |
|------------|-------------|
| 1) PMMA | 2) Bakelite |
| 3) Glyptal | 4) Dacron |

8. Which of the following is copolymer?

- | | |
|--------------|---------|
| 1) Buna-S | 2) PAN |
| 3) Polythene | 4) PTFE |

9. Which of the following is a linear polymer?

- | | |
|----------------|----------------------------------|
| 1) Nylon | 2) Bakelite |
| 3) Alkyd resin | 4) Melamine-formaldehyde polymer |

10. Amongst the following, the branched chain polymer is

- | | |
|--------------------------|--------------|
| 1) PVC | 2) Polyester |
| 3) Low density polythene | 4) Nylon-66 |

11. A copolymer of acrylonitrile and 1, 3-butadiene is called

- | | |
|-------------|----------------|
| 1) Buna-N | 2) Polystyrene |
| 3) Neoprene | 4) Buna-S |

12. Which of the following is wrong?

- 1) PMMA is called Plexiglas
- 2) PTEE is called Teflon
- 3) SBR is natural Rubber
- 4) LDPE is called low density Polythene

13. Which of the following statement/s is/are correct?

- 1) Vinyon is a copolymer of vinyl chloride and vinyl acetate.
- 2) Saran is a copolymer of isobutylene and isoprene.
- 3) Butyl rubber is a copolymer of isobutylene and isoprene
- 4) All are correct.

14. Mark the correct statement about thiokol rubber.

- 1) It is a synthetic polysulphide rubber.
- 2) It is obtained by condensation chloride with sodium tetrasulphide.
- 3) It is resistant to oils and abrasion.
- 4) All are correct.

15. Which of the following pairs is not correctly matched?

- 1) Terylene-condensation polymer of terephthalic acid and ethylene glycol
- 2) Teflon - polymer of phenol and formaldehyde
- 3) Perspex-A homopolymer of methyl methacrylate
- 4) Synthetic rubber-A copolymer of butadiene and styrene

16. Which of the following an addition (chain growth) polymer?

- | | |
|-------------|--------------|
| 1) Nylon-66 | 2) Polyester |
| 3) PVC | 4) Glyptal |

17. Which of the following is not an addition polymer?

- | | |
|------------------|----------|
| 1) Polystyrene | 2) PVC |
| 3) Polypropylene | 4) Nylon |

18. An example of addition copolymer is

- | | |
|--------------|-------------------|
| 1) Polythene | 2) Butyl rubber |
| 3) Neoprene | 4) Natural rubber |

19. Which of the following is an addition homopolymer?

- | | |
|--------------|------------------|
| 1) Polythene | 2) Teflon |
| 3) PVC | 4) All the above |

20. Which of the following sets contain only addition homopolymers?

- 1) Polythene, Natural Rubber, Cellulose
- 2) Starch, Nylon, Polyester

- 3) Teflon, Bakelite, Orlon
- 4) Neoprene, PVC, Polythene

21. Which of the following is not a condensation (step growth) polymer?

- 1) Melamine-formaldehyde resin
- 2) Bakelite
- 3) Polythene
- 4) Polyester

22. An example of a condensation homopolymer is

- 1) Bakelite
- 2) Melamine-formaldehyde resin
- 3) Alkyl resin
- 4) Perlon or Nylon-6

23. A polymer formed by coordination polymerization is

- 1) Low density polythene
- 2) High density polythene
- 3) Nylon-6
- 4) Dacron

24. Low density polythene is prepared by

- 1) Free radical polymerization
- 2) Cationic polymerization
- 3) Anionic polymerization
- 4) Ziegler-Natta polymerization

25. The best way to prepare polyisobutylene is

- 1) Coordination polymerization
- 2) Free radical polymerization
- 3) Cationic polymerization
- 4) Anionic polymerization

26. Natural rubber is

- 1) Polyvinyl chloride
- 2) cis-Polyisoprene

3) trans-Polyisoprene

4) Polychloroprene

27. Gutta percha is

1) trans-Polyisoprene

2) A synthetic polymer

3) A very hard material

4) All statements are correct

28. Natural silk is a

1) Polypeptide

2) Polysaccharide

3) Polychloroprene

4) Polyacrylonitrile

29. Artificial silk is a

1) Polypeptide

2) Polysaccharide

3) Polychloroprene

4) Polyacrylonitrile

30. Which of the following is not a polyamide?

1) Wool

2) Leather

3) Nylon

4) Natural rubber

31. Among the following polymers, the strongest intermolecular forces of attraction are present in

1) Elastomers

2) Fibres

3) Thermoplastic

4) Thermosetting polymers

32. Among the following, the weakest inter-particle forces of attraction are present in

1) Thermosetting polymers

2) Thermoplastic polymers

3) Fibres

4) Elastomers

33. Thermoplastics are

1) Linear polymers

2) Soften or melt on heating

3) Molten polymer can be moulded in desired shape

4) All are correct

34. Thermosetting polymers are

- 1) Cross-lined polymers
- 2) Do not melt or soften on heating
- 3) Cross-linking occurs during heating when it hardens irreversibly
- 4) All are correct

35. Which of the following is not a thermosetting polymer?

- | | |
|----------------|-------------|
| 1) Alkyl resin | 2) Bakelite |
| 3) Melmac | 4) SBR |

36. Which are true for elastomers?

- 1) They possess electricity.
- 2) These possess weak intermolecular forces of attraction between polymer chains.
- 3) Vulcanization rubber is an example of elastomers.
- 4) All are correct.

37. Which of the following can be re-melted time and again without producing any change?

- 1) Thermosetting polymers
- 2) Thermoplastic polymers
- 3) Bakelite
- 4) Melamine-formaldehyde polymer

38. The tensile strength, elasticity and resistance to abrasion can be increased by a process called

- | | |
|------------------|-------------------|
| 1) Diazotization | 2) Vulcanization |
| 3) Isomerization | 4) Polymerization |

39. The process of vulcanization was introduced by

- | | |
|---------------------|----------|
| 1) Charles Goodyear | 2) Kolbe |
|---------------------|----------|

3) Wohler

4) Zeiger

40. In vulcanization of rubber

- 1) Sulphur reacts to form a new compound
- 2) Sulphur cross-links are introduced
- 3) Sulphur forms a very thin protective layer over rubber
- 4) All statements are correct

41. Vulcanized rubber resists

- 1) Wear and Tear due to Friction
- 2) Cryogenic Temperature
- 3) High Temperature
- 4) Action of acids

42. The polymer contained by condensation of sebacic acid and hexamethylenediamine is called

- 1) Nylon 6, 6
- 2) Nylon 6
- 3) Nylon 6, 10
- 4) Dacron

43. The linear chains in nylon are held together by

- 1) H-bonds
- 2) Covalent bonds
- 3) Ionic bonds
- 4) Van der waals forces

44. The monomer of PVC is

- 1) Ethylene
- 2) Vinyl Cyanide
- 3) Vinyl chloride
- 4) Chloroprene

45. The repeating structural unit in neoprene is

- 1) Chloroprene
- 2) Chloropicrin
- 3) Chloroethene
- 4) ethylene

46. Chloroprene is obtained by addition of HCl to

- 1) Acetylene
- 2) Vinylacetylene

- 3) β -D- Fructose 4) α -D -Fructose

54. Repeating disaccharide unit of starch is

- 1) Lactose 2) Sucrose
3) Maltose 4) Cellobiose

55. Cellulose is a condensation polymer of

- 1) β -D-Galactose 2) α -D-Glucose
3) β -D-Glucose 4) α -D-Galactose

56. The repeating disaccharide unit of cellulose is

- 1) Cellobiose 2) Maltose 3) Lactose 4) Sucrose

57. A polymer which has better light transmission properties than even glass is

- 1) Perspex 2) Bakelite
3) Buna-S 4) Poly (ethyl acrylate)

58. The polymer used in manufacture of electrical goods such as switches, plugs etc is

- 1) Polythene 2) Bakelite
3) Melamine formaldehyde resin 4) Neoprene

59. The polymer used for coating electrical wires, cables etc is

- 1) Natural rubber 2) Neoprene
3) Nitrile rubber 4) PVC

60. A polymer which is commonly used as a packaging material is

- 1) Polythene 2) Polypropylene
3) PVC 4) Bakelite

61. A synthetic rubber which is resistant to the action of oils, gasoline and other solvents is

- 1) Buna-S 2) Polyisoprene

3) Neoprene

4) Polystyrene

62. The monomer unit of silicone-a water repellent, heat and acid resistant polymer is

1) Si

2) SiO₂

3) R₂SiO

4) R₄Si

63. If N₁, N₂, N₃.....N_i are the number of molecules with molecular masses M₁, M₂, M₃ M_i respectively, then the weight average molecular mass (\overline{M}_w) is expressed as

1) $\frac{\sum N_i M_i^2}{\sum N_i M_i}$

2) $\frac{\sum N_i M_i}{\sum N_i}$

3) $\frac{\sum M_i^2}{\sum N_i}$

4) $\frac{\sum N_i M_i}{\sum M_i}$

64. If N₁, N₂, N₃.....N_i are the number of molecules with molecular masses M₁, M₂, M₃ M_i respectively, then the number average molecular mass (\overline{M}_n) is expressed as

1) $\frac{\sum N_i M_i^2}{\sum N_i M_i}$

2) $\frac{\sum N_i M_i}{\sum N_i}$

3) $\frac{\sum M_i^2}{\sum N_i}$

4) $\frac{\sum N_i M_i}{\sum M_i}$

65. Number average molecular mass (\overline{M}_n) and weight average molecular mass (\overline{M}_w) of synthetic polymers are related as

1) $\overline{M}_n < \overline{M}_w$

2) $\overline{M}_n > \overline{M}_w$

3) $\overline{M}_n = \overline{M}_w$

4) $\overline{M}_n = \sqrt{\overline{M}_w}$

66. The abbreviation PDI refers to

1) Name of the polymer

2) Polydispersity index

3) Planck's disposal index

4) Poly diagonal index

67. PDI for natural polymers is generally close to

1) Zero

2) 100

3) 1

4) 10

Key

Level – I

1) 3 2) 2 3) 1 4) 4 5) 4 6) 1

7) 1 8) 1 9) 1 10) 3 11) 1 12) 3

13) 4 14) 4 15) 2 16) 3 17) 4 18) 2

19) 4 20) 4 21) 3 22) 4 23) 2 24) 1

25) 3 26) 2 27) 1 28) 1 29) 2 30) 4

31) 2 32) 4 33) 4 34) 4 35) 4 36) 4

37) 2 38) 2 39) 1 40) 2 41) 1 42) 3

43) 1 44) 3 45) 1 46) 2 47) 1 48) 4

49) 1 50) 2 51) 2 52) 2 53) 1 54) 3

55) 3 56) 1 57) 1 58) 2 59) 2 60) 1

61) 3 62) 3 63) 1 64) 2 65) 1 66) 2

67) 3

**SOME IMPORTANT POLYMERS NATURAL AND SYNTHETIC LIKE
POLYMERS LIKE POLYESTERS, BAKELITE, RUBBER, BIODEGRABLE AND
NON-BIODEGRABLE POLYMERS**

1. Polymer obtained by condensation polymerization is

- | | |
|------------------------|-------------------|
| 1) Polythene | 2) Teflon |
| 3) Phenol-formaldehyde | 4) Nitrile rubber |

2. Which is an example of thermosetting polymer?

- | | |
|--------------|-------------|
| 1) Polythene | 2) PVC |
| 3) Neoprene | 4) Bakelite |

3. Which of the following fibres is made of polyamides?

- | | | | |
|-----------|----------|----------|----------|
| 1) Dacron | 2) Orlon | 3) Nylon | 4) Rayon |
|-----------|----------|----------|----------|

4. Which one of the following can be used as a monomer in polymerization reaction?

- | | |
|--------------------------------------|--------------------------------------|
| 1) $\text{CH}_3\text{CH}_2\text{Cl}$ | 2) $\text{CH}_3\text{CH}_2\text{OH}$ |
| 2) C_6H_6 | 4) C_3H_6 |

5. The catalyst used in the manufacture of polyethylene by Ziegler method is

- 1) Titanium tetrachloride and triphenyl aluminium
 - 2) Titanium tetrachloride and triethyl aluminium
 - 3) Titanium dioxide
 - 4) Titanium isopropoxide
- 6. Bakelite is obtained from phenol by reacting it with**
- 1) Acetaldehyde
 - 2) Acetal
 - 3) Formaldehyde
 - 4) Chlorobenzene
- 7. Synthetic human hair wigs are made from a copolymer of vinyl chloride and acrylonitrile and is called**
- 1) PVC
 - 2) Polyacrylonitrile
 - 3) Cellulose
 - 4) Dynel
- 8. An example of biopolymer is**
- 1) Teflon
 - 2) Neoprene
 - 3) Nylon-66
 - 4) DNA
- 9. Synthetic polymer prepared by using caprolactam is known as**
- 1) Terylene
 - 2) Teflon
 - 3) Nylon-6
 - 4) Neoprene
- 10. The turbidity of polymer solution measures**
- 1) The light scattered by solution
 - 2) The light absorbed by a solution
 - 3) The light transmitted by a solution
 - 4) None of the above
- 11. Plexiglas (PMMA) is a polymer of**
- 1) Acrylic acid
 - 2) Methyl acrylate
 - 3) Methyl methacrylate
 - 4) Adipic acid

13. The monomeric unit of orlon molecule is

- | | |
|--------------------------------------|--|
| 1) $\text{CH}_2=\text{CH}-\text{Cl}$ | 2) $\text{CH}_3\text{COO}-\text{CH}=\text{CH}_2$ |
| 3) $\text{CH}_2=\text{CH}-\text{CN}$ | 4) $\text{C}_6\text{H}_5-\text{CH}=\text{CH}_2$ |

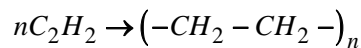
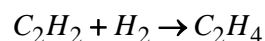
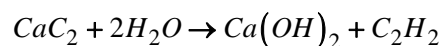
14. Which of the following is not an example of addition polymer?

- | | |
|----------------|------------------|
| 1) Polystyrene | 2) Nylon |
| 3) PVC | 4) Polypropylene |

15. Teflon is a polymer of monomer

- | | |
|------------------------|-----------------------|
| 1) Difluoroethylene | 2) Monofluoroethylene |
| 3) Tetrafluoroethylene | 4) Trifluoroethylene |

16. Formation of polyethylene from calcium carbide takes place as follows



The amount of polyethylene obtained from 64.1 kg of CaC_2 is

- | | | | |
|---------|----------|----------|----------|
| 1) 7 kg | 2) 14 kg | 3) 21 kg | 4) 28 kg |
|---------|----------|----------|----------|

17. Which one of the following is used to make 'nonstick' cookware?

- | | |
|----------------------------------|----------------------------|
| 1) PVC | 2) Polystyrene |
| 3) Poly (ethylene terephthalate) | 4) Polytetrafluoroethylene |

18. Ebonite is

- | | |
|-----------------------------|---------------------|
| 1) Natural rubber | 2) Synthetic rubber |
| 3) Highly vulcanized rubber | 4) Polypropylene |

19. Orlon is a polymer of

- | | |
|-------------------|------------------------|
| 1) Styrene | 2) Tetrafluoroethylene |
| 3) Vinyl chloride | 4) Acrylonitrile |

20. Which of the following polymers do not involve cross linkages?

- | | |
|--------------|----------------------|
| 1) Melmac | 2) Bakelite |
| 3) Polythene | 4) Vulcanised rubber |

21. Bakelite is prepared by the reaction between

- 1) Phenol and formaldehyde
- 2) Ethylene glycol and dimethyl phthalate
- 3) Urea and formaldehyde
- 4) Tetramethylene glycol and hexamethylenediamine

22. Polymer which has amide linkage is

- | | | | |
|---------------|-------------|-----------|-------------|
| 1) Nylon-6, 6 | 2) Terylene | 3) Teflon | 4) Bakelite |
|---------------|-------------|-----------|-------------|

23. Glyptal polymer is obtained from glycerol by reacting with

- | | |
|-----------------|------------------|
| 1) Malonic acid | 2) Phthalic acid |
| 3) Maleic acid | 4) Acetic acid |

24. The monomer unit of polyvinyl chloride has the formula

- | | |
|--------------------|------------------|
| 1) $CH_3 - CH_2Cl$ | 2) $CH_2 = CH_2$ |
| 3) $CHCl = CHCl$ | 4) $CH_2 = CHCl$ |

25. Which compound/set of compounds is used in the manufacture of Nylon-6,6?

- 1) $HOOC(CH_2)_4COOH + H_2N(CH_2)_6NH_2$
- 2) $CH_3 = CH - C(CH_3) = CH_2$
- 3) $CH_2 = CH_2$
- 4) $HOOC - COOH + HOCH_2 - CH_2OH$

26. P.V.C. is formed by polymerization of

- | | |
|-------------------|--------------------|
| 1) 1-chloroethene | 2) Ethene |
| 3) Propene | 4) 1-Chloropropane |

27. Dimethyl phthalate and ethylene glycol react to form

- | | |
|------------|-------------|
| 1) Nylon-6 | 2) Nylon-66 |
| 3) Dacron | 4) Neoprene |

28. Which of the following contains isoprene units?

- | | |
|-------------------|-------------|
| 1) Natural rubber | 2) Nylon-66 |
| 3) Polyethylene | 4) Dacron |

29. Which is not a macromolecule?

- | | |
|--------------|------------|
| 1) DNA | 2) Starch |
| 3) Palmitate | 4) Insulin |

30. Which one of the following is not an example of chain growth polymer?

- | | |
|-------------|------------|
| 1) Neoprene | 2) Buna-S |
| 3) PMMA | 4) Glyptal |

31. Ziegler-Natta catalyst is

- 1) Pd + BaSO₄
- 2) HCl + ZnCl₂
- 3) TiCl₄ + Al(C₂H₅)₃
- 4) LiAlH₄

32. Nylon-66 is made by using

- | | |
|----------------|------------------|
| 1) Phenol | 2) Benzaldehyde |
| 3) Adipic acid | 4) Succinic acid |

33. Natural rubber is a polymer of

- | | |
|--------------|-------------|
| 1) Butadiene | 2) Ethyne |
| 3) Styrene | 4) Isoprene |

34. Terylene is a condensation polymer of ethylene glycol and

- | | |
|-----------------|------------------|
| 1) Benzoic acid | 2) Phthalic acid |
|-----------------|------------------|

3) Salicylic acid

4) Terephthalic acid

35. Which is not true about polymers?

1) Polymers do not carry any charge.

2) Polymers have high viscosity.

3) Polymers scatter light.

4) Polymers have low molecular weight.

36. On the basis of mode of formation, polymers can be classified?

1) As addition polymers only

2) As condensation polymers only

3) As copolymers

4) Both as addition and condensation polymers

37. The process of involving heating of rubber with sulphur is called

1) Galvanization

2) Vulcanization

3) Bessemerisation

4) Sulphonation

38. Terylene is made by polymerization of terephthalic acid with

1) Ethylene glycol

2) Phenol

3) Ethanol

4) Catechol

39. Teflon, styrene and neoprene are all

1) Copolymers

2) Condensation polymers

3) Homopolymers

4) Monomers

40. Inter-particle forces present in Nylon-6,6 are

1) Van der Waal's

2) Hydrogen bonding

3) Dipole-dipole interactions

4) None of these

41. $F_2C=CF_2$ is a monomer of

1) Teflon

2) Glyptal

3) Nylon-6

4) Buna-5

42. Soft drinks and baby feeding bottles are generally made up of

- | | |
|--------------|-----------------|
| 1) Polyester | 2) Polyurethane |
| 3) Polyurea | 4) Polyamide |

43. Polymer used in bullet proof glass is

- | | |
|----------|-----------|
| 1) PMMA | 2) Lenan |
| 3) Nomex | 4) Kevlar |

44. Which of the following is a constituent of nylon?

- | | |
|----------------|------------------|
| 1) Adipic acid | 2) Styrene |
| 3) Teflon | 4) None of these |

45. Caprolactam polymerises to give

- | | |
|-------------|------------|
| 1) Terylene | 2) Teflon |
| 3) Glyptal | 4) Nylon-6 |

46. Polyvinyl alcohol can be prepared by

- 1) Polymerization of vinyl alcohol
- 2) Alkaline hydrolysis of polyvinyl acetate
- 3) Polymerization of acetylene
- 4) Reaction of acetylene with H_2SO_4 in presence of $HgSO_4$

47. A condensation polymer among the following is

- | | |
|----------------|-----------|
| 1) Dacron | 2) PVC |
| 3) Polystyrene | 4) Teflon |

48. The catalyst used for the polymerization of olefins is

- | | |
|---------------------------|-------------------------|
| 1) Ziegler-Natta catalyst | 2) Wilkinson's catalyst |
| 3) Pd-catalyst | 4) Zeise's salt complex |

49. Which of the following used in paints?

- | | |
|-------------|----------------|
| 1) Terylene | 2) Nylon |
| 3) Glyptal | 4) Chloroprene |

50. Polymer formation from monomers starts by

- 1) Condensation reaction between monomers
- 2) Coordination reaction between monomers
- 3) Conversion of monomer to monomer ions by protons
- 4) Hydrolysis of monomers

51. Which of the following is a polyamide molecule?

- | | |
|-------------|----------------|
| 1) Terylene | 2) Rayon |
| 3) Nylon-6 | 4) Polystyrene |

52. Nylon threads are made of

- | | |
|-------------------------|----------------------|
| 1) Polyethylene polymer | 2) Polyvinyl polymer |
| 3) Polyester polymer | 4) Polyamide polymer |

53. Rubber is a polymer of

- | | |
|-----------|-------------|
| 1) Pyrene | 2) Isoprene |
| 3) Urea | 4) Ethylene |

54. Which of the following is currently used as a tyre cord?

- | | |
|------------------|-----------------|
| 1) Terylene | 2) Polyethylene |
| 3) Polypropylene | 4) Nylon-6 |

55. List - I

- A) Natural Polymer
- B) Synthetic Polymer
- C) Condensation polymer
- D) Addition polymer

List - II

- 1) PVC
- 2) Nylon - 6, 6
- 3) Silk
- 4) Polyethylene

	A	B	C	D
1)	2	3	4	1
2)	3	2	1	4
3)	3	4	2	1

4) 3 2 4 1

56. **List - I**

List - II

A) Rayon

1) Cationic Polymerisation

B) Glass

2) Organic Polymers

C) Polystyrene

3) Inorganic polymers

D) Poly isoprene

4) Anionic polymerisation

	A	B	C	D
1)	2	3	4	1
2)	3	2	4	1
3)	2	1	3	4
4)	2	3	1	4

Key

- 1) 3 2) 4 3) 3 4) 4 5) 2 6) 3 7) 4 8) 4 9) 3 10) 1 11) 3 12) 3
 13) 3 14) 2 15) 3 16) 4 17) 4 18) 3 19) 4 20) 3 21) 1 22) 1 23) 2 24) 4
 25) 1 26) 1 27) 3 28) 1 29) 3 30) 4 31) 3 32) 3 33) 4 34) 4 35) 4 36) 4
 37) 2 38) 1 39) 3 40) 2 41) 1 42) 3 43) 2 44) 1 45) 4 46) 2 47) 1 48) 1
 49) 3 50) 1 51) 3 52) 4 53) 1 54) 2 55) 2 56) 4