Polymers

1. The formation of which of the following polymers involves hydrolysis reaction? **(2017)**
(a) Nylon-6
(b) Bakelite
(c) Nylon-6, 6
(d) Terylene

2. Which of the following statements about low density polythene is false? **(2016)**
(a) It is a poor conductor of electricity
(b) Its synthesis required dioxygen or a peroxide initiator as a catalyst
(c) It is used in the manufacture of buckets, dustbins etc.
(d) Its synthesis requires high pressure

3. On complete hydrogenation, natural rubber produces **(2016)**
(a) ethylene-propylene copolymer
(b) vulcanized rubber
(c) polypropylene
(d) polybutylene

4. Which polymer is used in the manufacture of paints and lacquers? **(2015)**
(a) Bakelite
(b) Glyptal
(c) Polypropene
(d) Polyvinyl chloride

5. Which one is classified as a condensation polymer? **(2014)**
(a) Dacron
(b) Neoprene
(c) Teflon
(d) Acrylonitrile

6. Among sucrose, poly (vinyl chloride), nylon and natural rubber, the polymer in which the intermolecular force of attraction is weakest is **(2009)**
(a) nylon
(b) poly (vinyl chloride)
(c) sucrose
(d) natural rubber

7. Which of the following is a polyamide? **(2005)**

(a) Teflon

(b) Nylon-6, 6

(c) Terylene

(d) Bakelite

8. Which of the following is a fully fluorinated polymer? **(2005)**

(a) Neoprene

(b) Teflon

(c) Thiokol

(d) PVC

9. Buna – N synthetic rubber is copolymer of: **(2009)**

(a) $H_2C=CH-CH=CH_2$ and $H_5C_6-CH=CH_2$

(b) $H_2C=CH-CN$ and $H_2C=CH-CH=CH_2$

(c) $H_2C=CH-CN$ and $H_2C=CH-\underset{\underset{CH_3}{|}}{C}=CH_2$

(d) $H_2C=CH-\overset{\overset{Cl}{|}}{C}=CH_2$ and $H_2C=CH-CH=CH_2$

10. The polymer containing strong intermolecular forces e.g., hydrogen bonding is **(2010)**

(a) Teflon

(b) nylon 6,6

(c) polystyrene

(d) natural rubber

11. The species which can best serve as an initiator for the cationic polymerization is **(2012)**

(a) $AlCl_3$

(b) HNO_3

(c) $LiAlH_4$

(d) $BuLi$

12. Which polymer is used in the manufacture of protective coating? **(2017)**

(a) Bakelite

(b) Glyptal

(c) Polypropene

(d) Poly vinyl chloride

13. Poly ethylene glycol is farmed as a result of? **(2016)**
(a) free radical polymerization of epoxider
(b) cationic polymerization of epoxider
(c) anionic polymerization of epoxider
(d) Can be any of these

14. Polymer formation from monomers starts by
(a) condensation reaction between monomers
(b) coordination reaction between monomers
(c) conversion of monomer to monomer ions by protons
(d) oxidation of monomers

15. On the basis of mode of formation, polymers can be classified as
(a) addition polymers only
(b) condensation polymers only
(c) co-polymers
(d) both addition and condensation polymers

16. Which of the following is a chain growth polymer?
(a) proteins
(b) starch
(c) nucleic acid
(d) polystyrene

17. The repeating units of PTFE are
(a) $F_2C = CF_2$
(b) $F_2C = Br_2$
(c) $F_3C - CF_3$
(d) $Cl_2CH - CH_3$

18. Low density polythene is prepared by
(a) free radical polymerization
(b) cationic polymerization
(c) anionic polymerization
(d) Ziegler – Natta polymerization

19. A sample of a polymer has 200 molecules of molar mass 1000 each and 500 molecules of molar mass 1,00000. The weight average molecular mass of this polymer is?
(a) 55394
(b) 49553
(c) 94553
(d) 35594

20. Which among the following is a synthetic polymer?
(a) Phenol-formaldehyde resin
(b) proteins
(c) polysaccharides
(d) natural rubber

21. The abbreviation PDI refers to
(a) poly diagonal index
(b) application of polymer
(c) name of the polymer
(d) poly disparity index of polymer

22. Which pair of species given below produce Bakelite?
(a) phenol, methanol
(b) phenol, NaOH
(c) phenol, urea
(d) phenol, formaldehyde

23. Treatment of rubber with sulphur is
(a) annealing
(b) vulcanization
(c) quenching
(d) none of these

24. Teflon, styrene and neoprene are all
(a) monomers
(b) co-polymers
(c) homopolymers
(d) condensation polymers

25. Which of the following contains isoprene units?
(a) natural rubber

(b) Nylon-6, 6
(c) polyethylene
(d) Dacron

26. PVC as obtained after polymerization is
(a) soft and pliable
(b) hard, brittle and transparent
(c) hard and infusible
(d) none of these

27. Which of the following polymers does not involve cross linkages?
(a) Melmac
(b) Bakelite
(c) polythene
(d) vulcanized rubber

28. The compound used in the manufacture of terylene is
(a) ethylene
(b) vinyl chloride
(c) ethylene glycol
(d) adipic acid

29. The best way to prepare polyisobutylene is
(a) coordination polymerization
(b) free radical polymerization
(c) cationic polymerization
(d) anionic polymerization

30. A polymer of ethylene chloride and sodium polysulphide is?
(a) Thiokol
(b) Melamine
(c) Glyptal
(d) Perlon L

31. Which of the following is not made of polyamides?
(a) nylon
(b) natural silk
(c) wool
(d) artificial silk

32. Which one of the following is used to make nonstick cookware?
(a) PVC
(b) polystyrene
(c) polythene terephthalate
(d) polytetrafluoroethylene

33. Natural rubber is a polymer of
(a) butadiene
(b) ethyne
(c) styrene
(d) isoprene

34. PVC is formed by polymerization of
(a) 1-chloroethene
(b) ethane
(c) propene
(d) 1-chloropropane

35. Synthetic polymer prepared from caprolactum is known as
(a) Teflon
(b) Nylon-6
(c) Nylon-610
(d) Terylene

36. Which one of the following is not an example of chain growth polymer?
(a) neoprene
(b) Buna – S
(c) PMMA
(d) glyptal

37. Urethane is
(a) $H_2N-X\equiv N$
(b) $H_2N-\underset{\underset{O}{\|}}{C}-OH$
(c) $H_2N-\underset{\underset{O}{\|}}{C}-OC_2H_5$
(d) $HO-C\equiv N$

38. Nylon threads are made of
(a) polyester polymer
(b) polyamide polymer
(c) polyvinyl polymer
(d) polyethylene polymer

39. Which of the following is a copolymer?
(a) Nylon 6, 6
(b) polyethene
(c) PMMA
(d) Nylon-6

40. Glyptal polymer is obtained from glycerol by reacting with
(a) malonic acid
(b) phthalic acid
(c) maleic acid
(d) acetic acid

41. Terylene is a condensation polymer of ethylene glycol and
(a) benzoic acid
(b) phthalic acid
(c) salicylic acid
(d) terephthalic acid

42. Soft drinks and baby feeding bottles are generally made up of
(a) polyamide
(b) polystyrene
(c) polyester
(d) polyurea

43. $F_2C = CF_2$ is monomer of
(a) Teflon
(b) glyptal
(c) Nylon-6
(d) Buna-S

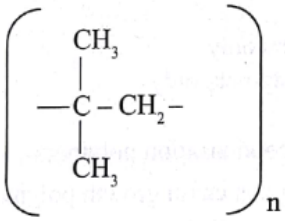
44. Plexiglas (PMMA) is a polymer of
(a) methyl methacrylate

(b) methyl acrylate
(c) acrylic acid
(d) none of these

45. Dimethyl phthalate and ethylene glycol react to form
(a) Nylon-6
(b) Nylon-6,6
(c) Dacron
(d) neoprene

46. Which of the following is not an example of addition polymer?
(a) polystyrene
(b) nylon
(c) PVC
(d) propylene

47. Monomer of



is
(a) 2-methylpropene
(b) styrene
(c) propylene
(d) ethene

48. Which is used for the formation of nylon-6, 6?
(a) phthalic acid
(b) sulphurous acid
(c) sulphur hexafluoride
(d) adipic acid

49. Which one of the following monomers gives the polymer neoprene on polymerization?
(a) $CH_2 = CH - Cl$
(b) $CCl_2 = CCl_2$
(c) $CH_2 = \overset{Cl}{\overset{|}{C}} - CH = CH_2$

(d) $CF_2 = CF_2$

50. Ziegler–Natta catalyst is

(a) $K\left[PtCl_3\left(C_2H_4\right)\right]$

(b) $\left(Ph_3P\right)_3 RhCl$

(c) $Al_2\left(C_2H_5\right)_6 + TiCl_4$

(d) $Fe\left(C_5H_5\right)_2$

51. Synthetic human hair wigs are made from a copolymer of vinyl chloride and acrylonitrile and is called

(a) Dynel

(b) Cellulose

(c) PVC

(d) Polyacrylonitrile

52. Ebonite is

(a) natural rubber

(b) synthetic rubber

(c) highly vulcanized rubber

(d) polypropene

53. Nylon-610 is a polymer of

(a) caprolactam

(b) hexamethylene and sebacic acid

(c) hexamethylene and adipic acid

(d) none of these

54. Which is not a macromolecule?

(a) DNA

(b) Starch

(c) Palmitate

(d) Insulin

55. The monomer unit of polyvinyl chloride has the formula

(a) $CH_3 - CH_2Cl$

(b) $CH_2 = CH_2$

(c) $CHCl = CHCl$

(d) $CH_2 = CHCl$

56. Teflon is a polymer of
(a) tetrafluorethylene
(b) tetraiodoethylene
(c) tetrabromoethylene
(d) tetrachloroethylene

57. The turbidity of a polymer solution measures
(a) light transmitted by the solution
(b) light scattered by the solution
(c) a light absorbed by solution
(d) none of these

58. If $N_1, N_2, N_3, ...N_i$ are the number of molecules with molecular masses $M_1, M_2, M_3, ...M_i$ respectively, then the number average molecular mass $\left(\overline{M}_w\right)$ is given by

(a) $\frac{\sum N_i M_i^2}{\sum N_i M_i}$

(b) $\frac{\sum N_i M_i}{\sum N_i}$

(c) $\frac{\sum M_i^2}{\sum N_i}$

(d) $\frac{\sum N_i M_i}{\sum M_i}$

59. Orlon has a unit of
(a) glycol
(b) isoprene
(c) vinyl cyanide
(d) acrolein

60. $\left[NH\left(CH_2\right)NHCO\left(CH_2\right)_4 CO\right]n$ is a
(a) thermosetting polymer
(b) aromatic nucleophilic substitution
(c) aromatic electrophilic substitution
(d) aldol reaction

61. Which of the following is a biodegradable polymer?
(a) cellulose
(b) nylon-6
(c) polythene
(d) polyvinyl chloride

62. The substance used to harden the rubber for tyre manufacture is
(a) CaC_2
(b) wax
(c) carbon black
(d) 1, 3-butadiene

63. Which of the following is not correct regarding terylene?
(a) synthetic fibre
(b) thermosetting plastic
(c) step-growth polymer
(d) condensation polymer

64. Perlon is another name of
(a) Nylon-610
(b) Nylon-44
(c) Nylon-6, 6
(d) Nylon-6

65. Cellulose is a condensation polymer of
(a) α -galactose
(b) α -glucose
(c) β -glucose
(d) β -galactose

66. Which one of the following polymers is prepared by condensation polymerization?
(a) Nylon-6, 6
(b) Teflon
(c) Rubber
(d) Styrene

67. Toluene di-isocyanate is used to prepare

(a) polyamides
(b) polyurethanes
(c) polycarbonates
(d) polyesters

68. Which of the following is an elastomer?
(a) Dacron
(b) Melamine
(c) vulcanized rubber
(d) polystyrene

69. Natural silk is a
(a) polychloroprene
(b) polypeptide
(c) polyacrylonitrile
(d) polysaccharide

70. Synthetic rubber (neoprene) is
(a) polyamide
(b) polyester
(c) poly halodiene
(d) polysaccharide

71. A polymer of prop-2-ene nitrile is called
(a) Tetron
(b) Saran
(c) Orlon
(d) Dacron

72. Which one of the following pairs of monomers is used in the manufacture of 'Dacron'?
(a) acrylonitrile and vinyl acetate
(b) terephthalic acid and ethylene glycol
(c) phthalic acid and ethylene glycol
(d) adipic acid and hexamethylene diamine

73. Which can be used as monomer in a polymerization reaction?
(a) C_2H_4
(b) C_2H_6
(c) C_2H_5Cl

(d) C_6H_5Cl

74. Consider the following sequence of reactions.

$$HC \equiv CH \xrightarrow{(i)CuCl, NH_4Cl, (ii)HCl} (X) \xrightarrow{\text{Polymerization}} (Y)$$

The polymer (Y) is

(a) PVC

(b) Saran

(c) Neoprene

(d) Chloroprene

75. Which of the following is biodegradable polymer of polyamide class?

(a) dextran

(b) Nylon-2-Nylon-6

(c) Nylon 6, 6

(d) PHBV

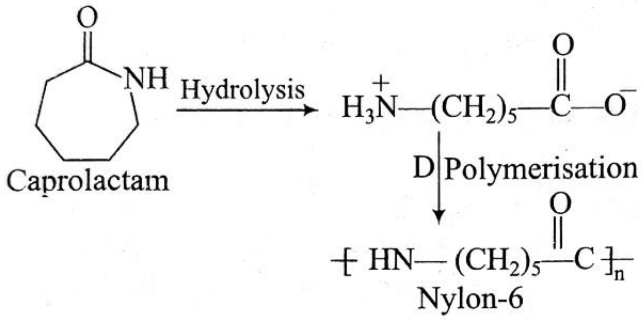
Answer Key:

1. (a) 2. (c) 3. (a) 4. (b) 5. (a) 6. (d) 7. (b) 8. (b) 9. (b) 10. (b) 11. (a) 12. (a)
13. (c) 14. (a) 15. (d) 16. (d) 17. (a) 18. (a) 19. (c) 20. (a) 21. (d) 22. (d) 23. (b) 24. (c)
25. (a) 26. (c) 27. (c) 28. (c) 29. (c) 30. (a) 31. (d) 32. (d) 33. (d) 34. (a) 35. (b) 36. (c)
37. (c) 38. (b) 39. (a) 40. (b) 41. (d) 42. (b) 43. (a) 44. (a) 45. (c) 46. (b) 47. (a) 48. (d)
49. (c) 50. (c) 51. (a) 52. (c) 53. (b) 54. (c) 55. (d) 56. (a) 57. (c) 58. (b) 59. (c) 60. (c)
61. (a) 62. (c) 63. (c) 64. (d) 65. (c) 66. (a) 67. (c) 68. (c) 69. (b) 70. (c) 71. (c) 72. (b)
73. (a) 74. (c) 75. (c)

Solutions

1. (a)

Nylon-6 or perlon is prepared by polymerisation of amino caproic acid at high temperature. Caprolactam is first hydrolysed with water to form amino acid which on heating undergoes polymerisation to give nylon-6.

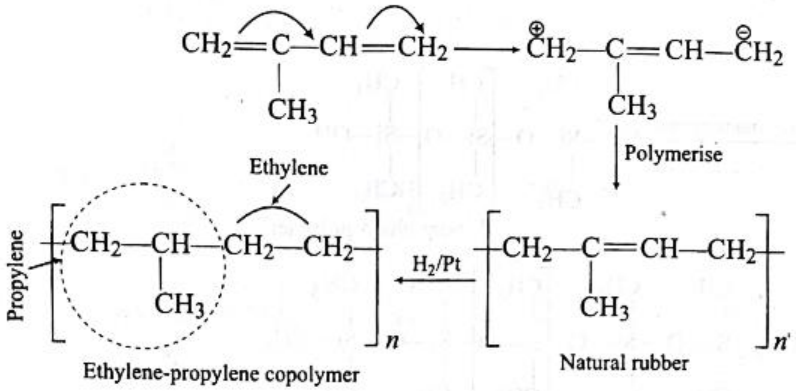


2. (c)

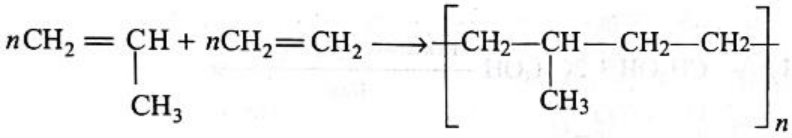
High density polythene is used in the manufacture of buckets, dustbins etc.

3. (a)

Natural rubber is formed by polymerisation of isoprene.



This co-polymer is formed from propylene and ethylene.



4. (b)

(a) Bakelite is used for making gears, protective coating and electrical fittings.

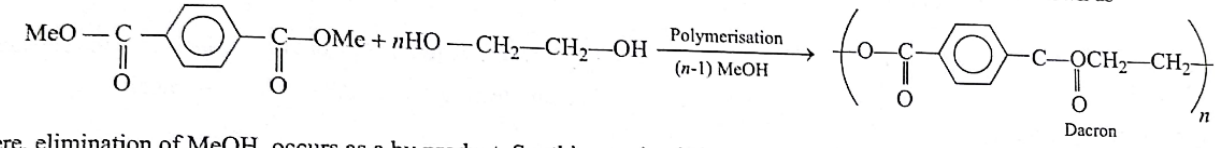
(b) Glyptal is used in the manufacture of paints and lacquers.

(c) PP is used in the manufacture of textile, packaging materials etc.

(d) Polyvinyl chloride (PVC) is used in the manufacture of rain coats, hand bags, leather clothes etc.

5. (a)

Dacron is a condensation polymer of ethylene glycol and methyl terepthalate. Formation of dacron can be shown as

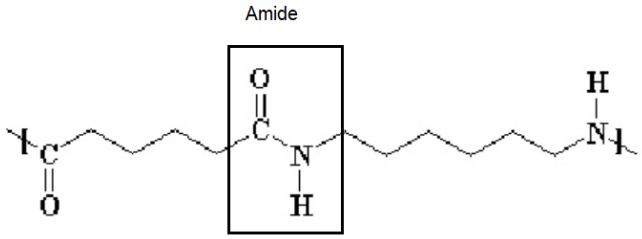


Here, elimination of MeOH occurs as a by product. So, this reaction is known as condensation polymerisation.

6. (d)

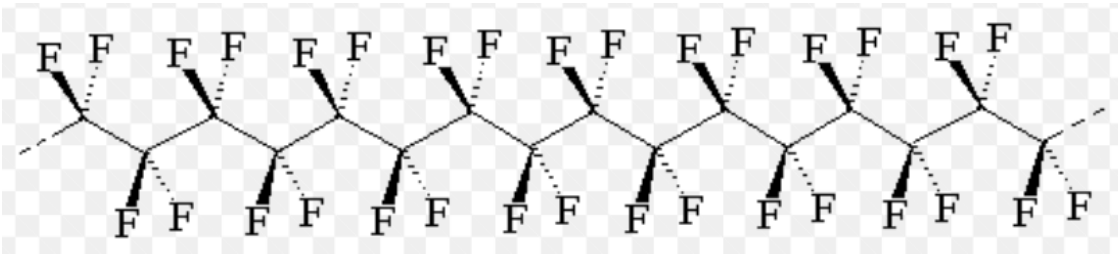
Cellulose and nylons have H-bonding type of intermolecular attraction while poly (vinyl chloride) is polar. Natural rubber is hydrocarbon and has the weakest intermolecular force of attraction, i.e. van der Waals' force of attraction.

7. (b)



nylon 6,6

8. (b)

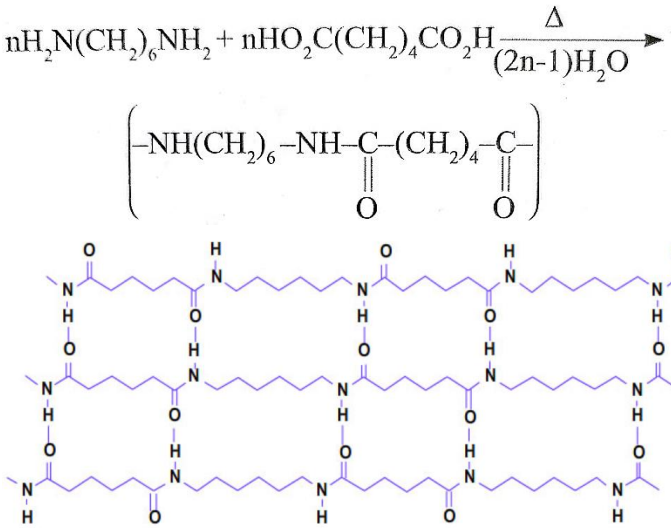


Teflon structure

9. (b)

10. (b)

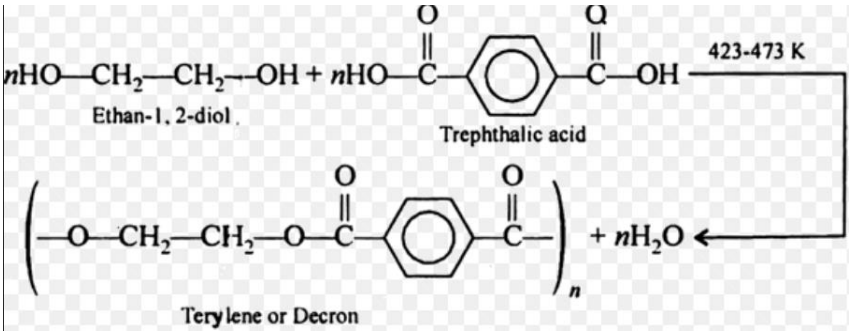
. Nylon 6, 5 has amide linkages capable of forming hydrogen bonding



11. (a)
In cationic polymerization Lewis acids like $AlCl_3, BF_3$ etc. act as good initiators.

12. (a)
Bakelite is used in the manufacture of protective coating.

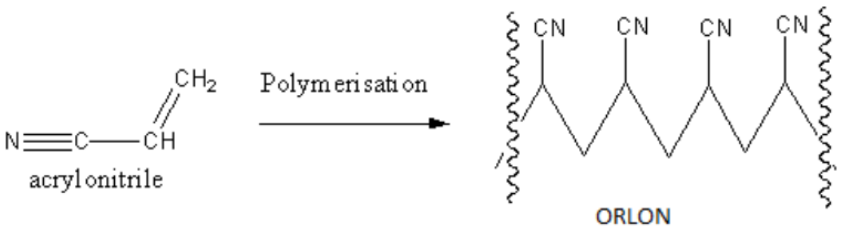
13. (c)
14. (a)
15. (d)
16. (d)
17. (a)
18. (a)
19. (c)
20. (a)
21. (d)
22. (d)
23. (b)
24. (c) Homopolymers are polymers made by joining together monomers of the same chemical composition or structure.
25. (a)
26. (c)
27. (c)
28. (c)



29. (c)
30. (a)
31. (d)
32. (d)
33. (d)
34. (a)
35. (b)
36. (c)
37. (d)
38. (b)
39. (a)
40. (b)
41. (d)
42. (b)
43. (a)
Thiokol is polymer of $C_2H_4Cl_2$ and Na_2S_2.

44. (a)
45. (c)
46. (b)
47. (a)
48. (d)
49. (c)
50. (c)
51. (a)
52. (c)
53. (b)
54. (c)
55. (d)
56. (a)
57. (c)
58. (b)

59. (c)



60. (c)
61. (a)
62. (c)
63. (b)
64. (d)
65. (c)
66. (a)
67. (c)
Polyurethane is a co-polymer of ethylene glycol and toluene di isocyanate or ethylene di-isocyanate.

68. (c)
69. (b)
70. (c)
71. (c)
Orlon is a polymer of prop-2-ene nitrile or acrylonitrile or $CH_2 = CH - CN$.

72. (b)
73. (a)
The monomer unit for polymerization must possess a C=C double in it.

74. (c)

75. (c)