25POLYMERS

MULTIPLE CHOICE QUESTIONS

1. Trans-form of polyisoprene is

(a) Guttapercha (b) Hydrochloride rubber

(c) Buna-N (d) Synthetic rubber

Sol. (a)

Guttapercha rubber is very hard horny material consisting of trans 1, 4 - polyisoprene polymer

2. Wash and wear clothes are manufactured using

(a) Nylon fibres (b) Cotton mixed with nylon

(c) Terylene fibres (d) Wool fibres

Sol. (c)

The fibre of terylene is highly crease - resistant, durable and has low moisture content. It is also not damaged by pests like moths and mildew. It is therefore used for the manufacture of wash and wear fabrics. It is also blended with cotton (Terycot) and wool (Terywool) to increase their resistance to wear and tear.

3. In the manufacture of polythene by the Ziegler process using ethylene, the temperature for proper polymerisation required is

(a) Below $10^{\circ}C$ (b) 10° to $50^{\circ}C$

(c) 50° to $80^{\circ}C$ (d) 80° to $140^{\circ}C$

Sol. (c)

The reaction carried out at temp. 50°-80°C.

4. High density polyethylene(HDPE) can be prepared from ethylene by

(a) Ziegler-Natta process

(b) Heating with peroxides

(c) Condensing in sealed tubes

(d) Condensing with styrenes

Sol. (a)

HDPE is prepared by co-ordination polymerization which occurs through the intermediate formation of co-ordination complexes. For example, ethylene first forms a co-ordination complex with the transition metal titanium by donating its π-electrons. The π complex thus formed then reacts stepwise with a large number of ethylene molecules ultimately leading to the formation of a polymer. The polythene so obtained has high density $(0.97\,g/cm^3)$ and higher m.pt. (403K) as compare to LDPE (density- 0.92 g/cm^3 and m.pt. 384K)

5. Nylon-6 is

(a) Elastomer (b)Orlon (c)**polyester** (d) Perlon

Sol. (d)

Perlon is Nylon-6 or **polycaprolactam** is a polymer developed by Paul Schlack.

6. Styrene at room temparature is

(a) Solid (b) Liquid

(c) Gas (d) Colloidal solution

Sol. (b)

Styrene at room temperature is liquid.

7. Which one of the following can be used as monomer in a polymerisation reaction

(a) CH_3CH_2Cl (b) CH_3CH_2OH

(c) C_6H_6 (d) C_3H_6

Sol. (d)

$$\underset{\text{Propene}}{n\,CH_3-CH=CH_2} \rightarrow \underset{\text{Polypropene}}{\left(-CH_2-\underset{CH_3}{\underset{|}{CH}}-\right)_n}$$

8. The Zieglar-Natta catalysts are

(a) Stereospecific

(b) Non-metallic complexes

(c) Gaseous catalysts

(d) Universal in all polymerisation reactions

Sol. (a)

Zieglar Natta catalyst is a mixture of $TiCl_4$ and $(C_2H_5)_3Al$ used in the synthesis of stereoregular polymers.

9. Melamine is

(a) Gas (b) Yellow liquid

(c) White crystalline solid (d) Colloidal solution

Sol. (c)

Melamine is the phenol-urea resin which are white crystalline solid.

10. Glyptal is a

(a) Viscose rayon (b) Nylon

(c) Polystyrene (d) Alkyd resin

Sol. (d)

Glyptal is a polymer of phthallic acid and Glycol.

11. Which of the following is not polyamide

(a) Nylon-66 (b) Protein

(c) Glyptal (d) Nylon-6

Sol. (c)

Glyptal is an alkyd resin of ethylene glycol $(HO-CH_2-CH_2-OH)$.

12. Choose the correct option from the following about the loss of raw rubber

(a) Low temperature properties

(b) Do not have a long library life

(c) Cannot be used in power transmission

(d) All of these

Sol. (d)

The raw rubber do not have a long library life. It has Low temperature properties. It cannot be used in power transmission.

13. 'Celanese silk' is

(a) Cellulose trinitrate (b) Cellulose acetate

(c) Cellophane (d) Pyroxylin

Sol. (b)

Cellulose acetate known as celanese silk.

14. Ebonite is

(a) Polropene (b) Natural rubber

(c) Synthetic rubber (d) Highly vulcanized rubber

Sol. (d)

Ebonite is a hard and highly (20-30%) vulcanized rubber.

15. Polymer used in bullet proof glass is

(a) Lexane (b) PMMA

(c) Nomex (d) Kevlar

Sol. (b)

PMMA is used in bullet proof glass.

16. Which of the following is not a natural polymer

(a) Cellulose (b) Protein

(c) PVC (d) Nucleic acid

Sol. (c)

PVC is a synthetic polymer made by vinylchloride.

17. Among the options given below which is not thermosetting plastic

(a) Bakelite

(b) Melamine

(c) Silicones

(d) Terylene

Sol. (d)

Terylene is not a thermosetting plastic because it does not soften on heating.

18. Which of the following is a syndiotactic polymer in

$-[-CH_2-C(YZ)-]_n-$

(a) All Y groups lie on one side of the chain and all Z groups on the other side.

(b) The Y and Z groups lie alternately on each side of the chain.

(c) The Y and Z groups are arranged in a random fashion.

(d) Y and Z groups are same.

Sol. (b)

19. The monomers used in the production of nylon-66 are

(a) Hexamethylenediamine and ethylene glycol

(b) Adipic acid and ethylene glycol

(c) Adipic acid and hexamethylenediamine

(d) Dimethyl terephthalate and ethylene glycol

Sol. (c)

Adipic acid $(HOOC-(CH_2)_4-COOH)$ and Hexamethylenediamine $(NH_2-(CH_2)_6-NH_2)$

20. The compound required for the formation of a thermosetting polymer with methanol is

(a) Benzene (b) Phenyl amine

(c) Benzaldehyde (d) Phenol

Sol. (d)

Tetrafluoroethene $(CF_2=CF_2)$.

21. Terylene is a

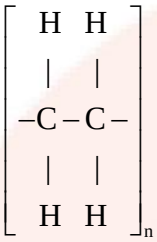
(a) Polyamide (b) Polyester

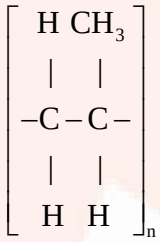
(c) Polyethylene (d) Polypropylene

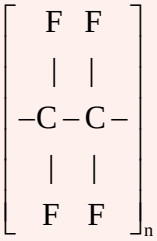
Sol. (d)

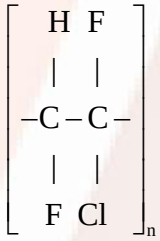
When phenol react with HCHO form bakelite which is a thermosetting polymer.

22. Which of the following is **teflon**

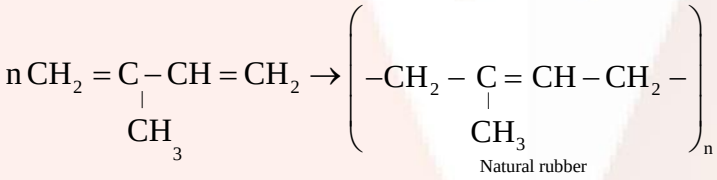
(a) 

(b) 

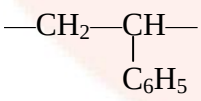
(c) 

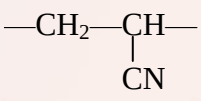
(d) 

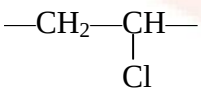
Sol. (b)



23. The repeat unit of polystyrene is

(a) 

(b) 

(c) 

(d) —CCl_2—CCl_2—

Sol. **(a)**

In polystyrene the monomeric unit is styrene which is having the formula of H_2C=CH—C_6H_5.

24. Which one of the following polymers may be classified as step growth polymer?

(a) Teflon (b) Polythene

(c) PVC (d) Nylon 66

Sol. (d)

Step growth polymers (or condensation polymers) are prepared by reaction between two functional groups and thereby eliminating small molecules during polymerization. Nylon-66 is an example of step growth polymer.

25. Buna–S rubber is a polymer of

(a) 1, 3-butadiene and styrene (b) vinyl acetate

(c) Acrylonitrile (d) none of these

Sol. (a)

$n\ CH_2{=}CH{-}CH{=}CH_2 + n\ C_6H_5{-}CH{=}CH_2$ (styrene)

(1,3-butadiene)

$\longrightarrow [CH_2{-}CH{=}CH{-}CH_2{-}CH(C_6H_5){-}CH_2]_n$

(Buna–S)

26. The presence of carbon in an organic compound is detected by heating it with

(a) Sodium metal to convert it into NaCN.

(b) CaO to convert it into CO which burns with a blue flame.

(c) CuO to convert it into CO_2 which turns lime water milky.

(d) Cu wire to give a bluish–green flame.

Sol. (c)

$CuO + C \xrightarrow{\Delta} 2Cu + CO_2\uparrow$

27. Choose the example of synthetic rubber among the below

(a) Polychloroprene (b) Silicone Rubber

(c) Buna-S (d) all of these

Sol. (d)

A synthetic rubber is any synthetic elastomer. These are mainly synthetic polymer from petroleum by-products.

28. Among the below, which one is not thermoplastic of polymer?

(a) Teflon (b) Natural rubber
(c) PMMA (d) nylon

Sol. (b)

Teflon, PMMA, nylon are thermoplastic polymers. These polymers are the linear or slightly branched long chain molecules capable of repeatedly softening on heating and hardening on cooling.

INTEGER TYPE QUESTIONS

29. The value of n in the formula $(C_5H_{10}O_5)_n$ for inulin is about

Sol. (30)

30-Inulin $(C_5H_{10}O_5)_{30}$ is found in the "Roots of Dahaliya".

30. In the trinitrocellulose each glucose unit contains how many $-OH$ groups

Sol. 3