SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

Faculty i/c : **Dr. G. Yuvaraj**

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Year & Branch : **II MECH B** Course : **23MET203 & Engineering Materials & Metallurgy**

UNIT V- NON METALLIC MATERIALS

Part-A (2 Marks)

1. What are polymers?

- Polymers are composed of a large number of repeating units of small moleculescalled monomers.
- Polymers may be defined as giant organic, chain-like molecules having molecularweight from 10000 to more than 1,000,000 g.mol^{-1}

2. List any four attractive characteristics of polymers.

- Low density
- Good thermal and electrical insulation properties
- High resistance to chemical attack
- Ease of fabrication
- Relative low cost

3. Classify polymers

- Plastics
- Elastomers
- Adhesives
- Coatings
- Fibres

4. ***Define the following terms: (1) monomers, (ii) homopolymer, (iii) copolymer.***

Monomer is a small molecule consisting of a single mer i.e., a single unit/ blocking block
Homopolymer is a polymer made out of identical monomer
Copolymer is a polymer which is obtained by adding different types of monomers.

5. What is meant by isomerism?

Isomerism is a phenomenon wherein different atomic configurations are possible for the same configuration.

6. What is meant by the term ‘unsaturated molecule’? State its significance in plastics.

A compound in which the valence bonds of the carbon atoms are not satisfied is said to be unsaturated such. Such unsaturated molecules are important in the polymerization i.e.,joining together of small molecules into large one having the same constituents.

7. What is polymerisation?

Polymerisation is the process of forming a polymer.

8. Define the term 'degree of polymerisation'?

Degree of polymerization is the number of repetitive units (or mers) present in onemolecule of a polymer.

9. What is the difference between addition polymerization and condensationpolymerization?

- Addition polymerization, also known as chain reaction polymerization, is a process by which two or more chemically similar monomers are polymerized toform long chain molecules.
- Condensation polymerization, also known as step-growth polymerization, is the formation of polymers by stepwise intermolecular chemical reactions that normally involve at least two different monomers.

10. Why are additives added to polymers?

The various polymer additives include:

1. Filler materials, 2. Plasticizers 3.stabilizers 4. Colorants
5. Flame retardants 6. Reinforcements 7.Lubricants.

11. What are the characteristics of plastics which account for their wide use as engineering materials?

Plastics are extensively used in engineering applications due to their important properties such as low price, colour range, toughness, water resistance, low electrical and thermal conductivity, ease of fabrication, etc.

12. Differentiate commodity plastics with engineering plastics.

The plastics which are not generally used for engineering applications are known as commodity plastics. The plastics which are used in engineering applications are knows as engineering plastics.

13. Name any four commodity plastics and engineering plastics.

Commodity plastics: (i) polyethylene (PE), (ii) polypropylene (PP), (iii) Polystyrene (PS), (iv) Polyvinyl chloride (PVC).

Engineering Plastics: (i) Ethenic, (ii) polyamides, (iii) cellulosics, (iv) acetlas.

14. Distinguish between thermoplastics and thermosetting plastics.

S. No	Thermoplastics	Thermosetting plastics
1	They are formed by addition	They are formed by condensation polymerisation
2	They are linear polymers, so theyare composed of chain molecules.	They are composed of three dimensional network of cross linked molecules.
3	Softening is possible on reheating (because of the weak secondary forces)	Softening is possible on reheating (because of strong covalent bonds)
4	They can be easily moulded on remoulded into any shape.	They cannot be remoulded into any newshape
5	They can be recycled again	They cannot be recycled.

15. ***Name any four thermoplastics and thermosetting plastics.***
Thermoplastics: polythenes, polypropylene, polystyrenes, PVC.
Thermosetting Plastics: polyesters, phenolics, epoxides, melamine formaldehyde.

16. What are the advantages do thermoplastics polymers have over thermosettingpolymers, and vice versa?
Since thermoplastics have low melting temperature and can be repeatedly
moulded and remoulded to the desired shape, they habe a good resale/scrap value.
They thermosetting plastics are generally stronger, harder, more brittle moreresistant to heat and solvents than thermoplastics.

17. What are the sources of raw materials for plastics?
Animal and vegetable by –products.
Coal by products
Petroleum by-products.

18. What do the following acronyms refer: PE,PP,PS,PVC,PTFE,PMMA
PE: polyethylene; PP: polypropylene; PS: polystyrene; PVC: polyvinyl chloride; PTFE: polyterafluoro ethylene; PMMA: polymethyl methacrylate.

19. List the properties and typical applications of PVC.
Acrylic materials are thermoplastics polymers based in the polymerization ofesters of acryclic acid and/or methacrylic acid
The most commonly used acrylic polymers are:
PMMA (polymethyl methacrylate), and
PAN(polyacrylonitrile)

20. What are the bakelites? Also state their applications.
Phenolics, also known as bakelites, are the oldest family of thermosetting plastics. Themost important phenolic materials ispolyformaldehydes.

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