

MANUFACTURING TECHNOLOGY-1

UNIVERSITY QUESTION BANK WITH ANSWERS

UNIT-I:METAL CASTING PROCESSES

PART-A

1. **Name any four casting defects. (Dec 2014)**

(1) Blow holes (2) Scab (3) Shift (4) Hot tear

2. **What do you mean by core print?. (Dec 2018)**

A core print is an extra projection on the pattern. It supports the core.

3. **What are the functions of flux in melting metals and alloys? (June 2013)**

The function of adding flux is to remove impurities in the iron and to protect the iron from oxidation, to reduce the melting point of the slag and to increase its fluidity for easy disposal.

4. **Write about any two advantages of sand casting. (May 2109)**

(1) Molten material can flow into very small sections so that intricate shapes can be made by this process.

(2) Possible to cast both ferrous and non ferrous materials

5. **List the materials used for making patterns. (Dec 2014)**

(1) Wood (2) Cast Iron (3) Brass (4) Aluminum (5) White metal (6) Plastics, (7) Rubbers (8) Plasters

6. **What are the characteristics of core?. (May 2019)**

Sufficient strength to support itself without breaking

High permeability and high refractoriness

Provide smooth surface to get smooth casting

7. **Name any five furnaces employed in casting process. (Dec 2018)**

(1) Cupola furnace (2) Open hearth furnace (3) Crucible furnace (4) Pot furnace (5) Electric furnace

8. **What is meant by carbon dioxide moulding? (Dec 2014)**

The principle of working of the carbon dioxide process is based on the fact that if CO₂ gas is passed through a sand mix containing sodium silicate, the sand immediately becomes extremely strongly bonded as the sodium silicate becomes a stiff gel. This gel is responsible for giving the necessary strength to the mould.

9. **Name the alloys which are generally die cast. Why are aluminum alloys preferably cast in cold chamber die casting machines. (Dec 2018)**

Zinc, copper, aluminum, magnesium, lead and tin based alloys. Higher melting point metal alloy namely aluminum alloys will attack and dissolve a ferrous based gooseneck and so the contact time between this molten alloy and ferrous based feeding system needs to be kept to a minimum. So cold die casting is preferred for aluminum alloys.

10. Make a note on Loam sand. (Dec 2013)

Loam sand is high in clay, as much as 50 percent or so, and dries hard. This is particularly employed for loam moulding usually for large castings.

11. Make a note on shrinkage allowance. (May 2019)

As metal solidifies and cools, it shrinks and contracts in size. To compensate for this, a pattern is made larger than the finished castings by means of a shrinkage or contraction allowance. Different metals have different shrinkages, therefore, there is a shrink rule for each type of metal used in a casting.

12. Compare the advantages of metal moulds over sand (expandable) moulds. (Dec 2018)

- (1) Closer dimensional tolerances
- (2) better surface finish
- (3) Greater mechanical strength
- (4) More economical production in larger quantities

13. Mention few applications of centrifugal casting. (May 2019)

- (1) Water pipes
- (2) Gears
- (3) Bush bearings
- (4) Fly wheels
- (5) Piston rings
- (6) Brake drums
- (7) Gun barrels

14. What is meant by grain fineness number? (June 2013)

It is defined as the ratio between the total products and total percentages of sand retained on pan and each sieve.

15. Define casting. (Dec 2014)

It is the process of producing metal parts by pouring molten metal into the mould cavity of the required shape and allowing the metal to solidify. This solidified metal piece is called as „casting“

16. What is pattern? (Dec 2014)

Pattern is the model of the required casting. It is used to produce the mould cavity in sand.

17. What factors are to be considered in calculating the shrinkage allowance? (June 2014)

- (1) Pouring temperature of molten metal
- (2) Casting dimension
- (3) Amount of finish required

18. What are the essential requirements of a core sand? (June 2014)

- (1) Permeability
- (2) Refractoriness
- (3) Strength
- (4) Collapsibility

19. What is the ideal profile of a sprue? (Dec 2015)

The ideal profile of the sprue should be parabolic.

20. What is meant by permanent mould casting? (Dec 2015)

Permanent mould casting is a process for producing a large number of castings using a

single reusable mould. The casting process simply involves pouring molten metal into a mould where it cools and solidifies. The mould is then opened, the casting removed and the mould is reused.

21. What is the cause of the casting defect called hot tear? (Dec 2015)

(1) sudden change in section (2) No fillets in corner (3) Improper pouring temperature

22. What are the causes of misruns in castings? (Dec 2016)

(1) Low pouring temperature (2) Slow pouring (3) Small gates (4) Low fluidity of metal

23. What are chaplets? (May 2017)

Sometimes, it is not possible to provide sufficient support for a core in the mould being poured, if the cores are bigger in size. In such cases, the core is supported with rigid metal pieces called Chaplets.

24. Write the application of core prints? (May 2017)

Core prints are used to position the core securely and correctly in mould cavity. It should take care of the weight of the core and upward metallostatic pressure of molten metal.

25. State the advantages of investment casting. (June 2016)

(1) Complex shapes can be cast accurately (2) Surface finish is very good (3) High accuracy can be maintained (4) Unmachinable alloys can be cast.

26. What is natural moulding sand? Give its constituents. (June 2016)

Natural moulding sands are taken from river beds and they possess an appreciable amount of clay. Silica 80 to 90% , Clay 5 to 20% , Water 2 to 8%

27. What are hard spots and hot tears? (May 2015)

Hard spots: Some spots on the surface become hard

Hot tears: Internal or external discontinuity in the casting

28. State any four types of patterns. (May/June 2016)

(1) Solid pattern (2) Split pattern (3) Loose piece pattern (4) Match plate pattern

29. Write a note on chilled casting. (Nov/Dec-2010)

A chill is an object used to promote solidification in a specific portion of a metal casting mould. Normally, the metal in the mould cools at a certain rate relative to the thickness of the casting.

UNIT-II:JOINING PROCESSES

PART-A

1.Make a note on Soldering. (May 2019)

Soldering is a process in which two or more items are joined together by melting and putting a filler metal(solder) into the joint,the filler metal having a lower melting point than the adjoining metal.Soldering is used to form a permanent connection between electronic components.

2.What is the principle of resistance welding?

Resistance welding processes are pressure welding processes in which heavy current is passed for short time through the area of interface of metals to be joined with the application of pressure.

3.Sketch and explain Fusion welding processes.

In fusion welding, the metals are heated to a molten state and then it is allowed to solidify without application of pressure.

4.Define welding. (May 2019)

The process of joining two similar metals by the application of heat with or without application of pressure and with or without addition of filler metal is called as welding.

5.State the use of flux material. (Dec 2014)

- (1) To act as a shield to the weld
- (2) To prevent atmospheric reaction between molten metal and atmosphere

6.List any four welding defects. (Dec 2014)

- (1)Undercuts (2)Incomplete fusion (3) Slag inclusion (4)Porosity (5)Cracks

7.What is the minimum distance maintained between two successive spot welds made by resistance welding?Why? (Jun 2013)

The minimum distance of 150mm and maximum distance of 300mm between two successive spot welds or the acceptable distance of 16 times of thickness of metal to be welded because the shunt current flowing through already formed weld spot reduces the efficiency of the welding process.

8.What is meant by carburising flame in gas welding? (Dec 2012)

A carburising flame is also called reducing flame which is obtained by supplying more acetylene than oxygen. This flame has three zones sharp inner cone,white intermediate cone and bluish outer cone

9.What is the principle of thermit welding? (Dec 2012)

Thermit welding is a welding process utilizing heat generated by exothermic chemical reaction between components of thermit.Thermit consists of one part of aluminum and three parts of iron oxide.The molten metal produced by the reaction acts as a filler

material and joins the workpieces after solidification. The welding principle is the heat of the thermit reaction used for welding in plastic state and mechanical pressure is applied for the joint.

10.What is the difference between soldering and brazing? (May 2015)

1.Soldering is done at temperature below 200C,Brazing is done at temperature above 450C but below the critical temperature of metal.

2.Soldering does not need to preheat of base metal,brazing needs preheating of base metal.

11.Sketch the different types of oxy acetylene flame. (May 2017)

(1) Neutral flame (2) Carburising flame (3) Oxidising flame

12.What is meant by nugget in electric resistance welding?(Dec 2014)

The welding of overlapping pieces of metal at small points by application of pressure and electric current creates a pool of molten metal that quickly cools and solidifies into a round joint known as nugget.

13.State the applications of friction welding.

1.Because of high quality weld obtained,the process is widely accepted in aerospace and automobile industry for critical parts.

2.In aerospace industry,turbine blade joining,seam less joining etc are produced using friction welding.

3.In consumer goods manufacturing,it is used for producing hand tools,sports equipments.

14.What are the functions of a good flux in welding? (Dec 2015)

1.To act as a shield to the weld

2.To prevent atmospheric reaction between molten metal and atmosphere

15.What is a spelter and give the composition of some commonly used spelters? (Dec2015)

Zinc,brass ,silver and brass

16.How does the seam welding is a application of spot welding? (Dec 2015)

The metal to be welded is moved between electrodes and electric pulses create spots of molten metal that overlap to form the continuous seam.

17.Why do residual stresses get developed in weldments? (Dec 2016)

Residual stresses in welded joints are primarily developed due to differential weld thermal cycle(heating,peak temperature and cooling at any moment during welding) experienced by weld metal and region closed to fusion boundary i.e heat affected zone.

18.Why the temperature in plasma arc welding is much higher than in other arc welding processes? (Dec 2016)

The plasma arc is constricted with the help of water cooled small diameter nozzle

which squeezes the arc, increases its pressure, temperature and heat intensely. It also improves arc stability, arc shape and heat transfer characteristics.

19. What are the two types of plasma arc welding? (May 2017)

(1) Transferred type (2) Non transferred type

20. Why is spot welding commonly used in automotive bodies and in large appliances?

Many parts of the car are made up of sheet metals such as frame, the body, the suspension etc., So the most common application of spot welding is in the automobile manufacturing industry where it is used almost universally to weld the sheet metal to form a car.

21. Name various causes for the defect porosity in the welding. (May 2015)

Porosity results when the gases are entrapped in the solidifying weld metal. These gases are generated from the flux or coating constituents of the electrode or shield gases used during welding or from absorbed moisture in the coating. Arc speed, base metal composition, incorrect welding technique

22. How do you specify an electrode?

Bare and coated electrodes are specified by the diameter and length.

23. What is the difference between brazing and braze welding? (Dec 2018)

In brazing, the filler metal has a lower melting point than the adjoining metal and the fabricators do not melt the base metal. In braze welding, the filler metal has a higher melting point

24. Write short notes on transferred and non transferred arc in plasma arc welding. (Jun 2013)

(a) Transferred type

In transferred type, the tungsten electrode is connected to negative terminal and the Workpiece is connected to positive terminal. An electric arc is maintained between electrode and workpiece which heats a co-axial flowing gas and maintains it in a plasma state. It is difficult to initiate the arc first between workpiece and electrode. So, the pilot arc is struck between nozzle and electrode.

(b) Non-transferred type:

In this type, power is directly connected with the electrode and torch of nozzle. The electrode carries the same current. Thus, the ionizing is at high velocity gas that is streaming toward the workpiece. The main advantage of this type is that the spot moves inside the wall and heat the incoming gas and layer remains cool. This type plasma has low thermal efficiency.

25. How does penetration vary for DCSP and DCRP welding? (May 2015)

In DCSP (Direct Current Straight Polarity), workpiece connected to positive and electrode to negative, 2/3 heat is generated on positive side. Depth of bead penetration is deep and width of the bead / pass is narrow.

In DCRP(Direct current reverse polarity),workpiece connected to negative and electrode to positive,2/3 heat is generated on positive side.Depth of bead penteration is shallow and width of the bead/pass is broad.

26.Why shielding of weld area during welding is required? (Dec 2015)

The primary purpose of shielding is to prevent exposure of the molten weld pool to oxygen,nitrogen and hydrogen contained in the air atmosphere.The rection of these elements with the weld pool can create a variety of problems,including porosity and excessive spatter.

27.Define the terms “weld decay“ and “dilution“.

Weld decay is a corrosion process that mainly occurs as a result of sensitization(regions susceptible to corrosion) in the head effected zone of metal during welding operation.

Dilution is defined as the weight of the base metal melted divided by the total weight of the weld metal.

UNIT-III: METAL FORMING PROCESSES

PART-A

1.What are the types of roll passes? (Dec 2018)

(1) Two high rolling mill (2) Three high rolling mill (3) Four high rolling mill (4)Multi high rolling mill

2.State the advantages of cold extrusion. (Dec 2014)

(1) Improved mechanical properties (2) Good control of dimensional tolerance (3)improved surface finish (4)No oxidation takes place

3.Name the types of forging machines. (Dec 2014)

(1) Power hammers (2) Air and steam hammers (3)Mechanical hammers (4) Power press

4.How can you reduce the “roll force” in a rolling process ? (May 2017)

Roll force can be reduced by the following means,

- (1) Reducing friction at the roll-workpiece interface
- (2) Using smaller diameter rolls to reduce the contact area
- (3) Taking smaller reduction per pass to reduce contact area
- (4) Rolling at elevated temperature

5.What is meant by fullering? (June 2013)

Fullering is used to reduce the cross sectional area of a portion of stock.It is used as an earlier step to help in the distribution of metal of the work in preparation for further forging operation.

6.What is Recrystallization temperature? (May 2019)

The approximate minimum temperature at which complete recrystallization of cold worked metals takes place within a specified time is known as recrystallization temperature.

7.What is meant by flat rolling?

Flat rolling is the most basic form of rolling with the starting and ending material having a rectangular cross section.The friction at the interface between the material and the rolles causes the material to be pushed through.

8.What is ironing? (June 2013)

Ironing is a sheet metal forming process that uniformly thins the workpiece in a specific area.

9.Working on the metal lead at room temperature, is considered to be hot working.Why? (Dec 2012)

Lead is hot worked at room temperature because of its low melting temperature.The recrystallization temperature of lead is lower than the ambient temperature.

10.List two advantages of cold extrusion over hot extrusion. (Dec 2012)

The advantages of this over hot extrusion are the lack of oxidation,higher strength due to cold working,closer tolerances,better surface finish and higher production rates.

11.Distinguish between forward hot extrusion and backward hot extrusion. (Dec2018)

S.No	Forward Extrusion	Backward Extrusion
1	Simple,but material must slide along the chamber wall	In this case,material does not move but die moves
2	High friction forces must be overcome	.Low friction forces are generated as the mass of the material does not move
3.	High extrusion forces required	25-30% less extrusion force is required

12.What is the difference between hot and cold forging? (Dec 2013)

The cold forging process increases the strength of metal through strain hardening at a room temperature.

The hot forging process keeps materials from strain hardening at high temperature,which results in optimum yield strength,low hardness and high ductility.

13. Differentiate extrusion and forging (Dec 2013)

S.No	Extrusion	Forging
1	The heated metal is compressed and forced through a suitable shaped die.	The heated metal bar is held inside the solid die and the force is given to the punch. so, the punch will squeeze the heated metal to the shape of the die cavity.
2	Most of the metals are extruded in hot conditions only	Both hot and cold conditions are preferred.

14. What do you mean by angle of bite? (Dec 2018)

In rolling metals where all the force is transmitted through the rolls, the maximum attainable angle between roll radius at the first contact and the roll centers.

15. Define upsetting and drawing down in forging operation. (June 2014)

Upsetting forging also known as heading, is a manufacturing process which decreases the length of a workpiece in order to increase the diameter of material in this area. The effect of pressure is on the longitudinal axis of the material.

Drawing down is a process of elongate the length and reduce the cross sectional area of workpiece.

16. Sketch the different types of rolling mills. (June 2014)**17. Why is drop forging called so? (Dec 2014)**

The upper die is fitted on the ram and the lower die is fitted on the anvil. Both the dies have impressions. Two rollers are fixed on the board. When both rolls rotate opposite to each other, it drives the board upward and lifts the using friction. When the rolls are released, the ram drops down i.e. dropped by gravitational force and produce a working stroke. That's why this type of forging is called drop forging.

18. Define hot isostatic forging. (Dec 2015)

Hot isostatic forging is one of material processing methods, which compress materials by applying high temperature and isostatic pressure at the same time.

19. What do you mean by lateral extrusion? (Dec 2015)

In this process, the material flows in the perpendicular direction of the punch displacement. The material which is enclosed by the punch and die is forced to flow through orifices that are radially placed.

20. Give a few examples of hot forged products. (Dec 2016)

Piston, connecting rod, cams, cam shafts, gear, universal joints, brake plates, landing gear, engine with turbine blade.

21. Why is it necessary condition the metal before hot rolling? (Dec 2016)

The metal is conditioned before hot rolling so that the metal may be rolled without any significant tendency to crack or split even though the metal has not been homogenised. The metal to be rolled is conditioned for hot rolling by reducing the cross sectional area of the metal without splitting and cracking to destroy the columnar dendritic structure.

22. Why is the surface finish of a rolled product better in cold rolling than in hot rolling? (Jun 2016)

The cold rolling takes place below recrystallisation temperature of the source materials, grains are not subjected to recrystallisation, resulting in a better surface finish than in hot rolling.

23. What is strain rate sensitivity? (Jun 2016)

Strain rate is the change in strain (deformation) of a material with respect to time. It is the most important mechanical characteristic of a super plastic material which is its high strain rate sensitivity of flow stress.

24. What are the various forming processes? (May 2015)

(1) Forging (2) Bending (3) Drawing (4) Squeezing (5) Embossing (6) Nibbling

25. Name various defects in parts produced by drawing. (May 2015)

(1) Internal cracking (2) Surface defect

26. Differentiate flat rolling and shape rolling.

Flat rolling is the most basic form of rolling with the starting and ending material having a rectangular cross section. The friction at the interface between the material and the rolls causes the material to be pushed through.

In Shape rolling, the rolling mill to bend or deform the workpiece to a desired shape while maintaining a constant cross section. Examples, I-beams, H-beams

27. What is precision forging?

It is defined as a flashless near net shape forging operation which generates high quality parts concerning surface quality and dimensional accuracy. The advantages of precision forgings are high material utilization, good working performance and high precision.

UNIT-IV: SHEET METAL PROCESSES

PART-A

1.State the purpose of detonator in explosive forming. (Dec 2014)

A detonator, frequently a blasting cap, is a device used to trigger an explosive device. A detonator contains an easy to ignite primary explosive that provides the initial activation energy to start the detonation in the main charge.

2.What is the basic requirement of super plastic forming? (Dec 2014)

- (1) The average grain size of less than 10 micron is required
- (2) Forming temperature for super plastic forming is more than one half the melting temperature of the material
- (3) It is formed between the strain rate of 0.01 to 0.00001/sec

3.What is the effect of clearance in the punch and die for shearing sheet metal? (May 2019)

Clearance is a must to allow in meeting the fractures when the break occurs. The amount of clearance depends upon the following factors: type of material, thickness, hardness of material and type of operation.

4.Define springback in bending operation. (May 2019)

Springback is the geometric change made to a part at the end of the forming process when the part has been released from the forces of the forming tool.

5.What is lancing operation that is done on sheet metals? (Dec 2012)

Lancing consists of cutting the sheet metal through a small length and bending this small cut portion downwards.

6.What are the limitations of explosive forming? (Dec 2012)

Highly trained operators are needed, Noisy operation, Explosives must be carefully handled according to the regulation of the government, Dies must be larger and thicker to withstand shocks.

7.List the advantages of superplastic forming process. (Dec 2013)

It is a one step process, Higher material elongations, Reduction of subsequent machining, The process can be used to form complex components in shapes that are very the final dimension.

8.How are sheet metal operations classified and what are they? (May 2015)

(1) Shearing process

Punching, Blanking, Perforating, Parting, Notching and Lancing

(2) Forming process

Bending, Stretching, Drawing, Roll forming

(3) Finishing process

9. What is flanging? (May 2015)

Flanging is a process of bending the edges of sheet metals to 90deg. It is also called edge bending or wiping die bending.

10. Make a short note on hydroforming of sheet metal.

Hydroforming is a specialized type of die forming that uses a high pressure hydraulic fluid to press the working material into die. Hydroforming allows complex shapes with concavities to be formed, which would be difficult with standard solid die stamping. It is a cost effective way of shaping ductile metals such as aluminum, brass, low alloy steels, stainless steel into lightweight stiff and strong pieces.

11. What is meant by stand off distance in Explosive forming process? (Dec 2018)

The distance between the charge and the metal piece is called the standoff distance. The standoff distance and the amount of charge determine the amount of pressure transmitted to the metal.

12. What is the difference between a cutoff operation and a parting operation? (Jun 2014)

A cutoff operation separates parts from a strip by shearing one edge of each part in sequence. A parting operation cuts a slug between adjacent parts in the strip.

13. What is shear angle? Why is it given to punches and dies? (Dec 2014)

The angle about which the vertical lines tilt is called shear angle. Shear angle initiates the shearing to complete piercing or blanking on the workpiece. So, it is provided on punches and dies.

14. What is fullering? (May 2015)

Fullering or spreading the metal along the length of the job is done by working separate sections. In this case, the axis of the job is positioned perpendicular to the width of the flat die.

15. What are the various types of sheet metal dies? (Dec 2015)

(1) Inverted dies (2) Compound dies (3) Progressive dies

16. List out test methods for testing formability of material. (Dec 2015)

(1) Test methods based on tensile tests (2) Simulative drawing tests (3) Full scale forming tests

17. Distinguish between piercing and blanking. (Dec 2015)

(1) In piercing, the cut out portion is considered as waste and left out portion is the required part. So the punch is made to exact size and the die is made bigger in size by providing clearance.

(2) In blanking, the cutout portion is the required part in this operation. In this case, the die is made to exact size and the punch is made smaller in size providing clearance.

18. What are the desirable qualities in metal for maximum stretchability? (Dec 2016)

(i) Toughness (ii) Fine grain structure (iii) Large spread between tensile, yield and ultimate strength

19. What are applications of rubber pad forming process? (Dec 2016)

(1) Production of flanged cylindrical and rectangular cups

(2) Production of spherical domes, parallel and tapered wall shells, unsymmetrical shape components.

20. What are the two most common shearing operations? (May 2017)

(1) Cutting operations (2) Forming operations

21. Estimate the force required for punching a 25mm diameter hole through a 3.2mm thick annealed titanium alloy Ti-6Al-4V sheet at room temperature. The UTS for this alloy can be assumed to be 1000Mpa. (Jun 2016)

Ultimate shear stress = $0.577 \times$ Ultimate tensile strength

$$= 0.577 \times 1000 = 577 \text{ N/mm}^2$$

Cutting force = $3.14dt(\text{Ultimate shear stress}) = 3.14 \times 25 \times 3.2 \times 577 = 145017.41 \text{ N}$

22. Name any two super plastic materials. (Jun 2016)

(1) Bismuth-tin (2) Zinc-aluminum (3) Titanium (4) Aluminum-lithium alloys.

23. Distinguish redrawing and reverse drawing.

The process of deepening the cup after the first draw is known as redrawing. If the deep drawing process cannot produce a cup sufficiently deep one operation, then redrawing operation is used.

The process of flipping the intermediate part before being placed on the die for the next operation is called reverse drawing.

24. Define peen forming. (May 2010)

Peen forming is a process of well established surface cleaning. In this process, a stream of metal shots is blasted against the surface of the blank to be made into required shape.

UNIT-V: MANUFACTURE OF PLASTIC COMPONENTS

PART-A

1.What is polymerization? (Jun 2013)

A polymer is made up of linking thousands of monomer. The process of obtaining Large molecule by linking many monomers is called polymerization process it is achieved by one of the two processing techniques. They are as follows:

2.What is calendaring in processing of plastics? (Jun 2013)

Calendering process is used for sheet making. A calender is a series of hard pressure rollers used to form or smooth a sheet of material such as paper or plastic film. In this process. The plastic compounds composed of resin,filler,plasticizer and other additives are heated for sometime and passed through the heated rollers.

3.What is polythene? (Jun 2014)

It is a tough,light flexible synthetic resin made by polymerizing ethylene,chiefly used for plastic bags,food containers and other packaging.

4.Name the common thermosetting plastics. (Jun 2014)

Polyurethane plastics,Epoxy,Phenolics

5.What are the different types of compression moulds?

(1) Positive type (2)Semi positive type (3)Flash type

6.Define pulforming. (Dec2013)

Pulforming can be defined as pultrusion with additional steps to form the length into a semi circular contour and alter the cross section at one or more locations along the length.

7.What is the need for rotational moulding in manufacturing plastic components? (Dec 2015)

Rotational moulding is a unique plastic moulding process used primarily to create seamless, stress free, hollow on piece items.It is a high temperature,low pressure manufacturing method that combines heat and biaxial rotation.

8.Make a note on polymerization. (Dec 2015)

A polymer is made up of making linking thousand of monomer. The process of obtaining large molecule by linking many monomers is called polymerization process. It is achieved by one of the two processing techniques.They are as following:

- 1.Addition polymerization
- 2.Condensation polymerization.

9.Name the types of plastics. (Dec 2014)

- (1)Thermoplastics e,x Polyvinyl chloride,Polypropylenes
- (2) Themosetting plastics e.x Alkyds,Epoxy,Phenolic,Silicone.

10. Define thermoforming. (Dec 2014)

Thermoforming is the process in which the thermoplastic sheet are formed are formed with the application of heat and pressure in a mould. Thin sheet [up to 1.5] and thick sheet [about 3 mm] can be formed easily.

11. Write short note on thermoset plastics.)

The property of material becoming permanently hard and rigid after cooling when heated above the melting temperature is called thermosets. The transformation from the liquid state to the solid state is irreversible process. The mechanical properties are not temperature dependent, as compared to thermoplastics. Hence, thermosets are generally stronger than the thermoplastics.

12. Make a note on film blowing. (May 2019)

Crystalline shape melting polymers such as nylon or polyethylene terephthalate PET are very much suited for film production by melt casting techniques. Initially, the heated plastics power is extruded by using extrude machines called extruder. In this extruding process, the thin film is produced.

After extruding the thin film, it is stretched by pulling rollers through the chilled drum in the reeling wheel. The thin film is cooled in the chilled drum and the rollers are used to pull the film from chilled drum. The reeling wheel is used to make the film roll.

13. Name two important differences between thermoplastics and thermosetting plastics. (Dec 2012)

S.No.	Thermoplastics	Thermosetting Plastics
1.	Softened by heating	Cannot be softened
2.	Structure is made of linear chain molecules	Structure is made of cross linked molecules
3.	Produced by addition of polymerization process	Produced by condensation polymerization process

14. What are thermoplastics? Give examples.

The plastics which are hardened by heat effecting a non-reversible chemical change are called thermosetting plastics.

- 1. Shellac
- 2. Polyethylenes
- 3. Polystyrenes
- 4. Acrylic resins
- 5. Vinyls

6. Polyamide

7. Methyl methacrylate

15. Name the common thermosetting plastics. (Jun 2014)

Alkyds, Allylics, Amine, Bakelite, Epoxy, Phenolic (PF), Polyester, Silicone, Polyurethane (PUR) and vinyl ester

16. List out any four types of adhesives used in adhesive bonding of plastics. (Dec 2014)

1. Epoxies

2. Methyl methacrylates

3. Silicone adhesives

4. Urethanes.

17. Name the types of plastics. (Dec 2014)

1. Thermosetting plastics

2. Thermo Plastics

18. What are reinforced plastics and where is it applied? (Dec 2015)

Reinforced plastics are embedded with fibrous matter such as carbon fibre, glass fibre to obtain additional strength. Some important areas of application include aerospace, automotive industry and consumer goods.

19. What are the industrial uses of fibres and filaments? (Dec 2015)

It is used to making ropes, seat belts, tires, hoses and making parachutes

20. What is the need for rotational moulding in manufacturing plastic components? (Dec 2015)

The rotational moulding is needed to make thin walled hollow parts

21. Name the various methods of processing thermoplastics. (Dec 2016)

1. Injection moulding – Plunger and screw machines

2. Blow moulding

3. rotational moulding

4. Film blowing

5. Sheet forming process

6. Extrusion process

7. Vacuum forming

22. Mention any two applications of blow moulding process.

Plastic bottles, toys and cosmetics

23. Viscosity is an important property of a polymer melt in plastic shaping processes, upon what parameters does viscosity depend?

Viscosity of a polymer melt depends on

(a) Temperature

(b) Shear rate

(c) Molecular weight of the polymer affects viscosity

24. What is the difference between a positive mould and a negative mould in thermoforming?

S.NO	Positive Mould	Negative Mould
1.	A positive mould has a convex shape	Negative mould have concave cavities.
2.	The heated sheet is draped over the convex using pressure	The heated sheet is draped over the concave form using vacuum

25. Define polyaddition.

Polyaddition is a process in which many monomers are bonded together via rearrangement of bonds without the loss of any atom or molecule under specific conditions of heat, pressure, and/or the presence of a catalyst. Some of the plastics made by using polyaddition include polyethenes, polypropylene, PVC, Teflon, Buna rubbers, polyacrylates and polystyrene

26. Write short notes on the application of plastics.

Application of plastics in different domains are listed below:

APPLICATION	MOST USED PLASTICS
Bearing	Acetal, Nylon, PETP,
Bolts & nuts	Nylon, PVC, pp
Bushes	Nylon, PETP, Acetal, PE
Electrical insulators	PTEF, Bakelite
Gears	Nylon, Acetal, Bakelite
Insulators	Acetal, Nylon, PTFE, Bakelite

27. What are commonly used fillers?

(1) Mica, (2) Cloth fibre and glass fibre (3) Asbestos

28. Define potting and encapsulation.

Potting refers to a process where the shell or pot that is filled with resin becomes a part of the finished components.

In encapsulation, the component and the hardened resin are then removed from the pot to be placed in an assembly.