MANUFACTURING TECHNOLOGY-1
UNIVERSITY QUESTION BANK WITH ANSWERS
UNIT –I
METAL CASTING PROCESS

1. State any four types of patterns. (May 2006)

Ans: The various types of patterns which are commonly used are as follows:

1) Single piece or solid pattern
2) Two piece or split pattern
3) Loose piece pattern
4) Cope and drag pattern
5) Gated pattern

2. Mention any two advantages and disadvantages of die casting. (May=2006) Ans: Advantages:

- It is a very fast process.
- Moulds have longer life.
- Better surface can be obtained.

Limitations:

- Moulds are much costlier.
- This method is not suitable for small quantity production.
- Shape and weight of the casting is limited.

3. What is core venting? (May 2007)

Ans: While pouring the mould with molten metal mould walls and cores heat up rapidly and releases large amount of gases. In order to prevent casting defects these gases must be vented out. For this purpose core venting are used. Core venting are incorporated in the core box itself.

4. What function of core ? (May 2008)

Ans: Functions of core are:

- Core provides a means of forming the main internal cavity for hollow casting.
- Core provides external undercut feature.
- Cores can be inserted to obtain deep recesses in the casting.

Cores can be used to increase the strength of the mould.

5. Which process is called lost waxing method? Why? (May 2008)

Ans: Investment casting process is also known as Lost-wax process. The term investment refers to a clock or special covering apparel. In investment casting, the clock is a refractory mould which surrounds the precoated wax pattern.

6. What is the function of core prints? (Dec. 2008)

Ans:

1. Core prints are basically extra projections provided on the pattern.
2. They form core seats in the mould when pattern is embedded in the sand for mould making.
3. Core seats are provided to support all the types of cores.
4. Though the core prints are the part of pattern, they do not appear on the cast part.

7. What are the advantages and applications of ceramic moulds? (Dec. 2008)

Ans: Advantages:

- It is less expensive
- Intricate objects can be casted.
- Castings of thin sections and which do not require machining can be produced.

Applications:

- It is mainly used for all material using better ingredient in slurry.

8. What are the pattern materials? (Dec. 2008)

Ans:1) Wood 2) Metal 3) Plastic
4) Plaster 5) Wax

9. Explain the term fettling. (Dec. 2009)

Ans: Fettling is the name given to cover all those operations which help the casting to give a good appearance. It includes the removal of cores, sand, gates, risers, runners and other Unwanted projections from the casting.

10. What are the applications of casting?

Ans: Transportation vehicles (in automobile engine and tractors)

- Machine tool structures
- Turbine vanes and power generators
- Mill housing
- pump filter and valve

11. Mention the specific advantages of Co2 moulding Process.

1.Gives strength and hardness to core.
2.Process cost is less.
3.It saves time on heating
4.It can be stored for long use.

12. Define AFS grain- fineness number.

It is defined as the ratio between the total products and total percentage of sand retained on pan and each sieve.AFS grain fineness number =sum of products /total sum of the % of sand retained on pan and each sieve.

UNIT – II

METAL JOINING PROCESS

1. List out any four arc welding equipment. (May 2006)

The most commonly used equipments for arc welding are as follows:

(a) A.C or D.C. machine
(b) Wire brush
(c) Cables and connectors
(d) Ear thing clamps
(e) Chipping hammer

2. What are the special features of friction welding? (May 2007)

- Friction welding is a solid state welding process where coalescence is produced by the heat obtained from mechanically induced sliding motion between rubbing surfaces.
- The work parts are held together under pressure.
- Its operating is simple.
- Power required for the operation is low.
- It is used for joining steels, super alloys, non-ferrous metals and combinations of metals.

3. Define resistance welding process. (May 2006, May 2007)

Resistance welding is a process where coalescence is produced by the heat obtained from resistance offered by the workpiece to the flow of electric current in a circuit of which the workpiece is a part and by the application of pressure.

4. What is the purpose of flux? (May 2008)

It acts as shield to weld.
To prevent atmospheric reaction of molten metal with atmosphere.

5. How can slag inclusions in welding be avoided? (May 2008)

Avoid multi layer welding

- Reduce arc length
- Increase electrode angle
- Avoid using large electrode

6.Why flux is coated on filler rods? (Dec. 2008)

The coating improves penetration and surface finish.
Suitable coating will improve metal deposition rates.

7.What is the application of carburizing flame? (Dec. 2009) Ans:

Carburizing flame is generally used for: Welding of
low alloy steel rods Non-ferrous metals High carbon steel

8.What are the diameter and length of the electrodes available in the market? (Dec. 2009)

Standard length of electrodes are 250 mm, 300 mm and 450 mm.
Standard diameters of electrodes are 1.6,2 ,2.5, 3.2, 4,5,6,7,8, and 9 mm.

9. Classify various ARC welding processes

(i**) Arc welding**

- Carbon arc

- Metal arc
- Metal inert gas
- Tungsten inert gas
- Plasma arc
- Submerged arc
- Electro-slag

11. Classify various GAS welding processes

- Oxy-acetylene
- Air-acetylene
- Oxy-hydrogen

12. Name the various methods of Resistance Welding

Butt
Spot
Seam
Projection & Percussion.

13. What is 'Brazing'

It is defined as the t3echnique of joining two dissimilar or similar materials by addition of special filler material. Brazing gives a much stronger joint than soldering but requires greater heat which cannot be obtained from copper in soft soldering.

14.Mention the applications of friction welding.

Used in refrigeration.
Used in super alloys.
Making simple forging.
Production of taper and reamer drills
Production of axle shafts , valves and gears.

15.Name the chemicals used in flux Manufacure.

1.Chlorides
2.Borax and boric acid.
3.Borates
4.Fluorides.

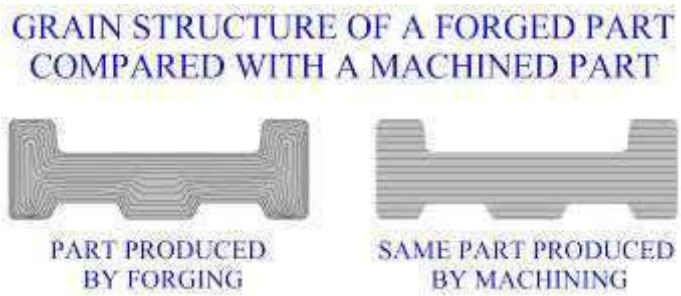
UNIT III

METAL FORMING PROCESS

1. What are the four major drawbacks of hot working? (May 2006)

- As hot working is carried out at high temperatures, a rapid oxidation or scale formation takes place on the metal surface which leads to poor surface finish and loss of metal.
- Due to the loss of carbon from the surface of the steel piece being worked, the surface layer loses its strength.
- This weakening of the surface layer may give rise to fatigue crack which results in failure of the part.
- Close tolerance cannot be obtained.
- Hot working involves excessive expenditure on account of high tooling cost.

2. **Explain why parts produced by Forging is preferred when compared to other machining and welding process.**



3.**Classify the types of extrusion. (May 2006)**

Ans: Extrusion

1. Hot Extrusion
2. Cold Extrusion
3. Hot extrusion

(A)Direct extrusion,(B) Indirect extrusion,(C)Tube extrusion

4.**What is the difference between a bloom and a billet? (May 2007)**

Ans: A bloom has a square cross section with minimum size of 150x150 mm and a billetis smaller than bloom and it may have any square section from 38 mm upto the size of a bloom.

5.**What is impact extrusion ? (May 2007)**

Ans: The raw material is in slug form which have been turned from a bar or punched from a strip. By using punch and dies, the operation is performed. The slug is placed in the die and struck from top by the punch opareting at high pressure and speed.

6.**Why are a number of passes required to roll a steel bar? (May 2008)**

Ans: To reduce the thickness and to increase the width of the bar number of passesare required.

7.**How are seamless tubes produced? (May 2008)**

Ans: Seamless tubing is a popular and economical raw stock for machining because it saves drilling and boring of parts. The piercing machine consists of two rapered rolls, called as piercing rolls.

8.**What is Sejournet process? (Dec. 2008)**
Ans: That extrusion process which is based both on the use of a lubricantin a viscous condition at extrusion temperature and on a separation between the lubrication of the chamber wall and die is called Sejournet process.

9.**What is skew rolling ?(Dec. 2008)**
Ans: The rolls are powered and the workpiece is in due to frictional force between metal and surface. The torque on the rolls is being zero.

10.**Explain the term Extrusion process. (Dec.2009)**
Ans: The extrusion process consists of compressing a metal inside achamber to force itout through a small opening which is called as die. Any plastic material can be successfully extruded. A large number of extruded shapes which are commonly used are tubes, rods, structural shapes and lead covered cables. During the process, a heated cylindrical billet is placed in the container and forced out through a steel die with the help of aramor plunger.

11.**What are the disadvantages of forging processes? (Dec. 2009)**
Ans:

- Complicated shapes cannot be produced.
- Generally used for large parts.
- Because of cost of dies, process is costly.

12.Define Impact extrusion.

Ans. It is a cold working process of making required shape by striking slugs of metal by high impact. It is used for making tooth paste ,shaving cream and collapsible medicine tubes.

13.What is meant by cold spinning. It is the operation of shaping very thin metals by pressing against a form while it is rotating , It is carried out at room temperature.

14. Define Hot Spinning.
It is the process of making circular cross section or a dish or head from circular , heavy plates by spinning sheet metal.

UNIT - IV

SHEET METAL PROCESS

1 **What is punching operation ?**

Ans : It is the cutting operation with the help of which various shaped holes are produced in the sheet metal. It is similar to blanking; only the main difference is that, the hole is the desired product and the material punched out to form a hole is considered as a waste.

2 **What is super plastic forming operation ?**

Ans: Superplastic forming is a metalworking process for forming sheet metal. It works upon the theory of superplasticity, which means that a material can elongate beyond 100% of its original size.

3 **What is press brake?**

Ans: Press brake (bending brake) is an open frame press used for bending, cutting and forming. Generally, it handless long workpieces in the form of strips. Usually press brake have long dies and suitable and suitable for making long straight line bends.

4 **Define hydro forming process.**

Ans : Hydro forming is a process which can be carried out in two ways:

1) Hydro - mechanical forming

2) Electro - hydraulic forming Hydro - mechanical forming: In this method , the blank is placed over the punch whose shape is similar to inner of the find workpiece.

Electro - hydraulic forming : This method involves the conversion of electrical energy into mechanical energy in a liquid medium. Electric spark in a liquid produces shock waves and pressures which can be used for metal forming.

5 **Give the difference between punching and blanking.**

Ans:

Blanking : It is the cutting operation of a flat metal sheet. The article punched out is known as blank. Blank is the required product of the operation and the metal left behind is considered as a waste.

Punching: It is simillar to blanking; only the main difference is that, the hole is the desired product and the material punched out to form a hole is considered as a waste.

6 **How is hydro forming is similar to rubber forming ?**

Ans : In both the sheet metal working processes sheet metal is pressed between a die and rubber block.

Under pressure, the rubber and sheet metal are driven into the die and confirm to its shape by forming the part.

7 **What do you mean by minimum bend radius?**

Ans: It is the radius of curvature on inside surface of the bend. If the bend radius is too small, then cracking of a material on the outer tensile surface takes place. To prevent any damage to punch and die, the bend radius should not be less than 0.8mm.

8 **Define limiting drawing ratio.**

Ans : It is the ratio of finished shell diameter (d) to the radius of bottom corner(r).

9 **Define Embossing.**

Ans : With the help of this operation, specific shapes or figures are produced on the sheet metal.

It is used for decorative purpose or giving details like names, trade marks, specifications, etc. On the sheet metal.

10. What are the factors affecting shearing operation?

Shape and material of punch
Die,speedof punching,lubrication
Clearance between punch & die.

11. Define Blanking.

A finite shape of sheet metal is removed and blocked by shearing the entire contour using a die and a punch. The portion removed, which is the required part is called as blank and the operation is called as blanking.

12.What is meant by Dimpling.

irst hole is punched and then it is expanded into a flange. flange may be produced by piercing with a sharp punch when ther bend angle is less than90^0, as n fittings with conical ends. this process is also called as
FLAIRING.

13.Define Notching.

It refers to the removing pieces from the edge. In this process, the metal is removed from the side (or) edge of a sheet to get the desired shape.

14.define Stretch forming.

The sheet metal is placed under a tensile load over a forming block and stretching it beyond its elastic limit and to the plastic range, thus cause permanent set to take place.this process is useful in making prototype models of aircraft and automotive parts.

15.Define Wrinkling

It is caused by compressive stresses in the plane of the sheet . It can be objectionable or can be useful in imparting stiffness to parts. It can be controlled by proper tool and die design.

16.What is wire drawing.

Drawing of metal through a small aperture die and wounding in the form of coil is called wire drawing. The aperture is generally below 16mm diameter.

17.What is meant by deep Drawing.

It is the process of making cup shaped parts from sheet metal blanks, where the depth of the cup is greater than that of the diameter of the cup.

UNIT -V

MANUFACTURING OF PLASTIC COMPONENTS

1 **What are the characteristic of thermoplastics ? (May 2006)**

ANS: Themoplastics polymers soften when heated and harden, when cooled.These types of polymers are soft and ductile. They have low melting temperature and can be repeatedly moulded and remoulded to the required shapes.

2 **List out the material for processing of plastics?**

ANS: The following metioned are the various polymer additives used in practice:

(1) Filler material (2) Plasticizers (3)Stabilizers
(4) colorants (5)Flame retardants (6) Reinforcements
(7)Lubricants.

3 **List the advantage of cold forming of plastics? (MAY 2007)**

ANS:

ADVANTAGES:

- Cold forming can be carried out at room temperature
- It is used to produce filament and fibres
- It is a simple process.

4 **What is film blowing? (May 2007)**

Ans: In this process a heated doughy paste of plastic compound is passed through a series of hot rollers, where it is squeezed into the from of thin sheet of uniform thickness. It is used for making plastic sheets and films.

5 **What are the types of plastics ? (May 2008)**

Ans: Polymers are classified in two major categories:

polymers (Soften when heated and permanently hardened when cooled).

6 **What is compression moulding? (May 2008)**

Ans: The main objective is to melt the material due to compression.

7 **Name the parts made by rotational moulding. (Dec. 2008)**

Ans: Rotational moulding process is mostly used for the production of toys in P.V.C like horse, boats, etc. Larger containers upto 20 m^3 capacity, fuel tanks of automobile are made from polythene and nylon. This process is also used for production of large drums, boat hulls, buckets, housings and carrying cases.

8 **What is parison ? (Dec.2008)**

Ans: Blow moulding consists of extrusion of the heated tubular plastic piece called as parison which is transferred to the two piece mold.

9 **Define degree of polyenerization. (Dec. 2009)**

Ans: It is the number of repetitive units present inone molecule of a polymer.

$$\text{Degree of polymerisation} = \frac{\text{Molecular weight of a polymer}}{\text{Molecular weight of a single monomer}}$$

10 **What is rotational mouldig of plastics? (Dec. 2009)**

Ans:

- Rotataional moulding also called as roto-moulding.
- A measured amount of polyemer power is placed in a thin walled metal mould and the mould is closed.

- Then the mould is rotated about two mutually perpendicular axes as it is heated.

11.What are the two types of polymerization.

1.addition polymerization

2.Condensation polymerization

12. Rubber is a _____ Polymer

Rubber is a **Organic** Polymer.

13.Write the two types of Injection Moulding.

1.Ram Or plunger type injection
moulding 2.Screw type
Injection Moulding

14.Define Polymer

Polymers are long chain molecules and are formed by polymerization process,linking and cross linking a particular building block called monomer, a unit cell.

15.Define Plastics.

Plastic is defined as the organic polymer which can be moulded into any required shape with the help of heat and pressure.