

SRINIVASAN ENGINEERING COLLEGE, PERAMBALUR  
DEPARTMENT OF AERONAUTICAL ENGINEERING  
AE 2253-PRODUCTION TECHNOLOGY  
2 MARKS QUESTIONS AND ANSWERS

UNIT-I  
CASTING

1. What is foundry?

Foundry is the process of forming metallic products by melting the metal, pouring in to a cavity known as the mould.

2. What are the stages of casting process?

1. Mould making
2. Clamping
3. Pouring
4. cooling
5. removal
6. trimming

3. What are the different types of pattern?

1. Single piece pattern
2. split pattern
3. match plate pattern
4. cope and drag pattern
5. gated pattern
6. loose piece pattern
7. sweep pattern skeleton pattern
8. segmental pattern
9. Shell pattern

4. What are the properties of moulding sand?

- a. grain size and shape
- b. porosity
- c. refractoriness
- d. strength
- e. plasticity

5. What are the important methods of sand testing?

- moisture content test
- clay content test
- grain fitness test
- strength test

6. What are the steps involved in refractoriness test?

- prepare a cylindrical specimen of sand
- heating the specimen at 1500o C for 2 hours
- observe the changers in dimension and appearance
- if the sand is good, it retain specimen share and show very little expansion. If the sand is poor, specimen will shrink and distort.

7. What are the pattern materials used?

- Wood and wood materials
- Metal and alloy
- Plasters
- Plastic and rubber
- Waxes.

8. What are the various types of pattern allowance?

- Shrinkage allowance
- Machining allowance
- Taper allowance
- Shake and distortion allowance

9. What are the basic steps in core making process?

- core sand preparation
- core making
- core baking
- core finishing

10. What is mean by core?

A core is a part used in casting and moulding processes to produce internal cavity and reentrant angles.

11. Name the three types of core binders?

- Thermoplastic binders
- Thermosetting binders
- Core oils
- Clays

12. What are the types of cores?

- Green sand cores
- Dry sand cores
- Oil bonded cores
- Resin bonded cores
- Sodium silicate and CO<sub>2</sub> cores

13. What are the tools used in moulding process?

- Shovel
- Riddle

- (iii) Rammer
- (iv) Strike-off bar
- (v) Vent wire
- (vi) Lifter
- (vii) Trowel
- (viii) Swab

14. What are the types of moulding processes?

- (i) Green sand moulding
- (ii) Dry sand moulding
- (iii) Loam moulding
- (iv) Metal moulds
- (v) Bench moulding
- (vi) Floor moulding
- (vii) Sweep moulding

15. How we are classifying the moulding machines?

A. Hand operated moulding machine

- (i) Pattern draw type
- (ii) Pin lift type
- (iii) Role over type

B. Power operated moulding machine

- (i) Squeeze machine
- (ii) Jolt machine
- (iii) Jolt squeeze machine
- (iv) Sand slinger

16. Name the different zones in Cupola furnace?

- (i) Combustion or oxidizing zone
- (ii) Reducing zone
- (iii) Melting zone
- (iv) Preheating zone
- (v) Stack

17. What are the advantages of special casting process over sand casting processes?

- (i) greater dimensional accuracy
- (ii) higher metallurgical quality
- (iii) lower production cost
- (iv) high production rate

16. What are the three types of centrifugal casting?

- (i) true centrifugal casting
- (ii) semi centrifugal casting

(iii) centrifuge casting

17. What are the advantages of ceramic mould casting?

(i) high production rate are possible

(ii) no cores are needed

(iii) complex shapes can cast

(iv) machining can be eliminated

(v) long lead time are needed

(vi) to develop new casting

18. What are the defects in casting processes?

(i) Dirt

(ii) Porosity

(iii) Blow

(iv) Dross

(v) Scab

(vi) Gas hole

(vii) Scar

(viii) Inclusion

(ix) Blister

(x) pinholes

## UNIT-II WELDING

1. Define welding.

Welding is a materials joining process in which two or more parts are joined together.

2. What are the types of welding processes?

(i) Oxyfuel gas welding

(ii) Arc welding

(iii) Resistance welding

(iv) Solid state welding

(v) Unique welding

3. Name the equipments used in gas welding?

(i) oxygen gas cylinder

(ii) acetylene gas cylinder

(iii) oxygen pressure regulator

(iv) acetylene pressure regulator

(v) oxygen gas hose (blue)

(vi) acetylene gas hose (red)

(vii) welding torch

(viii) filler rod and fluxes.

4. Name the equipment used in arc welding

- (i) Arc welding power source
- (ii) welding cables
- (iii) electrode holder
- (iv) welding electrode
- (v) welding helmets and shields

5. What are the advantages of submerged arc welding?

- a. Because of high heat concentration, considerably higher welding speed can be used.
- b. High metal deposition rate can be achieved
- c. Welding is carried out without spark, smoke, flash or spatter.

6. Define plasma arc welding.

Plasma arc welding is an arc welding process wherein coalescence is produced by the heat obtained from a constricted arc setup between a tungsten/alloy tungsten electrode

and water cooled nozzle or between a tungsten alloy tungsten electrode and the job.

7. What are the disadvantages of plasma arc welding?

- a. Welders need ear plug because of unpleasant, disturbing and damaging noise.
- b. More chances of electrical hazards are associated with this process.

8. What are the procedures followed in Thermit welding?

- a. clean the joint
- b. allow the concentration
- c. construct the mould
- d. preheating the mould
- e. crucible and its charging

9. What are the equipments used in electron beam welding?

- a. An electron beam gun with a high voltage power supply and controls
- b. a vacuum pumping system
- c. mechanical tooling fixtures
- d. a beam alignment system

10. What are the disadvantages of electron beam welding?

- (i) Initial cost of equipment is high and portable equipment is rare
- (ii) Work is to be manipulated through vacuum seals.
- (iii) Time and equipment is required to create vacuum every time a new job is to be welded.
- (iv) Precaution are needed to prevent damage from X-rays

11. What is meant by friction welding?

Friction welding is a solid state welding process wherein coalescence is produced by the

heat obtained from mechanically induced sliding motion between rubbing surfaces.

12. Define Diffusion bonding.

Diffusion bonding is a solid state process wherein coalescence of the faying surfaces is produced by the application of pressure and elevated temperature to carefully cleaned and mated metal surfaces so that they actually grow together by atomic diffusion.

13. What are the defects in welds?

- a. cracks
- b. distortion
- c. incomplete penetration
- d. inclusions
- e. porosity and blow holes
- f. poor fusion

14. Define Brazing.

Brazing is a joining process in which a filler metal is melted and distributed by capillary action between the faying surfaces of the metal parts being joined.

15. What are the characteristic features of filler metals and fluxes?

- a. melting temperature must be compatible with base metal.
- b. low surface tension in liquid phase for good wettability
- c. high fluidity for penetration into the interface.

16. What are the methods involved in brazing?

- (i) Torch brazing
- (ii) Furnace brazing
- (iii) Induction brazing
- (iv) Resistance brazing
- (v) Dip brazing
- (vi) Infrared brazing

17. Define soldering?

Soldering is similar to brazing and can be defined as a joining process in which a filler metal with melting point not exceeding 450°C is melted and distributed by capillary action between the faying surfaces of the metal parts being joined.

18. What are the advantages of soldering?

- i) low energy input relative to brazing and fusion welding
- ii) variety of heating methods available
- iii) good electrical and thermal conductivity in the joint
- iv) easy to repair and rework

19. What is adhesive bonding?

Adhesive bonding is a joining process in which a filler material is used to hold two or

more closely spaced parts together by surface attachment. The filler material that binds the parts together is the adhesive.

20. What are the advantages of adhesive bonding technology?
- The adherents are not affected by heat
  - Uniform stress distribution
  - Possibility to join large surfaces.
  - Possibility to join different materials
  - Gas proof and liquid tight.

### UNIT-III MACHINING

1, Define cold working of metals?

Those process, which are working below the recrystallization temperature, are called cold working of metals

2, Define the process of mechanical working of metal?

Mechanical working process are based on permanent changes in the shape of body due to some extreme forces

3, Give some examples for mechanical working of metal?

Rolling Forging

Extrusion Drawing Press working

4, Define hot working of metals,

Those process which are working above the recrystallization temperature is known as hot working of metals

5, Advantages of cold working over hot working

Good surface finish

Better dimensional accuracy

6, Classifications of rolling mills

Two high rolling mill Three high rolling mill

Four high rolling mill Multi high rolling mill

Universal high rolling mill

7, Advantages of cold rolling

Improves machinability

Improves physical properties

Good surface finish and high accuracy

8, Define forging

Mechanical working of metals by which metals and alloys are elastically deformed by the application of compressive force is known as forging process

9, Classification of forging process

Open-die process Close-die process

10, Some hand tools , which is used in the forging operation

Swage block Chisels Fillers Hammers

Flatters Punch Tongs Swage

11, Types of force weld

Lap weld Butt weld T or jump weld V finished weld

12, Define extrusion process

It is defined as the ratio of the cross sectional area of the billet to the cross section area of the product

13, What is meant by cold and hot spinning process

Cold spinning process is the operation of shaping very thin metal by pressing against Brass wheel

Hot spinning is a process of making circular cross section by spinning sheet metal

14, Define tube drawing

Making hallow cylinder and tubes by hot working process like extrusion, piercing is called tube drawing

15, Define degree of drawing

The ratio of the difference in cross sectional area before and after drawing to the initial cross sectional area is known as degree of drawing

16, Name four press working operation

Blanking Piercing Notching Nibbing

17, Defects in forging operation

Cold laps Die shift Cracks Flakes De carbonization

18, Methods used for producing seam less tube

Extrusion Piercing.

19, Define forge ability

It is defined as utility of a materials to deform before cracks appear on the metal

20, Defects in rolling parts

Surface defects Internal structure depicts Lamination

#### UNIT-IV

#### FORMING AND SHAPING OF PLASTICS

1. Define plastics.

Materials that can be reshaped (remolded) by applying heat and pressure. Most plastics are made from synthetic resins (polymers) through the industrial process of polymerization. Two main types of plastics are thermoplastics and thermosets.

2. Write types of plastics.



Thermoset- Heat hardening/ Undergoes chemical change

Thermoplastic- Heat softening/ Undergoes physical change .

3. Write the advantages of plastics.

Light Weight

High Strength-to-Weight Ratio

Complex Parts - Net Shape

Variety of Colors (or Clear)

Corrosion Resistant

Electrical Insulation

Thermal Insulation

High Damping Coefficient

“Low” pressures and temp required

4. Write disadvantages of plastics.

Creep

Thermally Unstable- Can't withstand Extreme Heat

U-V Light Sensitive

Relatively low stiffness

Relatively low strength

Difficult to Repair/Rework

Difficult to Sort/Recycle

5. Explain various types of manufacturing of plastics.

☒ Extrusion

☒ Lamination (Calendering)

☒ Thermal Forming

☒ Foaming

☒ Molding

☒ Expansion

☒ Solid-Phase Forming

☒ Casting

☒ Spinning

6. Write the basic components of injection moulding system.

Mold pieces (define the geometry of the part), and sprue, gates, runners, vents, ejection pins, cooling system.

7. Define compression moulding.

The process of molding a material in a confined shape by applying pressure and usually heat.

8. Define transfer moulding.

A process of forming articles by fusing a plastic material in a chamber then forcing the whole mass into a hot mold to solidify.

9. What are the advantages of compression moulding?
  - Little waste (no gates, sprues, or runners in many molds)
  - Lower tooling cost than injection molding
  - Good surface finish
  - Less damage to fibers
  - Process may be automated or hand-operated
  - Material flow is short, less chance of disturbing inserts, causing product stress, and/or eroding molds.
10. What are the disadvantages of compression moulding?
  - High initial capital investment
  - Labor intensive
  - Secondary operations may be required
  - Long molding cycles may be needed.
11. Define cold moulding.

Charge is pressed into shape while cold then cured in an oven. Economical but usually poor surface finish.
12. Define extrusion process.

Extrusion is the process of squeezing metal in a closed cavity through a tool, known as a die using either a mechanical or hydraulic press.
13. Define rotational moulding.

Used to form hollow seamless products such as bins. Molten charge is rotated in a mold in two perpendicular axes simultaneously, or rotated while tilting.
14. Define foam moulding.

Foaming agent is combined with the charge to release gas, or air is blown into mixture while forming.  
Used to make foams. Amount of gas determines the density.
15. Define vacuum forming.

It is accomplished by heating the plastic sheet until it is pliable enough to be vacuumed either into a female mold or over a male mold.
16. Define spinning.

Modified form of extrusion in which very thin fibers or yarns are produced is called spinning.
17. Define calendaring.

Molten plastic forced between two counter-rotating rolls to produce very thin sheets e.g. polyethylene sheets.
18. Define rotational moulding.

Used to form hollow seamless products such as bins. Molten charge is rotated in a mold in two perpendicular axes simultaneously, or rotated while tilting.

19. Define thermoforming.

Sheet material heated to working temperature then formed into desired shape by vacuum suction or pressure.

20. Explain various plastics used for blow moulding.

- HDPE (stiff bottle, toys, cases, drum)
- LDPE (flexible bottle)
- PP (higher temperature bottle)
- PVC (clear bottle, oil resistant containers)
- PET (soda pop bottle)
- Nylon (automotive coolant bottle, power steering reservoir)

## UNIT-V

### METAL FORMING AND POWDER METALLURGY

1. What is sheet metal work

The working of metal thickness from 3mm. to 5mm. with hand tools and simple machines into various forms is known as sheet metal work.

2. Various sheet metal that can be formed in press working

Funnels bends boxes pipe covers etc.

3. What are the various measuring tools used in sheet metal operations

Steels rule, folding rule, circumference rule, vernier caliper, micrometer, thickness gauge and steel metal gauge

4. What is meant by clearance

Clearance is the intentional space between the punch cutting edge and the die cutting depends on the type cutting operation the space between punch and die is provided known as clearance

5. Mention the effect of insufficient clearance,

It does not allow a clean break but partial break occurs. It is also called as secondary shear.

6. What is meant by seaming?

The process of providing lock between the two edges of the different work metal is called seaming.

7. How deep drawing operations differ from shallow drawing operations?

The length of the part to be drawn is deeper than its width.

8. What is stretching?

Stretching is the process of stressing the work blank beyond its elastic limit by moving a form block towards the blank or sheet metal.

9. Define the term "Spring back".

Spring back is beyond as the movement of the metal to resume its original position causing a decrease in bend angle after the applied force is withdrawn.

10. State the methods of stretch forming process
  1. Form-block method
  2. Mating-die method
11. What are the advantages of stretched forming operations?
  1. Blanks can be stretched in a single operation
  2. No need of any heat-treatments before and after the stretching process.
  3. Spring back is reduced or eliminated when compared to other forming methods
  4. Direct bending is not introduced
12. List out the applications of stretch forming operations.
  1. Production of aircraft wing and fuselage parts.
  2. Production of contoured panels for truck trailer and bus bodies in automobile industry.
13. Mention the various materials used for making dies and form blocks in stretch forming process.

Wood, masonite, zinc alloys and cast iron.
14. State the law of process of fracturing in formability.

The ductility of the same material is lower if the section size is larger.
15. State the law of geometrical similitude.
  1. Blanks are geometrically similar in all aspects with respect to another blank such as dimension, thickness, width, length etc. These geometrically similar blanks should be fabricated by using similar tools.
  2. Unit strains at corresponding locations are identical for geometrically similar blanks.
  3. The forces required to form any required shape on geometrically similar blanks are directly proportional to the square of the thickness.
  4. The consumption of work for forming the required shape is also proportional to the cube of its thickness for geometrically similar blanks.
16. What are the formability test methods?
  1. Formability tests for bulk deformation.
  2. Formability test for elastic-plastic deformation and
  3. Simulative tests for forming operation
  4. Full scale forming tests
17. How work-hardening is predicted in terms of stress-strain in formability?

Usually, the strain distribution is assessed from the surface. But, the magnitude of strain is determined by impregnating the sheet metal with a grid pattern or concentric circles are stretched into elliptic during pressing the sheet metal. The major and minor axes of ellipse give the directions of principal strains.
18. Mention the various types of simulative tests carried out for various cup forming process.
  1. Erichson test
  2. Olsen test

3. Surf test

4. Fukui test

19. What are the applications of forming limit diagram?

1. The new of tools in easy, hard or impossible to work be easily determined

2. Good materials used n forming operations are identified.

3. Location of source of trouble is also easy from a reference pressing by the designer.

20. How special forming process is defined?

In the case of mating die method, sheet metal is place over to lower die and its ends are fixed on movable grippers. Then, the upper die is moved towards the blank. If the female or upper die is actuate by any other means except hydraulic fluid contained in the cylinder forming process called special forming process.