

Test 1

1. Define the term Engineering Technology

Manufacturing technology solves the technology of machining, assembly and surface treatment.

2. Define the term composite.

A composite can be defined as a material consisting of two or more components forming a heterogeneous material. These components differ in their mechanical, physical and chemical properties. Generally, the composite material consists of a continuous and discontinuous phase. The continuous phase is called a matrix and its main task in the composite structure is to act as a binder. The discontinuous phase is called reinforcement and has a reinforcing function in the composite.

3. Give reasons for the use of composite in the automotive industry.

In the automotive industry, composites are used because of the mechanical properties and to reduce the weight of individual components and hence the entire car

4. Define the concept of model and what is important to consider in composite material models?

The model is an integral part of the production technology, according to which both the mold and the finished part are produced. The model has the shape of the negative geometry of the resulting form. Dimensional additions must be taken into account when designing. This is the case when the mold surface is machined. In models where composite molds are manufactured, the surface of the model is painted and a release agent is applied for ease of removal.

5. What is the principle of plastic molding?

Pressing is one of the simplest and economically least demanding technologies for processing polymeric materials. The principle of molding is to mold the molten polymer in the mold cavity with subsequent fixation of the shape of the article. The shape fixation depends on the type of polymer being processed. Thermoplastics must be cooled before being removed from the mold, and in the case of thermosetting plastics and rubber compounds, a chemical reaction - crosslinking, vulcanization - must take place.

6. Define the term Rolling.

Rolling is a technology in which the polymer mass is formed into sheets and strips in a slot between two opposing rotating rolls.

7. How is alloyed steel divided according to the alloying element content?

According to the content of alloying elements we divide them into: low-alloyed (content of alloying elements below 5%), medium-alloyed (content of alloying elements 5% - 10%), high-alloyed (content of alloying elements over 10%)

8. What are foundry molding materials?

There are raw materials (sands - grogs, binders and auxiliaries) from which molding mixtures are made. These serve to make semi-permanent and non-permanent cores and molds.

9. Define the term binder

The binder connects the grinder and the molding compounds gives the necessary formability and strength.

10. Describe the forming technology.

Forming is a part of engineering technology where we change properties, dimensions and shape by external forces. The shape change occurs by displacing the metal particles based on plasticity. It is the most important property of metals in terms of strength and elasticity. It is a permanent change in the shape and size of the molded material (components). This is due to the external forces of the forming machine and tool.

Test 2

Test 2 STT1

1. How is corrosion protection performed?

- appropriate material selection
- structural design
- correcting the corrosive environment
- electrical protection

- surface treatment

2. Define the term plating

Immersion plating in molten metal baths - one of the oldest methods of corrosion protection. By dipping, mainly Zn, Sn, Pb coatings are formed. After heating and soaking the surface, they are removed from the bath and cooled.

3. Define the term cladding.

Plating - during cladding, the protective metal layer on the components is formed by rolling, dressing, soldering, or preparing tough metal, protective metal, explosion.

4. Describe how chips are formed.

When machining the material, a cutting wedge is formed and a part of the material is separated from the blank. We call this part splinter. An intense plastic zone is formed before the chip is formed.

5. Define the term cutting wedge.

A cutting wedge is the part of the tool that has the ability to penetrate the workpiece. The cutting wedge is formed by differently oriented surfaces of the spine and the face or face. the areas of the back. The intersection of the forehead and the back forms the main cutting edge, and the intersection of the forehead and the secondary back forms the minor cutting edge.

6. Describe the turning operation.

Turning is the most widespread technological operation. Turning is possible to machine internal and external cylindrical surfaces, spherical and general rotary surfaces. On lathes it is possible to drill, rough, ream, produce external and internal threads using turning tools or taps.

7. Describe the technological grinding operation.

Grinding is a cutting of material with multiple cutting wedges created by abrasive grains. The abrasive grains are fixed in the tool with a binder so that the tool has a porous structure. Characteristic is the irregular placement of the cutting wedges (abrasive grains), which in addition have a random orientation and random geometry. A special feature of the grinding process is that the process takes place with the participation of a large number of relatively small grains in short sections.

8. Define the term assembly

Assembly is the formation of fixed or movable joints between rigid components, but also between batches of liquids and gases. Assembly creates the final process of the production system. Production system can be understood as a manufacturing company. Then the mounting system is just one subsystem of the production system.

9. Explain the concept of manufacturing process.

The production of components and their assembly into units takes place by certain activities. We call these activities the manufacturing process. The production process needs to be organized, planned, managed, implemented and controlled. The production process has three phases: preparation, implementation and control. In the production process it is necessary to prescribe the order of activities.

10. Explain the concept of manufacturing process.

The prescription of individual activities for the production and assembly of components is called the production process. If the worker's activity is involved in the manufacturing process during the manufacturing process, this is called a workflow.

Test 3 STT1

1. Define the term tempering.

Tempering is the heating of hardened steel with a martensitic structure to temperatures of A1 to create structures closer to equilibrium. From the technological point of view we divide tempering into tempering at low temperatures (up to 300 ° C) and at high temperatures (above 400 ° C).

2. Define the term cementing.

Cementing -Surface of carbon, low-alloy and alloyed steels with low-carbon content (up to 0, 25% C) with a carbon network to eutectoid or carbon-based. an overaduttotoid concentration of 0.8 - 1 wt. carbon).

3. What methods of chemical-thermal treatment do you know?

Nitro-cementing - saturation of the surface with carbon and nitrogen at temperatures around AC3,

Carbonitriding - saturation of the surface with carbon and nitrogen at temperatures around 650-750 ° C,

Sulfonitriding - saturation of the surface with sulfur and nitrogen in a gaseous or liquid environment (elephant bath - 95% sodium cyanide and 5% sodium sulfite),

sulfonating - saturating the surface of components with sulfur. It's a process similar to sulfonitriding,

diffusion plating - saturation of chromium (diffusion chrome plating), silicon, aluminum surface (aluminizing, aluminizing) - refractory and corrosion resistant, boron increases surface hardness and wear resistance.

4. Explain the concept of CAD systems.

CAD systems (Computer Aided Design) are software tools designed for use in the initial stages of the production process, in the development, construction and technological preparation of production. CAD is just one part of the IT industry. Collectively, this deployment is called CA technology.

5. Explain the abbreviation CAD

Computer aided design includes all software tools designed for the design process. This means that it is used to design and optimize the design solution.

6. Explain the abbreviation PLM

PLM - Product Lifecycle Management - an information platform that incorporates technical, manufacturing and marketing data about a product. A manufacturing company needs to have a production management system, a supplier relationship management system, a customer relationship management system, a quality management system and a system for planned technical development and innovation. PLM unifies these systems and creates a consolidated set of product information.

7. The activities that a structure must perform in the design process include:

assignment of technical task and processing of technical conditions
normalization and technical-economic evaluation of the proposal
making drawings of assemblies and production drawings, wiring diagrams
production of parts lists, inspection assemblies and assembly drawings
participation in prototype production or directly at the start of production, repair of drawings
proposals for external orders, documents for packaging and shipping the product
instructions for operation and use of the product, creation of brochures

8. Explain the process of cold bulk forming.

Bulk cold forming is a blank forming process that is prepared by shearing or cutting from rod material. The process proceeds below the recrystallization temperature of the molded material. Deformation hardening of the material is an accompanying feature of cold bulk forming. This is due to the increased hardness and strength of the material.

9. Explain the Rolling technology operation.

By rolling is understood a continuous process in which the formed material deforms between rotating working rolls under conditions of prevailing all-round pressure. The rolled material deforms between the rollers. Rolling is mainly done in hot, but also cold. The result of the process is a rolled metal.

10. Explain the bending technology operation

Bending is elastic-plastic deformation. This deformation is caused by moments of external forces. It is the creation of sharp or rounded edges. This operation can be used to straighten an improperly formed sheet.

11. Define the term annealing.

Annealing is a method of heat treatment. In this way, we usually want to achieve equilibrium of the part. The essence of annealing is the uniform heating of the component to the annealing temperature, the holding (stay) at this temperature for a certain period of time and consequently usually slow cooling takes place.

12. Define the term hardening.

Hardening is the heating of the steel to the recrystallization temperature, the holding at that temperature and subsequent cooling at a rate higher than the lower critical cooling rate. The most moderate and economically preferred quenching environment is air.

The aim of quenching is to achieve a different state such as equilibrium.