Dentistry: Materials Science

2nd year exam questions

Classifications and auxiliary materials:

1.
Types of corrosion. Give examples of chemical processes observed when working with dental materials.

2.
Viscosity and brittleness. Define these concepts. Impact strength and method of its determination.

3.
Give an explanation of material fatigue. Methods to combat fatigue of structural materials.

4.
Define and reveal the essence of the metal corrosion process.

5.
Dental materials science as a subject: content, goals and objectives, connection with other sciences.

6.
Artificial abrasive materials, methods of their production, properties.

7.
What types of deformations do dental construction materials experience at the stages of manufacturing dentures and in the oral cavity?

8.
What materials are called abrasive? Their classification.

9.
What are the loads in size and direction experienced by dentures in the oral cavity?

10.
What indicators characterize the physical properties of materials?

11.
What properties of abrasive grain determine its grinding ability?

12.
What properties of materials are called technological and how are they taken into account in production conditions?

13.
What is the principle of choosing a grinding tool depending on the hardness of the product being processed?

14.
Classification of auxiliary materials.

15.
Classification of materials used in orthopedic dentistry.

16.
Modeling materials and their classification.
17.
Purpose of insulating (separating) materials in the manufacture
of dentures, their classification
18.
Purpose of low-melting alloys, requirements for them, main components, properties.
19.
Name natural abrasive materials and describe their properties.
20.

Inorganic acids, their properties and applications.

21.

Alloys for stainless steel and noble alloys. Safety precautions.

22.

Polishing agents, indications for their choice. Composition of polishing pastes for polishing stainless steel, gold, plastic.

23.

Electropolishing process, its essence, electrolyte composition.

24.

Silicate molding materials, their properties, application.

25.

Melting and boiling points, practical significance of these indicators. Methods

for producing materials with relatively low melting points.
26.
Thermal expansion and its practical significance. What is called the coefficient of thermal expansion?
27.
Requirements for basic structural materials.
28.
Requirements for molding materials, their classification.
29.
Phosphate molding materials, their properties, application.
30.
What is the difference between grinding and polishing processes?

31.
What is called elasticity? How is it measured?
32.
What is meant by the biological properties of materials?
33.
What is plasticity? How is this property of materials used in practice?
34.
What is the hardness of a material? Its practical significance and method of determination
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35.
What are fluxes? What are the most commonly used fluxes used in
soldering?

Basic construction materials:

1.
Acrylic monomers, their structure and properties.
2.
Types of artificial teeth for removable dentures.
3.
Types of dental alloys, features of their structure.
4.
Internal stresses in metal products, their influence on physical and mechanical
properties. Ways to relieve internal stresses.
5.
Define the processes of forging, punching, rolling and drawing. How
do these processes differ?
6.
Describe the maturation stages of the plastic dough.
7.
The value and characteristics of the components of the ceramic mass.
8.
Changes in the physical and mechanical properties of metals during deformation, practical
significance.
9.
What dyes are used for staining basic plastics and plastics for
bridges?
10.
What transformations does the alloy structure undergo during casting? How does this affect the
physical and mechanical properties of the alloy?
11.
What effect can the method of metal melting have on the carbon content in the alloy?
12.
What is the optimal ratio of monomer and polymer in the manufacture of dentures
?
13.
Classification of ceramic masses, processing methods.
14.

Classification of plastics used in dentistry.

15.
Cobalt and chromium, their properties and applications. Alloys based on cobalt and chromium, their composition
and properties, application.
16.
Mechanism of connection of ceramic mass and metal frame.
17.
Explain the reasons that cause the solder in the stainless steel dentures to dissolve
in the oral cavity.
18.
Features of self-hardening plastics. What components make
polymerization possible at room temperature, the principle of their operation.

19.
List the substances and factors that accelerated the polymerization of acrylic plastics.
20.
Porosity of plastics, its types, causes, influence on physical and mechanical properties.
21.
Solders for stainless steel and gold, composition and properties.
22.
Causes of shrinkage and gas sinks.
23.
Self-polymerization of acrylic plastics and ways to prevent it. Inhibitors.

24.
Sitals, their composition, properties, application.
25.
Modern materials for the manufacture of dentures: zirconium dioxide. Composition and properties.
26.
Alloys based on gold, silver, platinum, their composition and properties, application.
27.
Structure of zirconium dioxide and its crystal states.
28.

The essence of soldering and welding processes. Necessary conditions for passing them.
29.
Raw materials for obtaining dental ceramics.
30.
The temperature regime of polymerization and the consequences of its violation.
31.
Heat treatment of metals, its purpose and the nature of structural transformations in metal accompanying this process.
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32.
Conditions required for connecting plastic artificial teeth with plastic and metal bases of dentures.
33.
Physical and mechanical properties of basic plastics.
34.
Physical and mechanical properties of ceramic masses.
35.
What explains the irritating effect of plastic on the oral mucosa ? How can I reduce this action?

Clinical materials:

1.
Alginate impression materials. Properties and indications for use.
2.
Antiseptic and therapeutic drugs used in endodontic treatment.
3.
Temporary filling materials used in endodontics.
4.
Classification and general characteristics of filling materials used in therapeutic practice. Basic requirements for them.
5.
Classification of impression materials. Indications for the use of different groups of materials.
6.
Classification and properties of materials for dental implants.
7.
Composite filling materials. Classification, composition, physical and chemical properties, indications for use.
8.
Compomers and keromers. Composition, properties, indications for use.
9.
Crystallizing impression pastes, their properties.
10.
Materials for insulating gaskets (cements, pastes, varnishes). Composition, properties, indications for use.
11.
Materials for medical pads and temporary dental fillings. Composition,

properties, indications for use.

12.
Materials used for reconstructive surgery of the face, requirements for them.
13.
Comparative characteristics of composites of various classes. Mechanisms of curing polymer composites.
14.
Definition and general characteristics of amalgam. Composition and mechanism of hardening. Classification and properties.
15.
Plastic hardening (endogermetic) materials for filling root canals.

16.
Filling materials for root canals, their classification, composition.
17.
Cements and materials containing calcium hydroxide. Application.
18.
Preparations for chemical expansion of root canals.
19.
Properties of alginate impression materials, the reason for their shrinkage, features of use.
20.
C-silicones. Composition properties, typical set of components, method of application.

21.
A-silicones. Composition properties, typical set of components, method of application.
22.
Comparative characteristics of the properties of alginate materials and silicone masses.
23.
Means for devitalization of tooth pulp, composition, properties.
24.
Glass ionomer cements. Classification, chemical properties, indications for use.

25.
Dental amalgams. Composition, properties, advantages and disadvantages. Modern mercury-free amalgams.
26.
Dental materials used for temporary root
canal obturation. Composition and properties.
27.
Thermoplastic impression materials, their components, properties and applications.
28.
Thermoplastic impression materials, properties, application.
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29.
Requirements for filling materials for root canals.
30.
Requirements for impression materials, their classification.
31.
Zinc-eugenol cements. Composition and properties.
32.
Enamel-dentin adhesive systems of different generations. Mechanism of hybrid zone formation.
33.
Materials used in surgical dentistry.
34.
Cements for fixing crowns. Composition, properties, and application.
35.
Sealants, remineralizing and fluorine-containing products.

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