1. Write the relationship for calculating the equilibrium constant of the following reaction

   2 A +B ↔ 2 C +3 D. In which direction will the reaction take place if its value is 0.6?
2. Determine in which direction the reaction $FeSO_4 + Sn \leftrightarrow Fe + SnSO_4$ will take place when E^0 ($Fe^{2+}/Fe_{(s)}$) = -0,44; E^0 ($Sn^{2+}/Sn_{(s)}$) = -0,14
3. Write the full name of BCC lattice and give two examples of metals which crystallize in this lattice.
4. Briefly describe the production of pure titanium from ilmenite and write the associated chemical reactions.
5. Draw the cooling curve for pure metal and alloys.
6. Briefly characterize Ni-Cr alloys.
7. Explain the solidification process of conventional amalgams.
8. Which amalgams are more resistant to corrosion and why?
9. Give at least two examples of dental cements based on organometallic chelates.
10. Write the setting reaction of zinc oxide eugenol cement.
11. Write the reaction of the formation of slaked lime from quicklime.
12. Name and describe the effect of at least 2 chemical factors affecting the setting reaction of gypsum.
13. Name the saccharide units found in the structure of alginates (give a formula for at least one saccharide).
14. Name the types of reactions that produce polysulphides and polyethers.
15. Name 3 types of radical polymerization initiation and explain at least one.
16. List the factors (at least 4) that affect the properties of synthetic polymers.
17. Explain the concept of compomers and state their main use in dentistry.
18. List 4 advantages (or disadvantages) of using composites compared to amalgams.
19. Name and characterize the main organic component of saliva.
20. State the recommended concentration of fluorides in toothpastes as well as their effect.
21. Calculate the stoichiometric coefficients of the reaction: $Au + HNO_3 + HCl \rightarrow H[AuCl_4] + NO + H_2O$, and indicate the partial reactions of oxidation and reduction.
22. Hydroxyapatite is a compound with chemical formula $Ca_5(PO_4)_3(OH)$, Mr = 502.3. It represents the inorganic component of the body's hard tissues. Calculate the percentage of calcium and phosphate in one molecule of hydroxyapatite.
23. Acetylsalicylic acid (Mr = 180.16) is part of numerous drugs that act as analgesics, antipyretics, antiphlogistics (doses from 500 mg) and anticoagulants (doses up to 100 mg). It is the oldest synthetically prepared drug, still commonly used today, under the trade names Aspirin, Acylpyrin, Anopyrin. In aqueous solution, but also under the action of atmospheric humidity, it hydrolyzes to form acetic acid (Mr = 60.05) and salicylic acid (Mr = 138.12). Calculate the amount of substance and the number of particles of acetic acid that result from the decomposition of 32 g of acetylsalicylic acid.
24. Doxacurium chloride is administered as an antispasmodic in ampoules of an aqueous solution with a concentration of 0.25 $mg \cdot mL^{-1}$. The recommended dose for application in adult patients is 0.025 $mg \cdot kg^{-1}$. Calculate the volume of solution to be given to a 95 kg patient.
25. Calculate the volume of lactic acid solution (Mr = 90, c = 0.25 $mol \cdot L^{-1}$) that is needed to prepare 300 mL of a solution with a concentration of 15 $mmol \cdot L^{-1}$.