

“Approved”

Head of engineering
department

Kindrachuk M.V.

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Questions

for module test test #1

on «**Science of Aviation Materials**»

Field of Study: 17 «**Electronics and Telecommunications**»
Specialty: 173 «**Avionics**»
Specialization: «**Piloting and Navigation Equipment
Complexes**»

1. Types of chemical bonds
2. The structure of monocrystalline and polycrystalline substances
3. Crystal lattice. Unit cell
4. Types of unit cell. Description of unit cell
5. Isotropy and anisotropy of materials
6. Allotropy and allotropic transformations
7. Point and linear imperfections of crystal structure
8. Planar and volume imperfections of crystal structure
9. Types of dislocations and their influence on mechanical properties of material
10. Classification of electromaterials
11. Classification of dielectrics
12. Dielectric materials – general properties and application
13. Polarization of solid dielectrics
14. Currents in dielectric material

15. Conductivity of dielectric materials
16. Influence of temperature on conductivity of dielectrics
17. Influence of humidity and imperfections on conductivity of dielectrics
18. Explain what is dielectric loss
19. **The relation of current in dielectrics on power losses**
20. Types of energy losses in dielectric
21. Electrical strength of dielectrics. Break-down.
22. Breakdown in gases.
23. Factors influencing break-down voltage
24. Breakdown in solid dielectrics
25. Breakdown in liquid dielectrics
26. Organic solid dielectrics
27. Inorganic solid dielectrics
28. The basic characteristics of conductors
29. The nature of conductor resistance
30. Resistance dependence on different factors
31. Superconductivity
32. High-temperature superconductivity
33. Gothefson's effect
34. The metals of high conductivity
35. The materials for terminals
36. Solders, spelters and fluxes
37. The materials for thermocouples
38. Nonmetallic conductive materials
39. Elementary band structure of a semiconductor
40. The conductivity of semiconductors
41. The admixtures in semiconductors
42. Temperature influence on semiconductor conductivity
43. The lighting influence on semiconductor conductivity
44. Luminescence

45. The semiconductor-semiconductor contact. P-n-junction
46. The basic semiconductor materials
47. p-n – junction devices – rectifiers
48. p-n – junction devices – transistors
49. p-n – junction devices – the sun battery
50. The intensity of external electric field influence on semiconductor conductivity
51. The intensity of external magnetic field influence on semiconductor conductivity
52. Classification of magnetic materials
53. Explain the ferromagnetism
54. Domain structure of ferromagnet
55. Magnetic characteristics of materials
56. The properties of magnetic circuit with air clearance
57. Magnetization in direct fields
58. Magnetization in alternating fields
59. Magnetically soft materials
60. Magnetically hard materials
61. Special magnetic materials