

Demonstration version

Direction:
03.04.02 Physics

№	Task	Points
1	Center of mass of a system does not move if: <ol style="list-style-type: none"> 1. There are no external forces 2. There is one external force that affects system 3. All forces are equal 4. The net force is equal to zero in its value 	0 or 5
2	According to the Second law of thermodynamics change in the total entropy of a system is equal to <ol style="list-style-type: none"> 1. Supplied heat divided on temperature 2. Supplied heat divided on temperature for reversible process, and less than this value if the process is irreversible 3. Supplied heat divided on temperature for reversible process, and more than this value if the process is irreversible 4. Enthalpy change divided on the temperature 	0 or 5
3	Electro-conductivity of the matter in absence of phase transitions: <ol style="list-style-type: none"> 1. Increases with the increase in temperature for any kind of a state; 2. Decreases with the increase in temperature for any kind of a state; 3. Increases with the increase in temperature for metals, for electrolytes and semi-conductors – decreases; 4. Decreases with the increase in temperature for metals, for electrolytes and semi-conductors – increases; 	0 or 5
4	Discrete energy values can be observed in quantum mechanics only when: <ol style="list-style-type: none"> 1. wall is thick enough 2. energy of a particle is less than the value of a potential energy 3. energy of a particle is more than the value of a potential energy 4. a particle moves freely 	0 or 5
5	In order to observe incoherent scattering from a crystal lattice? It is necessary to use: <ol style="list-style-type: none"> 1. An optical laser 2. Ultraviolet which went through a collimator 3. Infrared 4. X-ray which went through a collimator 	0 or 5
6	Entropy values if pure components in different states are subordinated as follows: <ol style="list-style-type: none"> 1. $S_{\text{gaz}} > S_{\text{solid}} > S_{\text{liquid}}$ 2. $\text{liquid} > S_{\text{solid}} > S_{\text{gaz}}$ 3. $S_{\text{solid}} > \text{liquid} > S_{\text{gaz}}$ 4. $S_{\text{gaz}} > \text{liquid} > S_{\text{solid}}$ 	0 or 5
7	Phase rule for pure substances. Pressure-temperature diagram	0-15

8	The rate of a reaction as a function of concentration and temperature. Controlling stages of the process.	0-15
9	Least action principle. Lagrange function. Lagrange equation.	0-15
10	Particle movement in a one-dimensional potential field: energy values of a particle in a quantum well	0-15
11	Theoretical foundations used for bachelor graduation work. Main results of bachelor graduation work.	10