

Criteria

Criteria for the problem No. 2 "The Bulb in the Glass"

1	The green leaves is the most important factor influencing on the consumption of water	2
2	The root system is the second most important factor on the consumption of water	2
3	The temperature of water if the third important factor on the consumption of water	2
4	Presence of poisonous substances limits the consumption of water	2
5	Presence of fertilizers does not influence on the consumption of water	2
6	Experiment carried out with quantitative estimates	6
	TOTAL:	16

Criteria for the problem No. 3 "Magnetic arrows"

1	Correctly named the reason for the interaction of magnetic arrows	1
2	Theoretically demonstrated the number of possible types of coupled oscillations (in-phase, anti-phase, beats)	3
3	Experiment: mentioned possible types of coupled oscillations (in-phase, anti-phase, beats)	6
4	Experiment: mentioned energy transfer between both arrows	4
5	Found analogies to other types of oscillations in nature (mathematic pendula)	2
	TOTAL:	16

Criteria for the problem No. 4 "Fresh and Salted Water"

1	Performed measurements of conductivities	5
2	Compared quantitative data, offered theory, read references (e.g. the Dead Sea vs a lake)	5
3	Correctly identified samples	6
	TOTAL:	16

Criteria for the problem No. 5 "A Compass and a Ruler"

1	$A(n)=1,2,3,3,4,4,4,4,5,5$ – 0.5 points per each correct minimum number of steps	5
2	$B(n)=0,4,8,8,12,12,16,12,16,16$	5
3	Diagrams produced	1
4	Values for the ratios $A(n)/B(n)$	1
5	A trend is demonstrated: when n tends to infinity, $A(n)/B(n)$ tends to 0	4
	TOTAL:	16

Criteria for the problem No. 6 "Nontypical crystals"

1	Gave classification of various types of crystalline structures	4
2	What is the physical background for varied crystalline structures?	4
3	Discussed about possible defects of crystallographic structures (vacancies, impurities.) Why it is difficult to grow a big crystal?	4
4	Gave a clear answer to the question in the task	4
	TOTAL:	16

Criteria for the problem "Fastidious Flour Moth"

1	The needs of the moth are describe: protein, fats, carbohydrates, and minerals	3
2	The moth does not eat dangerous substances (e.g. caffeine)	3
3	The moth does not eat unbalanced food (e.g. pure sugar)	3
4	The moth does not eat food with mechanical shells (e.g. thick skin)	3
5	Experiments with quantitative data performed	4
	TOTAL:	16

Criteria for the problem No. 8 "A good battery"		
1	Gave classification of types of batteries	2
2	Considered the physical principles for various types of batteries	2
3	Mentioned two options: a maximum power and the maximum duration of operation	2
4	Theoretically justified the limitations on the power cell (maximum power, maximum duration)	2
5	Demonstrated that satisfying both options in p. 4 at once is impossible	3
6	Justified a fair price for the battery (not brand, but costs of production)	3
7	Choice made on the ratio price/quality	2
		TOTAL: 16
Criteria for the problem No. 9 "Plant fertilizers"		
1	Compared various fertilizers based on their physical and chemical properties	8
2	Application of the fertilizers	8
		TOTAL: 16
Criteria for the problem No. 10 "The land lease contract"		
1	Estimated the number of possible ratios for the sides of the quadrilateral shape (three possibilities)	3
2	Eimitation found on the parameter t (each side is longer than zero) t (-5/14; 1/7)	2
3	Proven that the surface is maximum when angles of the polygon are 90 degrees	4
4	Three cases of building a polygon according to p. 1 are considered	3
5	Verified the correctness of the three solutions via varied criteria (Pythagoras theorem, inequality for a triangle, each side is longer than zero)	3
6	A correct answer obtained: t = 0, S = 1	1
		TOTAL: 16
Criteria for the problem No. 11 "Flowering Chrysantemums"		
1	Distribution of temperatures from Wikipedia for the cities	5
2	Presence of specific data (days and months)	5
3	Scientific method	6
		TOTAL: 16
Criteria for the problem No. 12 "A fireproof handkerchief"		
1	Made an experiment with the cloth	2
2	Compared against an experiment with a different tissue (e.g. cottonwool)	3
3	Compared specific combustion heat of ethanol and specific evaporation heat of water	3
4	Pointed out the role of capillary phenomena, namely the fact that the external layer of the tissue is always wet	3
5	Mentioned that ethanol prevents water evaporation, and the cloth remains wet	3
6	A correct answer obtained: there is not enough ethanol to dry up and ignite the cloth	2
		TOTAL: 16