



Problems of the extramural round
V International natural sciences tournament

1.Mars One

According to the U.N.O., about 9 billion of people will have lived on the Earth by 2050 year. In this connection the problem of colonization of another planets becomes more and more important. Nonprofit organization Mars One is going to launch the first group of colonists to Mars in the near future. Please, suggest a food intake for colonists taking into account offered conditions of the expedition of Mars One and peculiarities of the interplanetary flights.

2. Dunno on the Moon

People's energy duty is doubled every 10-15 years. Scientists suggested to construct solar power stations on the Moon in search of new energy supplies. In lunar soil there is a mineral regolith which includes up to 30% of silicon. Please, suggest a technology for automated production silicon from regolith and for creation a solar power stations on the Moon. How could one deliver the energy from Moon to the Earth? How much energy can be obtained using the technology?

3.Optical fiber

Over recent years the optical fiber has become a standard in data transfer. A possible application of it is target delivery of laser radiation. Nowadays, the optical fiber in use can pass the radiation of 800-1500 nm. The optical fiber at the wave-length of 10 micrometres (CO₂ laser) could be used in laser cardiosurgery. Also the optical fiber for UV-radiation could be useful in spectroscopy. Please, suggest materials for creation of optical fibers for UV- and FIR-radiation.

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In 2014 the intramural round of the Tournament is separated in two leagues: International league and the Russian-speaking league. Participants of the International league perform in English both in the extramural and intramural rounds of the Tournament. Teams of the Russian-speaking league prepare their solutions in Russian.

Teams which would like to participate in the International league should send the solutions of tasks of the extramural round until 20 September, 2014.

You should send no less than two solutions of introduced problems. Points for teams that have sent three solutions will be calculated from two best solutions. Solution for each problem consists of 2 files: presentation in PowerPoint (or PDF) and extended solution in .doc format (5 pages or less)

Solutions should be sent on the e-mail: tournament@chem.spbu.ru .

Please, register if you are going to participate in the Tournament: www.scitourn.ru/reg