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**ПИСЬМЕННАЯ РАБОТА УЧАСТНИКА  
ОЛИМПИАДЫ ШКОЛЬНИКОВ СПбГУ  
2018–2019**

заключительный этап

Предмет (комплекс предметов) Олимпиады

СОВРЕМЕННЫЙ МЕНЕДЖЕР

Город, в котором проводится НовосибирскДата 07.03.2019

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**ВАРИАНТ 3**

**МАТЕМАТИКА (СОВРЕМЕННЫЙ МЕНЕДЖЕР)**

*Для каждой из сформулированных задач приведите полное ее решение и запишите ответ.*

1. (6 баллов) Найдите все целочисленные решения неравенства

$$\log_{15}(x+2)^2 \geq \log_3(x-2)^2 + \log_5(x+5)$$

2. (6 баллов) Сколько корней имеет уравнение  $\sin(2\pi x) = \log_2 x$  на промежутке  $(0; 10)$ ?

3. (6 баллов) При каком наибольшем целом  $p$  найдутся два отрицательных значения  $a$ , при которых выражение  $3a^2p + 6ap^2 - 1 = 0$  обращается в нуль?

4. (8 баллов) В параллелограмме перпендикуляры, опущенные из одной из одной из вершин на противоположные стороны, равны 12, а одна из диагоналей равна 15. Найдите периметр параллелограмма.

5. (8 баллов) В кубе  $ABCD A'B'C'D'$  через точки  $A$ ,  $C$  и середину ребра  $A'B'$  проведена плоскость. В каком отношении она делит объем куба?

**Решения заданий:**

№ 2 Рассмотрим графики функций  $y = \sin(2\pi x)$  и  $y = \log_2 x$ .  
 График функции  $y = \log_2 x$  монотонно возрастает, пересекает ось  $Ox$  в точке  $(1; 0)$ . График функции  $y = \sin(2\pi x)$  — синусоида,  $E(x) \in [-1; 1]$ .  
 При  $x=1$   $y=0$ , следовательно точка  $(1; 0)$  — точка пересечения графиков. Так как график  $y = \log_2 x$  монотонно возрастает, то больше точек пересечения нет, значит уравнение в промежутке  $(0; 10)$  имеет 1 корень.  
 Ответ: 1

This image shows a single sheet of white paper with very faint, evenly spaced horizontal lines, characteristic of notebook paper. The lines are light gray or blue and run across the width of the page. There are no margins, text, or other markings visible on the paper.

**For each question 1-2, mark one letter.**

1. In the text, the word in bold '**concerns**' is closest in meaning to:
- (A) worries
  - (B) doubts
  - (C) interests
  - (D) threats
2. In the Arab States region, development achievements can be threatened by one of the following:
- (A) lack of clean water
  - (B) sexual inequality in the society
  - (C) sex-ratio imbalance
  - (D) increasing number of refugees in the region

## АНГЛИЙСКИЙ ЯЗЫК И ОБЩЕСТВОЗНАНИЕ (СОВРЕМЕННЫЙ МЕНЕДЖЕР)

## Task 1

In this integrated task, you should read the text on the topic of environmental issues and answer the essay question. You have about 30 minutes to read and analyse the text and 40 minutes to plan, write, and revise your essay. Write your essay in 200–250 words in an appropriate style. Use your own words as far as possible.

- Identify at least three key environmental challenges that Russia faces today and give your arguments for each of them.
- Using the information from the text, explain if the initiatives presented in the text could be used in Russia to protect and improve the environment.

From Afghanistan to Zimbabwe, 141 countries made significant progress in 2017 to tackle the most urgent environmental challenges facing humanity and our planet, inspiring us to seek out new and more innovative solutions.

The 2030 Agenda for Sustainable Development provides our vision for this work – connecting people and welfare with the planet; development with environment – and signals that our response to these complex and inter-connected challenges must do the same.

In this 10th annual performance report of the United Nations Development Programme (UNDP), we show how investments in the Sustainable Development Goals<sup>1</sup> (SDGs) – on affordable and clean energy, climate action, life below water, and life on land – accelerate the achievement of other goals aimed at ending poverty, achieving zero hunger, achieving gender equality, reducing inequalities, and building strong institutions.

Many countries in the Arab States region continue to be marked by conflict and instability that threaten to destroy development achievements and, in some instances, reverse progress. Yet significant steps have been made on several development fronts over the past decades, including improved life expectancy and school enrollment. However, sustainable development challenges such as water scarcity, gender gaps in economic, political and social life, and forced migration could prevent the region from fully securing these achievements.

Since 1992, the Arab States region has received 5% of all environmental grant financing mobilized by UNDP for 15 countries in the region. When combined with US\$1.6 billion in co-financing, this total investment of US\$1.9 billion over the past 25 years has made significant progress in addressing the root causes of environmental degradation, and has built capacity to recover and strengthened livelihoods across the region.

Over 280,000 hectares of the archaeological and cultural sites of Petra, Dibein, and Wadi Rum in Jordan are protected by biodiversity-friendly land-use plans. Biodiversity<sup>2</sup> management needs and concerns are now integrated into Jordan's National Tourism Strategy and the new Biodiversity-Friendly Tourism Charter represents an effective intervention on biodiversity conservation efforts. Many of the threats to biodiversity that relate to tourism (e.g. off-road driving, camping and associated waste problems and cutting of wood, hunting, etc.) are being brought under control through better land-use planning and protected areas management.

Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda carried out water balance models that included physical, chemical and isotope data to estimate annual and monthly water balance information that is essential for sustained management of wetlands and lakes in

<sup>1</sup> Sustainable Development Goals – a plan of action to end poverty, protect the planet and guarantee the global well-being of people

<sup>2</sup> Biodiversity – the variety of plant and animal life in the world or in a particular habitat

the Nile River Basin. The results of these models fed into nine national reports and one Nile Basin Groundwater Report that will improve the joint management of the Nile River Basin and promote a common understanding of groundwater issues among the countries owning lands on river banks.

Over 6,000 households in the North-East and North-West regions of Somalia are benefiting from improved access to water, ecosystem services and reforestation. Land Use Policies to support natural resources management have been developed in Somaliland and Puntland. The Government has also developed a National Development Plan that aims to support natural resources management and increase capacities to cope with climatic disasters happening repeatedly. Households in Djibouti are using newly acquired seeds and training in ecosystem services and reforestation to upgrading their survival agricultural skills. A National Climate Change Strategy has been developed to coordinate such activities throughout the country and to support an integrated response to climate impacts.

Priority biodiversity conservation efforts are being carried out in protected areas in Egypt including the development of a resource mobilization and long-term financing strategy, the establishment of a concessions management system which includes an improved entrance fee collection system, identification of new sustainable business opportunities, and the creation of commercial services plans for selected parks. Visitor facilities in protected areas are being improved through partnerships with private sector companies. Sustainable practices in the management of forestlands, rangelands, and arable land are being introduced in the Qaraoun Catchment in Lebanon. In the targeted sites, these interventions will help to reduce land degradation, the conservation of natural habitats to maintain ecosystem services, and the restoration of natural productivity leading to improved livelihoods for local populations – with the potential to be spread across 78,000 hectares. Baseline ecological assessments have helped plan reforestation activities while socio-economic assessments have examined the impact of activities on the economy and natural resources, and policy interventions to foster further growth.

## Essay:

The human activities have been changing the planet for centuries so nowadays we face lots of environmental issues, and it is highly important to solve them in the nearest future.

In my opinion the most important environmental challenges that Russia faces today are waste problems. There are not many plants that reuse waste in the country, so it is grounded near towns, polluting soils, water and air. Moreover, it can cause forest fires, death of animals or even people.

I think that the next key issue is the problem of clean water. First of all, rivers are used as the way of travelling, for example, by ships, so they are polluted by fuels. Secondly, plants use water to reduce heat and it cause the change of environment by water pollution with waste and heat.

And the last but not least, the problem of endangered animals. It has occurred because of all the environmental issues, such as pollution, industrialisation, hunting, cutting of wood and so on. If the animal become extinct, it leads to the changes in the ecosystem and it is very dangerous.

To my mind, some of the initiatives presented in the text,

## Essay (продолжение)

for instance, land-use planning, protection of areas, financing of environmental programs could be used in Russia, because they can help to protect animals and reduce the impact of other problems.

In conclusion, I would like to say that we should come up with our own ways of solving environmental problems too, taking into account the political and national situation.

## Task 2

**Explain the meaning of the term "climatic disaster" from the text in about 50-100 words.**

Climatic disaster is a sudden change of natural processes that causes such consequences as the huge destruction of buildings, roads, systems of communication and supplyment, stoppage of work, human victims and so on. It requies a lot of time, money and work to rebuild all the buildings and reset the common life on the territory destroyed by the disaster.

## Математика (страница для решений – 3):

