

9th Hungarian Geographical Contest 2017/18

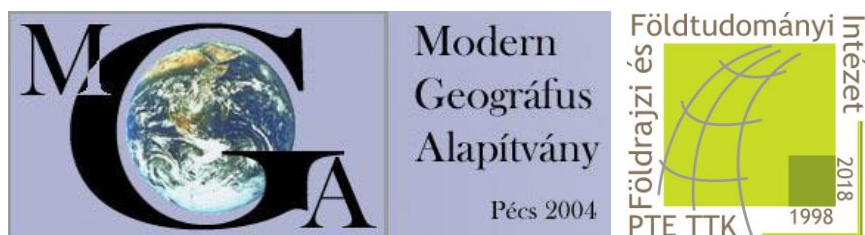
2nd Round

Written Test
Question and Answer Booklet
Answers

10 February, 2018

Password:

Date of Birth:



PASSWORD:

Instructions for Students

1. Fill in your password and your date of birth on the front page of this Question and Answer Booklet (QAB) and also on the top of all pages.
2. The test consists of 6 sections, marked with letter A-F. You can find all the sources (maps, figures) referred to in the Source Booklet (SB).
3. You can earn a maximum total of 120 points. There is a maximum of 18 (Section: D; E; F) or 22 (A; B; C) points for each Section.
4. All questions should be answered in the spaces provided in this booklet. Only answers given in QAB will be accepted: any answers written in the (SB) will be ignored.
5. Only the required number of answers (reasons, examples etc.) will be accepted in the order they are written. For instance, if the question asks for 2 reasons and you give more than 2, only the first 2 reasons will be marked.
6. Where appropriate, please, write sentences or phrases, not single words.
7. You might need a calculator, ruler and pencils during the test.
8. You have 180 minutes available to answer all questions.

Good luck!

Section A: Volcanic processes

Volcanic processes most likely occur at plate margins, and they are not only one of the most spectacular phenomena the Earth can provide, but also have significant impacts on human settlements.

A. 1. Fill the empty cells of the following table by using pictures 1-5 of the source booklet in section A. 1! Do not write anything to cells crossed with a line!

No. of pic.	Name and country	Type of volcanism	Connection to plate boundaries	Dominant rock type
5	Holuhraun, Iceland	lava field	Divergent boundaries	basalt
2	Mt. Fuji, Japan	stratovolcano	convergent boundaries	andesite
3	Manua Kea, USA/Hawaii	shield volcano	none, "hot spot"	basalt
1	Kilimanjaro, Tanzania	stratovolcano		
4	*Eifel-mts in Germany, Massif Central, France	maar volcano		pyroclastit, tuff

*Name a region, where these types of volcanoes are common.

[A1: 8 points]

A. 2. Volcanism is the phenomenon of eruption of molten rock (magma) onto the surface of the Earth (or other planet). If the magma does not reach the surface, we talk about magmatism. Magmatism creates specific forms of rock, which are likely revealed by the erosion of the surrounding, less resistant layers of sediments.

The following list contains the names of specific forms of volcanism and magmatism. Study Figure 6. in the source booklet (section A. 2.)! Pair one of the numbers from the figure to each form in the following list. Each form should be used only once!

Batholith: 3	Caldera: 5
Dike: 4	Laccolith: 1
Parasitic cone: 2	Volcanic neck or pipe: 6

[A2: 3 points]

A. 3. Study the small map in the source booklet (No. 7. in section A. 3.). The figure represents a map with a series of volcanoes. Volcano A is active today and volcano H is the oldest.

3. 1. Name this type of volcanism!

hot spot volcanism

3. 2. What is the tectonic reason for the “movement” of active volcanism on the map?

Lithospheric plates are moving over the “hot sport” in the asthenosphere.

3. 3. Name a group of islands that has been created by volcanism this way!

Hawaii (Midway Islands)

[A3: 3 points]

A. 4. Study Figure 8. at section A. 4. in the source booklet. It shows the potential damage on human settlements around a volcano, which is categorised as active according since it has had at least one eruption during the past 100 years. This might be the most dangerous volcano in the world because of the population of 3,000,000 living nearby and its tendency towards violent, explosive eruptions of the Plinian type.

Name the volcano and the present-day city located right next to it (or partly on the volcano’s flanks)!

4. 1. Name of the volcano: **Vesuvius**

4. 2. Name of the city: **Neaples, Italy**

What kind of threats a volcano may pose on the surrounding human settlements and residential areas? Name three different sources of volcanic hazard!

lava flows
 pyroclastic flows
 poisoning gas
 earthquakes

Section B: The great meltdown war of 'Permafrost Kingdom'

A long time ago on the Northern Hemisphere far, far away...

a Kingdom emerged, a Janus-faced and hidden empire, the realm of frost. Thus, people called it as the Kingdom of Permafrost. Recently, a new, invisible and stronger power evolves. With the help of the Sun and the unwise Homo sapiens it tries to sweep away old Kingdom. The dreaded energy of heat inexorably devours everything around us... Thus, people call it Global Warming. Explore two last-standing bastions of Permafrost: Siberia and Canada...

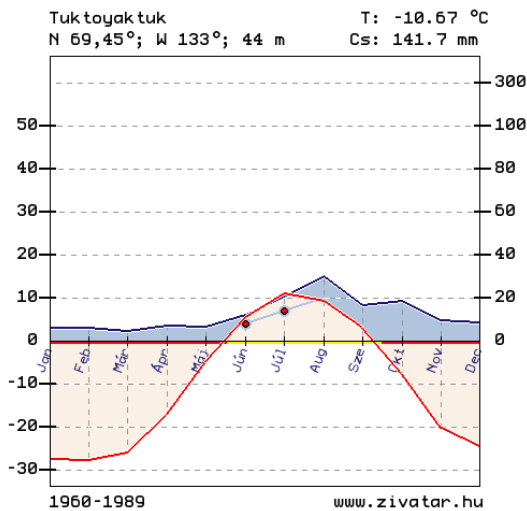
B. 1. Climate of the permafrost zone

Study Figure 1-2 (chart and table) in section B. 1. in the source booklet.

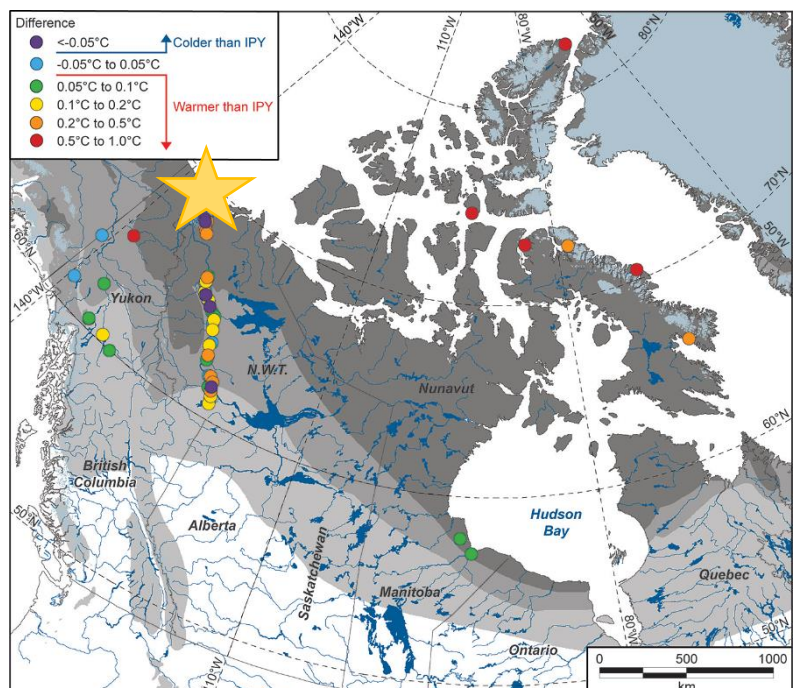
B. 1. 1. Draw a simplified climate chart of Tuktoyaktuk!

Study Figure 1-2 (chart and table) in section B. 1. in the source booklet.

B. 1. 1. Draw a simplified climate chart of Tuktoyaktuk!



B. 1. 2. Locate (with a dot and use nickname Tuk) **the city of Tuktoyaktuk on this map.** (Did you know? The borders of Alberta follow parallels and longitudes: N49 and N60, W110 and W120, respectively.)



B. 1. 3. Compare the climate chart in the SB and in B. 1. 1 ! Name two differences between the climates of the cities!

1.

Aldan has a significant rainfall throughout the year, Tuk is more 'arid'

2.

Although both places have at least one month over 10°C (average), but Aldan has milder summer (15°C average in July, while 10,8 °C in Tuk)

B. 1. 4. Name the climate of Aldan and Tuktoyaktuk!

Aldan:

subarctic (or boreal or subpolar)

Tuktoyaktuk:

subarctic (or boreal or subpolar)

B. 1. 5. Name the types of permafrost you could observe in these regions (use Figures 3-4. in section B. 1. in SB)

continuous permafrost

[B1: 10 points]

B. 2. Landforms in the realm of permafrost

Study Figure 5. (compare with maps in B. 1.) of section B. 2. in SB. to answer the following multiple choice test.

B. 2. 1. A region in close proximity to active glaciers, ice sheets and typified by intense frost action is generally referred to as a(n) _____ environment.

a. subarctic

c. glacial

b. periglacial

d. arctic

B. 2. 2. In permafrost regions, _____ is commonly present in pore spaces or as free bodies or lenses in the ground.

a. permafrost

c. ground ice

b. dirty ice

d. tundra ice

B. 2. 3. The _____ layer of permafrost terrains is due to seasonal thaws.

- a. continuous permafrost
- b. active
- c. permafrost
- d. discontinuous permafrost

B. 2. 4. The _____ is the upper surface of the perennially frozen zone directly below the active layer.

- a. permafrost table
- b. continuous permafrost zone
- c. discontinuous permafrost zone
- d. permafrost zone

B. 2. 5. The removal of the natural surface cover in permafrost regions can lead to landscape subsidence and the subsequent formation of water-filled depressions called _____.

- a. thermokarst lakes
- b. pingos
- c. water lenses
- d. ice lenses

B. 2. 6. Ice wedge polygons are emblematic forms of continuous permafrost zone. Figure 6. in section B. 2. (SB) explains how they are created. Study Figure 7! More than 400 sites were explored in Poland with polygonal cropmarks in the last years. **When and how were these landscapes formed in Central Europe?**

When?

Pleistocene (Late Pleistocene or Last Glacial Maximum or Last Permafrost Maximum or Würm glaciation)

How?

Ice wedges are thought to originate in cracks that form when permafrost shrinks during extreme winter cold. Surface meltwater enters the crack during the spring freezes, widening the crack. After several hundred winters, the ice wedge has grown and continues to grow as the same seasonal sequence is repeated. The ice wedge thickens until it becomes as wide as 3 m (about 10 ft) and as deep as 30 m (about 100 ft).

[B2: 8 points]

B. 3. Engineering works under extreme conditions

B. 3. 1. Study Figure 8-9. in Section B. 3. in SB! What happened with these buildings and with this highway? **Explain challenges of engineering works in permafrost-susceptible environment.**

Building on permafrost is very challenging. The layers of ice can thicken, change and heave over time. The buildings give off heat so that as the permafrost thaws, the building sinks and is damaged. The southern bred Klondikers didn't have the building techniques in those days to deal with this, so while the wood and fixtures of the buildings is beautifully preserved by the freezing cold, the physical structure is at risk of collapsing because of the 'heaves'.

The permafrost is dying along this highway... or Permafrost is deteriorating and shrinking quickly: houses sink unevenly into the ground, walls crack and doors stick, utility poles tilt, sometimes at alarming angles.

Buildings in such environments should be placed on piles with an insulating air space below or, alternatively, that a thick insulating pad of coarse gravel should be placed over the surface before construction. Steam and hot-water lines are now placed above ground to prevent thaw of the permafrost layer. Engineers designing new buildings and roads battle complex forces of nature in dealing with permafrost thaw.

[B3: 4 points]

Section C: Global fishing industry

Fishing industry is not only a highly important global business, which produces a major part of the world's protein consumption, but also a highly debated activity, a permanent source of tension between ecological and economic approaches.

C. 1. Match the following terms to the correct pictures! Give one positive and one negative factor (advantage/disadvantage) for each form!

traditional fishing, fish-farm/aquaculture, industrial fishing



1: industrial fishing

2: fish-farm/aquaculture

3: traditional fishing

+	economically effective, provides cheap fish for feed a many-many people	sustainable for the fish stock	provides jobs for communities, lower risk for overfishing
-	leads to overfishing, destroys natural habitats, utilities only a few species – all others are “wasted”	needs bigger investment, leads to concentration of capital, prices are somewhat higher	less effective, could sustain poverty

[C1: 4 points]

C. 2. Look at the Figure 1. and 2. at section C. 2. in source booklet! Answer the following questions!

C. 2. 1. How has the market price of the fish meat been changed between 2002 and 2014?

It has been dynamically grown until 2009, after that, prices has been fluctuated in narrowing lane.

C. 2. 2. Give three factors, which could influence the market price of fish!

1. for example

Long-term change of fish stocks

Weather situation: high number of storms and hurricanes could increase prices

Fuel prices influences prices

the demand for fish: long term (growing population, growing purchasing power),
transformation of nutrition habits

C. 2. 3. Fish production peaked in 1990s after decades of dynamic growth. **What could be the main factors behind this change? Name two factors!**

overfishing, yields (catches) are fallen

self-restriction in Western countries, pursuit for a sustainable fishery

changing habits in Asia, eating more meat and less fish.

[C2: 4 points]

C. 3. Study source 3. in C. 2. in the SB! Answer the questions!

C. 3. 1. Which country (from this list) has the highest per capita fish production?

Norway

C. 3. 2. Which country suffered the biggest relative drop in fish production in 2013?

Chile

Space for calculations (could be continued on the backside of this paper)

C. 3. 3. Look at the countries with a decreasing production! **Give two possible reasons, why production had dropped in these countries!**

1. Climatic reason: el ninho could influence some of these countries' production, because of the change in sea current.
 2. Local demand has been decreased
 3. water are overused
-

C. 3. 4. Select the country from the list below, where fisheries have the greatest economic significance! Use the table in SB C. 3 and Figure 1. of C. 2 in SB to calculate your answer! Give a brief justification of your choice! Please note, that the economic output of the fishing industry could approximately define with the market value of the fish been caught.

Answer:

Peru

Justification:

Fishing provides more than 6% of the GDP (estimated)

Space for calculations (could be continued on the backside of the paper)

[C3: 6 points]

C. 4. Study Map 4. in section C. 4. of SB!

C. 4. 1. Which European regions are the most dependent on fisheries? **Name four regions of this sort!**

1. Galicia (ESP), Northern Portugal, Algarve and Andalusia, Hebrides, Orkney and Scottish seacoast (highland), Eastern-Estonia, Aland, Istria, Northern-Dalmacia

2.

3.

4.

C. 4. 2. From the geographic viewpoint, these regions have some common characteristics. **Name two factors that make them similar!**

1. thin populated, rural, peripheral, less industrialised, low GDP

C. 4. 3. Explain, how this dependency could cause social problems, and give a short argumentation, how regional policy could help these regions!

Fishery provides low incomes in traditional sector. Because of the degradation of fauna, fishermen have to face a decreasing catch, their "production" is also restricted by regulation made by the European Union. While fishery former had a great influence for other economic branches, like food processing and shipbuilding, the concentration of the market means the concentration of supporting activities as well: small ship-building manufactures has been closed. Therefore, unemployment could be quite high in these regions. Regional policy can support fishermen because of the restriction of the yearly amount of catch, and also can help restructuring, to improve new activities, for example tourism, which could be a good "partner" traditional fishery.

[C4: 8 points]

Section D: The Land of the Rising Elderly? Ageing and shrinking in Japan

Japan experiences one of the largest net population losses in the world. No surprise, it also belongs to the group of the most ageing countries. The following questions concentrate on the issues of Japanese cities facing with high rates of depopulation and ageing.

D. 1. Study Figure 1. in section D. 1. of the source booklet **Which of the following population pyramids belong to Japan? Give two arguments to explain your choice.**

D. 1. 1. Letter of population pyramid:

B

D. 1. 2. Arguments:

most ageing pyramid of the three
 proportion of elderly is the highest
 2nd ww, baby boomers and their children draw curves

D. 1. 3. With a crude birth rate of 7.8‰ Japan is among the countries with greatest annual population decline rate. This rate is significantly worse compared to other highly developed countries; even with the ones that also experience the problem of ageing, like Germany (8.3‰) or Italy (8.7‰). **Name one potential demographic factor, which could be an important distinction between Japan and any other developed country!**

D. 1. 4. Study Figure 2. in section D. 1. in the source booklet. **Describe the geographical pattern of the population change in Japan! Give four valid statements, which could be justified by the maps.**

Most of Japan is shrinking

There is a shift in population from west to the east

Bigger cities growing or shrinking slower, than smaller one

Peripheral islands, especially Hokkaido are shrinking intensively.

D. 2. According to statistics, one-third of Japanese cities over 100,000 residents are facing the so called second demographic transition. In this phase, the number of births is permanently and significantly lower, than the number of deaths. Despite the high life expectancy, natural decrease and intensive ageing determine a sort of social and economic factors. These cities are often called shrinking cities, although demographic transition (natural decrease) is not the only potential factor behind the shrinkage.

D. 2. 1. One of the shrinking Japanese cities has lost approximately 90% of its residents in 50 years. The name of this city is Yubari, placed on Hokkaido Island. **Study the pictures of Yubari in the source booklet (Section D. 2. Pictures 5-8.). Which could be the main cause of the city' shrinkage?**

Main reason of extreme shrinkage:

Mine closure: formerly a mine (coal mine) was the most important element of local economy. by closing the mine, young people left the town.

D. 2. 2. Name three other possible reasons that could cause significant and/or permanent population loss of a city!

War

Industrial disaster

Degradation of natural resources

restructuring of economy

suburbanisation

D. 2. 3. Of course, shrinking is not a problem by itself, but it is interconnected a sort of local social, economic and political issues. With the help of the pictures in SB, your task is **to name one social, one economical and one political problem according to shrinkage, and shortly explain it.**

Social issue:

conflicts between youngsters and elderly → different use of space

high amount of old, sick people being abandoned

Economic issue:

low rate of labour

financial burden on labour

not enough active people → won't be attractive for investors

PASSWORD:

Political issue:

one group of society can validate their will → the elderly → conflicts

policy making processes have to concentrate only on the older age groups → financial burden on local governments

threat of bankruptcy of the city

[D2: 10 points]

Section E: Ecotourism

E. 1. Ecotourism has become popular over recent years. **Try to create a short definition about this term!**

Ecotourism is a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas, intended as a low-impact and often small scale alternative to standard commercial mass tourism. It means responsible travel to natural areas conserving the environment and improving the well-being of the local people. Its purpose may be to educate the traveler, to provide funds for ecological conservation, to directly benefit the economic development and political empowerment of local communities, or to foster respect for different cultures and for human rights. [Wikipedia]

[E1: 3 points]

E. 2. The following pictures show popular ecotourism destinations. **Where were the photos taken?** (Every pair of photos belongs to one single location)



E. 2. 1. location (islands and country): Galapagos, Ecuador



E. 2. 2. location (country or region): Okavango Delta, Botswana



E. 2. 3. location (country): Iceland



E. 2. 4. location (country): Kilimanjaro, Tanzania

[E2: 5 points]

E. 3. Ecotourism is often described as a ‘win-win’ activity, however, it can have negative impacts as well. While certain actors might benefit from it, ecotourism can be problematic for others. Geographers often question stereotypical understanding of such activities to give a more nuanced and comprehensive view. Using your own knowledge and the **following quotes (in section E. 3. in source booklet)** in which people talk about the Bwindi Impenetrable National Park, **identify the negative and positive aspects of ecotourism. Summarise your arguments in a brief essay and detailing 5 negative and 5 positive impacts of ecotourism,** trying to reach your own conclusion about ecotourism. (You can generalise in your arguments, they do not have to be connected specifically to Bwindi case, which is of course only used here as an example.)

positive effects (examples):

- it can promote economic development while protecting the environment: it can simultaneously promote poverty alleviation and biodiversity conservation
- it is an alternative to ‘mass tourism’ which is associated with the lack of respect for the environment and local communities and leads to the destruction of visited sites and
- it provides a way in which ‘nature’ can pay for its conservation: ecotourism features the ‘untouched nature’ as the core attraction, so it becomes financially reasonable to protect it long-term

- win-win solution for all actors, including the wildlife, local communities, conservation NGOs, as well as state and international officials
- local communities can be involved through revenue sharing programmes, jobs
- ecotourism can provide a revenue for human development projects (building schools, hospitals, community centres)
- encourages the consumption of local products, the revenues from which are used for boosting the local economy + less environmental pollution associated with the transport of products
- teaches tourists the importance of respecting the environment and local communities, adds to the personal development of tourists, helps to raise tourists' awareness of political, social, economic and cultural factors of the countries they visit
- ecotourism can help to preserve local cultures by providing an economic incentive for doing so
- local communities can engage in ecotourism: community involvement process
- through revenue sharing schemes, ecotourism can contribute to the alleviation of poverty among local people alongside provide income for the state

negative effects (examples):

- Displaying ecotourism as a 'win-win' solution for all actors obscures power relations embedded in ecotourism: not all actors benefit equally from ecotourism which might even be harmful for certain people (who are often the most vulnerable)
- Not everyone benefits from ecotourism: international, national and even local elites benefit from the process, but not everyone gets from the revenues of the park and revenues are not shared equally. Although it is important not to display local people as passive victims of poorly planned ecotourism project developments, it is often the case that while local people pay the highest price for the existence of the park (e.g. local farmers suffer from crop raiding threatening their livelihoods), their shares from the revenues is often the lowest compared to all other actors or may not get compensation at all.
- Ecotourism generates "winners" and "losers" on the local scale as well: due to the lack of transparency in the revenue sharing system in the case of the Bwindi national park, benefits often end up in the hands of family members and friends of local leaders. Moreover, while ecotourism provides waged employment in direct and indirect ways, only those are able to take part in ecotourism employment who are relatively well-educated and live close to the park.
- Not everyone can benefit from the jobs the park offers. Local employment opportunities are often insufficiently empowering, as even if local residents find employment in ecotourism, they are only employed in low skill and low-income jobs, without the prospect of career progression, as senior jobs are often granted for people coming from the West.
- In addition, the engagement in short-term employment and economic monetary gains often reduces the possibility of long-term development and community empowerment. For instance, encouraged by their parents to sell drawings of gorillas to tourists rather than attending school funded by the revenue sharing scheme, children often lack the educational background to community empowerment in the long-run
 → Children may drop out of school because of working at ecotourist destinations (selling their paintings or dancing to tourists)

- Thus, while ecotourism does result in the alleviation of poverty for certain people, it often generates uneven outcomes and fails to deliver community empowerment.
- By justifying biodiversity conservation based on its economic value rather than its intrinsic values, it has led to a very particular form of conservation that is often based on the separation of people from the 'natural environment': for ecotourist projects, local people are often evicted from their lands. Marketed as 'peopleless' and 'untouched' landscapes, local people cannot continue all of their practices as that would not match the ideal as ecotourist destinations are marketed for ecotourists.
- People often have to be evicted for the creation of ecotourism destinations.
- Compensations for eviction are often paid only to the owners of the land, not necessarily all the people who occupy it. The legal ownership of land is often questionable in developing countries.
- Ecotourism displays local cultures as part of the 'tourist' attraction → local people become tourist attractions themselves. As Western tourists often have certain expectations about local cultures in the visited destinations, local people often try to conform to these expectations that modifies local perceptions of culture. (Problems of "staged authenticity" and the projection of particular 'geographical imaginations' through ecotourism, "cultural imperialism").

Conclusion (example only):

- It is easy to display ecotourism both as a panacea for simultaneous poverty alleviation and biodiversity conservation, as well as a failed alternative of mass tourism. Therefore, it is important to adopt a pragmatic view on ecotourism. While its negative aspects suggest that displaying it as a miraculous solution is highly problematic, the outright condemnation of ecotourism is equally inappropriate as many communities see it as a way of improving their well-being.

[C3: 10 points]

Section F: Geopolitics of Northern Europe

The Baltics and the Baltic Sea is traditionally part of the Russian sphere of interest. As the Russian Federation continues its offensive geopolitical strategy, the security of this region is highly questionable. The European Union and the NATO have to take actions against the emerging threat.

F. 1. In this table you can see some Baltic countries and three international organisations. **You have to decide which country is member of the listed organisations. Mark with „x” in the right field. You can mark more than one for one country.**

	NATO	European Union	EFTA
Denmark	X	X	
Estonia	X	X	
Finland		X	
Iceland	X		X
Lithuania	X	X	
Norway	X		X
Sweden		X	

[F1: 7 points]

Skagerrak and Kattegat

F. 2. Even Sir Halford John Mackinder, one of the founders of the geopolitics, acknowledged the strategic importance of the Baltic Sea and its islands in his extended concept of the Heartland area.

In this task, you have to **identify** (with the help of Map 1. in the source booklet, section F. 2.) some strategically important geographical places in Northern Europe.

F. 2. 1. „Those islands hung over Stockholm as much as Sevastopol hung over Constantinople.” It is a famous quote by a British admiral, Sir Charles Wood. These important geostrategic islands greatly impact Baltic security, therefore after the results of numerous peace treaties, they have to be always demilitarised.

Name of the islands:

Åland or Åland Islands

F. 2. 2. This island is located in the mouth of the Baltic Sea. In the end of the Second World War, it was occupied by the Soviets but they returned it to a later NATO member state in 1946. Holding this island ensures access to the North Sea for the Russian Baltic fleet.

Name of the island:

Bornholm

F. 2. 3. This island is a big unsinkable aircraft carrier in the middle of the Baltic Sea. It is very weakly defended and after a successful attack, the here deployed missiles can easily reach Sweden and the Baltic countries. The Russians want to use the port of Slite in the construction of the Nord Stream 2 gas pipeline, which could cause a major security problem.

Name of the island:

Gotland

F. 2. 4. This major city is often called as the next Crimea, because more than 80% of its population is Russian. The city's famous castle was founded by the Danish Kingdom but the Swedes also ruled this city for a long time. The first battle of the Great Northern War occurred here.

Name of the city:

Narva

F. 2. 5. This region is home to nearly 25,000 Russian soldiers and the Baltic fleet. Russia has deployed long-range Iskander missiles here and there are rumours about nuclear weapons, too. The only problem is the resupplying via land since it does not share a border with mainland Russia.

Name of the region:

Kaliningrad region

F. 2. 6. These two straits are part of the main Russian trade route, connecting the North Sea and Baltic Sea. Ruling these could easily strangle the Russian fleet and keep them in the Baltic Sea.

Name of the straits:

Skagerrak and Kattegat

[F2: 6 points]

F. 3. After the emerging Russian threat, the NATO increased its armed forces in the region, and they held a big military exercise in Sweden under the codename Aurora 17. In recent years, there are emerging number of warnings from experts and journalist, which all concludes that the NATO should have serious difficulties to defend the three Baltic states and the entire region against a hostile Russian invasion.

Study the Figures 2-6. in the source booklet (section F. 3.) and **formulate five concerns** about the security and the defensibility of the Baltic Sea Region, including factors like transport, energy, ethnical issues and location.

PASSWORD:

- The Baltics are highly dependent on the Russian gas supply, Russia and the Baltics have several economic ties,
- There are countries in the Region (Sweden and Finland), that are not NATO members, if Russia would attack them, a NATO intervention is not likely, neutral countries hold geostrategically important islands.
- The Russian minority in the Baltics could act as a casus belli (like in Crimea), the Russian minority could weaken the social cohesion, the Russians could start a separatist movement or do sabotage actions.
- Russia has a highly important base in Kaliningrad, and it is able to control the Baltic Sea traffic
- Transporting/deploying NATO troops in Baltic states is complicated, because most of the transport corridors are vulnerable for attack.
- Small Baltic states are have low military potential.

[F3: 5 points]