16th Hungarian Geographical Contest 2024/25

2nd Round

Written Test

Question and Answer Booklet

13 December 2024

Password: .....

Date of birth: .....

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, photos, and tables) referred to in the Source Booklet (SB).

3. You can earn a total of **140 points.** Each section has a different maximum value:

A	28
B	28
C	16
D	22
E	25
F	21

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. The backsides of the papers are available for notes and calculations, but NOT for answers.

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, write sentences or phrases, not single words.

7. You might need a calculator, a ruler, crayons, and pencils during the test.

8. You have a total of 180 minutes to answer all questions.

Good luck!

A. "Beryl, Helene & Kirk" [28 points]

A hurricane is a type of storm called a tropical cyclone, which forms over tropical or subtropical waters. A tropical cyclone is a rotating low-pressure weather system that has organized thunderstorms but no fronts (a boundary separating two air masses of different densities). Tropical cyclones with maximum sustained surface winds of less than 39 miles per hour (mph) are called tropical depressions. Those with maximum sustained winds of 39 mph or higher are called tropical storms. When a storm's maximum sustained winds reach 74 mph, it is called a hurricane. The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating, or category, based on a hurricane's maximum sustained winds. The higher the category, the greater the hurricane's potential for property damage.

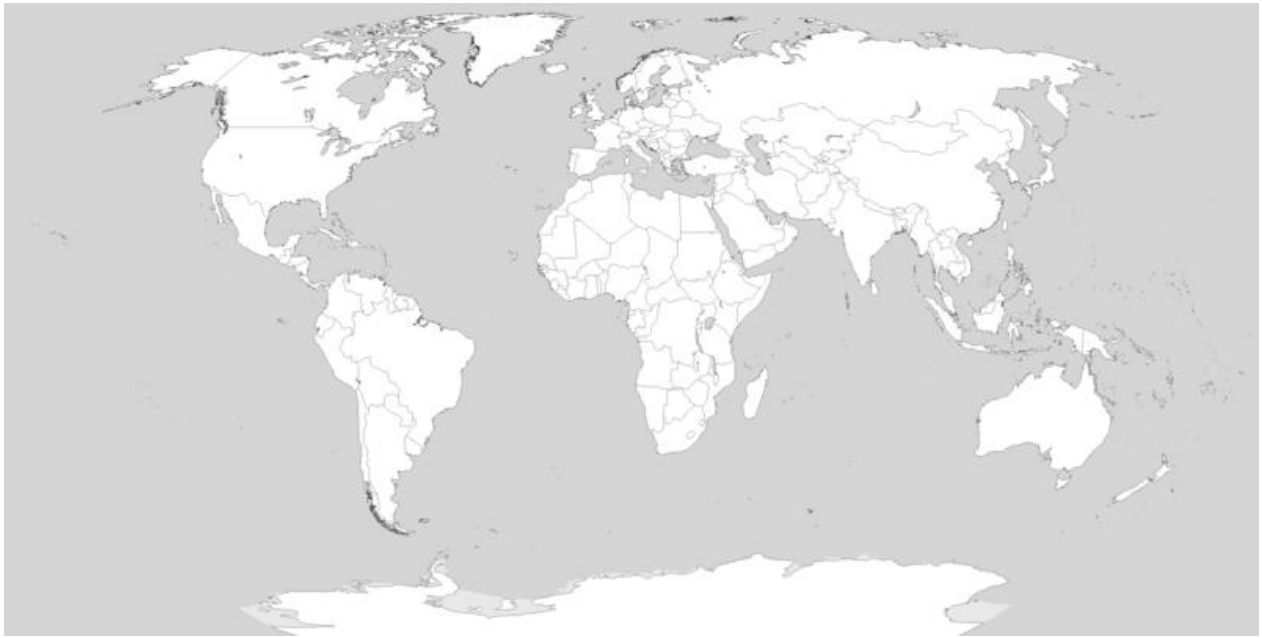
Saffir-Simpson Hurricane Wind Scale (revised 2012 version).

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph / 119-153 km/h	Very dangerous winds will produce some damage
2	96-110 mph / 154-177 km/h	Extremely dangerous winds will cause extensive damage
3 (major)	111-129 mph / 178-208 km/h	Devastating damage will occur
4 (major)	130-156 mph / 209-251 km/h	Catastrophic damage will occur
5 (major)	157 mph / 252 km/h or higher	Catastrophic damage will occur

A1

1.1.	Explain the difference between typhoons and hurricanes! [1]

A.1.2. Select and mark the area on the map where hurricanes originate! [2]



A.2. There are several favourable environmental criteria that must be met before a tropical cyclone can form. **Select the correct answer**, with marking A or B! [6]

2.1.	Temperature of ocean waters must be…	at least 27°C	A
		maximum 25°C	B
2.2.	The distance from Equator must be …	not more than 320 km / 3 degrees	A
		at least 480 km / 5 degrees	B
2.3.	Vertical wind shear between the surface and the upper troposphere must be…	less than about 37 km/h	A
		more than 48 km/h	B
2.4	Relative humidity values from the surface to the mid-levels of the atmosphere must be…	high	A
		low	B
2.5	Near the surface, there are …	some disturbance, waves in the atmosphere	A
		no disturbances, stable condition	B
2.6.	An atmosphere which….. fast enough with height such that it is potentially unstable to moist convection	warms	A
		cools	B

A.3 Hurricane frequencies

Study table A3!. The table contains hurricane occurrences in the Continental US between 1951 and 2020.

	Category 1	Category 2	Category 3	Category 4	Category 5	All	Major
1951-1960	7	4	3	3	0	17	6
1961-1970	3	5	4	1	1	14	6
1971-1980	6	2	4	0	0	12	4
1981-1990	9	2	3	1	0	15	4
1991-2000	2	7	4	0	1	14	5
2001-2010	8	4	6	1	0	19	7
2011-2020	9	5	1	3	1	19	5
1951-2020	44	29	25	9	3	110	37

A.3.1. **Calculate** the distribution of hurricanes based on data listed in the table below. What is the relative frequency of major hurricanes making landfall? What is the average number of hurricanes per decade? [7]

	Category 1	Category 2	Category 3	Category 4	Category 5	All	Major
Average/decade							
Frequency	%	%	%	%	%	%	%

A.3.2. **Draw** a chart depicting the data of table 1. Select a chart type that best fits your data. [5]

3.3	What sort of **consequence** could you draw based upon your chart? [1]

A4. Between 2000 and 2024, Florida experienced a total of 79 hurricanes. [1]

4.1	What is the average annual number of hurricanes in Florida over this period?	
4.2.	Based on this average, what is the probability that Florida will experience at least one hurricane in a given year?	

Study Figure A4 in SB! The figure illustrates the monthly distribution of tropical cyclones in Florida since 2000. Based on this data [1]:

4.4	In which months are tropical cyclones most and least likely to occur in Florida?	
4.5	What percentage of all tropical cyclones occur in the peak month(s)?	

A5

Figures A.5.1 to A.5.4 in SB show hurricane paths over the past hundred years and the total number of hurricanes for the period of 1900 to 2010 in Florida with some additional information. [4]

5.1.	Based on the pictures, **how does Florida's geography affect** the frequency and strength of hurricanes? List two items.
5.2.	Which are the **human geographical factors** that increase the hazard of hurricanes in Florida? Name two items!

B. Dynamic Earth [28 points]

Understanding the evolution of the Earth's surface and the prevalent sequences of different rocks is crucial in developing a holistic comprehension of the planet's history and the processes that have acted upon it. Therefore, by analysing cross sections until a given depth we can determine the order of events that created the different strata of rock.

B.1.

B.1.1. Using the **stratigraphic cross section** provided in SB B1, **determine the sequence of events** in geological history from oldest to youngest. "A" is a highly crystalline igneous intrusion, "H" is a metamorphic rock whereas "E, C, G, I, D, K, B and F" are different types of sedimentary rocks. "J" is a certain type of fault [4].

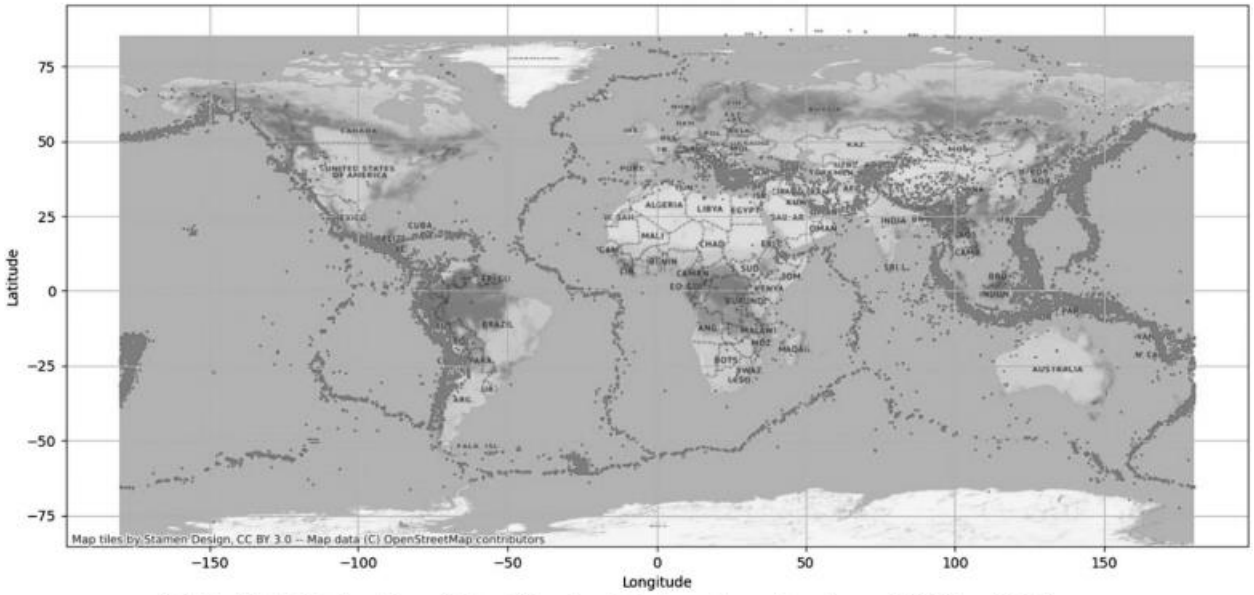
1.	2.	3.	4.	5.	6.	7.	8.	9.

B.1.2. **Justify** your decision [2]

B.1.3. Based on your knowledge**, name the type of fault "J"** represents and explain the mechanisms and the acting processes behind it [3]

B.2.Faults are often associated with causing earthquakes, which can have detrimental effects on urban areas without sufficient preparation and mitigation of such hazards. Using the map provided, answer the following questions.

2.1. **Mark** three distinct areas **on the map** where earthquakes have high occurrence and different circumstances lie in the background of the formation of these earthquakes. The colour version of the map is available in SB B.2.1 [3]



(b) Spatial distribution of significant global earthquakes from 1900 to 2023

B.2.2. **Discuss the position** and formation of these earthquakes relative to tectonic plate margins. [6]

1	Position to plate margins:
	Connection between plates and earthquakes:
2	Position to plate margins:
	Connection between plates and earthquakes:

3	Position to plate margins:
	Connection between plates and earthquakes:

B.3. Based on your knowledge of faults and natural hazards choose the right answers. *Note that multiple or none of the answers can be correct*. **Mark** the correct statements. [5]

3.1.	Transform faults	Transform faults are found at mid-ocean ridges and run perpendicular to the plate boundaries.	A
		Due to the different speeds of widening stress builds up regularly at these margins causing shallow focus earthquakes.	B
		Transform faults consist of two blocks of rock moving in the same direction.	C
		The two blocks making up these transform faults are parts of different tectonic plates.	D
3.2.	P and S waves	P or primary waves get their names from their significance, since they are responsible for most of the damage.	A
		S or secondary waves have been used to determine the inner structure of Earth, given their ability to travel through the core	B
		P waves can be described with a "pushing" and high frequency motion, whilst S waves are characterized by shaking, high frequency waves	C
		S waves are slower than P waves	D
3.3.	Tsunamis	Tsunamis are often created by underwater landslides, earthquakes or submarine volcanic eruptions.	A
		In open waters the wave height is low, but upon reaching the shore it increases dramatically. On the other hand, wavelengths are rather short on the open sea and stretch before arriving ashore	B
		Tsunamis consist of multiple waves; however, the first one is not always the biggest.	C
		The shores of Mozambique, Brazil and Yemen are heavily threatened by tsunamis	D
3.4.	Scales to quantify the magnitude of earthquakes	The Mercalli scale uses exponential factors to interpret the magnitude of an earthquake	A
		The Richter scale is based on empirical and observational data, such as: "IV - moderate - likely to rattle doors and windows	B
		The earthquake with the largest magnitude recorded on the Mercalli scale reached up to 7.5 in Chile	C
		The frequency and regularity of earthquakes can easily be predicted with the help of modern numeric models and calculations	D
3.5.	Mitigation, formation, impacts and prediction of earthquakes	The surface tends to sink before the occurrence of an Earthquake	A
		Residential buildings can be upgraded and renovated to better withstand the forces acting during earthquakes	B
		The epicenter is the breaking point beneath the surface where the earthquake initiates due to the overwhelming stress forced on the surrounding rocks	C
		Liquefaction is one of the main and most dangerous impacts of earthquakes, during which undersaturated soils temporarily lose their structure and strength	D

B.4. Apart from earthquakes, another very serious natural hazard is volcanic activity, especially volcanic eruptions which can take shape in very different faces.

4.1. Subduction zones are immensely active areas of volcanism. Using your own knowledge explain how the sinking of the denser oceanic plate contributes to volcanism on the surface. [2]

4.2. Apart from the hazards volcanic activity poses, it can also have several beneficial effects on a given area and its residents. Provide three aspects, in which volcanic activity positively shaped these circumstances [3]

1.

2.

3.

C. Let them grow! [16 points]

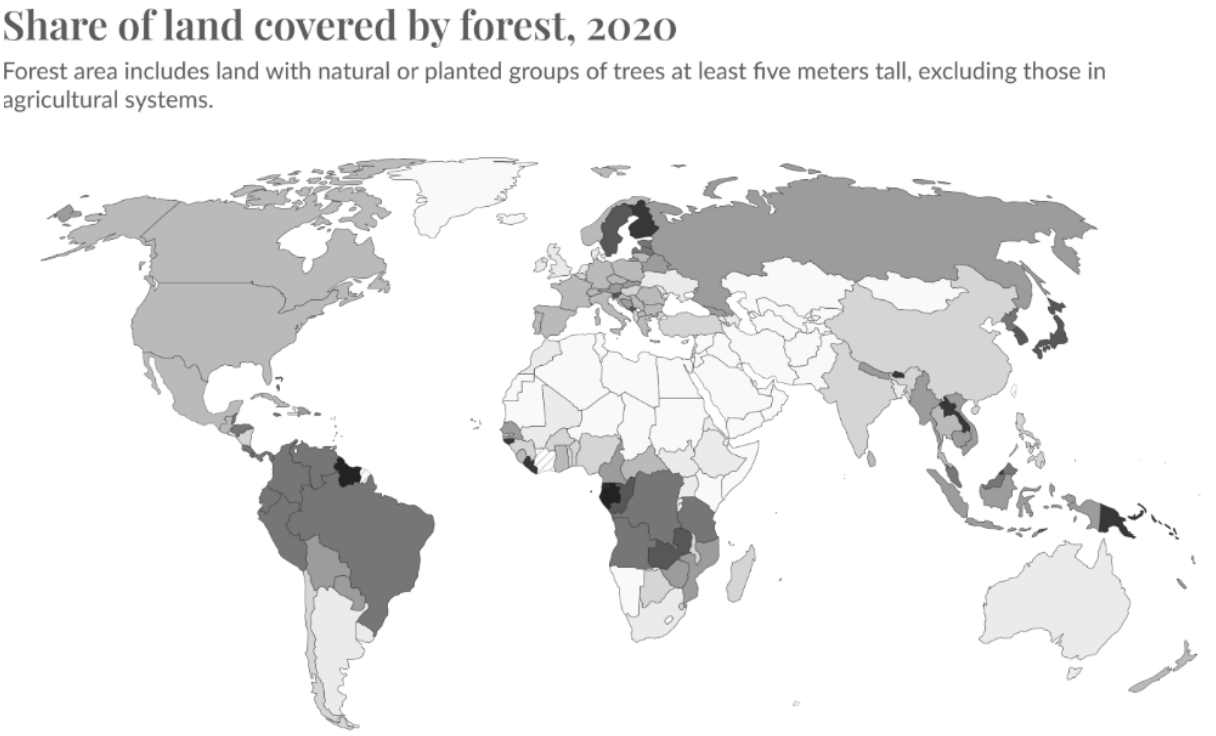
Planting more trees has gained significant attention as a potential solution for mitigating climate change, with additional benefits for biodiversity. However, recent years have seen intense scientific debate around tree-planting initiatives, with some experts arguing that afforestation might not be the "miracle solution" we once thought.

C.1.

1.1.	Tree planting seems like an obvious way for alleviating climate change's warming effects, as through photosynthesis, trees absorb a substantial amount of the most significant anthropogenic greenhouse gas from the atmosphere. **What is this process called?** [1]

C.2. Study map C.2.1 and C.2.2 in SB!

2.1.	**Outline two patterns** in map provided here regarding regional differences in tree cover percentage (see also C.2. in SB). For each pattern, **give a likely reason** for the observed trend. (There are more than two patterns to be observed, but you only must outline two!) Use the greyscale version of the map provided here to make the markings! [2]
	A.
	B



2.2.	Identify an anomaly in map. – i.e. a country/region where based on climatic conditions and share of land covered by forests. Provide a possible **explanation** for this anomaly. **Mark** the anomaly with "C" [2]
	C.
2.3.	Compare maps C.2.1 and C.2.2 **Describe** a pattern linking both maps, focusing on the relationship between percentage tree cover and net losses/gains). [2]

C.3. Planting more trees (reforestation and afforestation) can not only offset carbon emissions but might also counteract the alarming loss of tree cover shown in SB 1/b). However, many tree-planting initiatives today are controversial among both scientists and local communities. Two areas that have been particularly divisive in terms of whether tree-planting projects should proceed are the dry tropics and boreal regions.

	Tropical regions, where most forest cover has been lost due to human activities, are usually at the forefront of reforestation efforts. Some initiatives use the FAO definition (C.3.1.) to **identify areas** of "degraded forest" that are targeted for reforestation
3.1.	**Name** the ecosystem shown in the picture C.3.2. [1]
3.2	**Name two issues** that might arise from planting more trees in this ecosystem using the FAO definition. [2]

3.3.	Northern regions are an emerging "target" for afforestation (SB C.3.3), as global warming is expanding the areas suitable for tree growth in this zone. However, like tropical drylands, afforestation in these areas is also not without controversies. Based on the pictures in SB C.3.4. and your own knowledge, what potential issues can you identify with afforestation in boreal areas? **Name two natural aspects and one social factor**. [3]
	Nat. 1
	Nat. 2.
	Soc.1.

3.4.	"Carbon tunnel vision" in the context of tree planting refers to a narrow focus on trees' ability to absorb and store carbon dioxide as their primary benefit, while overlooking other crucial ecological, social, and environmental factors. Based on the exercises above and your own knowledge, what other considerations apart from climate change mitigation would you recommend considering when planning afforestation/reforestation projects? **Outline three potential factors.** [3]
	1
	2
	3

D. The GM Agriculture *[22 points]*

Genetically modified organisms (GMOs) have revolutionised agriculture, medical research, and environmental management in many parts of the world. However, they face extensive criticism and, therefore, continue to divide the opinions of producers, consumers, politicians, and policymakers alike.

D.1. Read the texts provided in SB (D1.1-2) carefully, and study figures D 1.3-4.

1.1. **Identify two socio-economic and two environmental incentives** for adopting GM crops. [4]

	Socio-economic incentives
1.1.1.	
1.1.2.	
	Environmental incentives
1.1.3.	
1.1.4.	

1.2**. Name three socio-economic or environmental concerns** around adopting GM/biotech crops. [3]

	Concerns
1.2.1.	
1.2.2.	
1.2.3.	

D.2. Study Figures D.2.1. and 2.2. in SB! [3]

2.1.	**Name** the phenomenon shown by the charts!
2.2.	Give a **reason** why this might happen!
2.3.	**Provide** an effect it may have on the global agricultural market!

D.3. The crops in the images below are increasingly adopted in GM varieties worldwide. **Name the crops**, identify their societal use, and match them to the map of their global yield in the SB (D.3) [6]

	Crop image	Crop name	Societal use	Letter of global yield map
3.1.				
3.2.				
3.3.				

D.4.1. In Part 4. of the Source Booklet, the graphs show the adoption of GM crops in different countries and their changing proportion to the overall production of a given crop over time. **Which of the following countries do the graphs correspond to?** [4]

	Country	Letter of graph in source booklet
4.1.1.	United States	
4.1.2.	Portugal	
4.1.3.	Brazil	
4.1.4.	Australia	

4.2. One graph has remained unassigned. Before colonial times, the country it represents was known for flourishing manufacturing a product made from one of the crops shown in the figure. Today, the country is the third largest exporter of the product in question, and the adoption of GM technology in cultivating the crop is likely to further boost this industry. **Name the country** and the **letter of the corresponding graph**! [2]

4.2.1.	Country
4.2.2.	Letter of the corresponding graph

E. Beyond the K-pop [25 points]

After the division of the Korean peninsula as the result of a devastating war in the 1950s, the Republic of Korea became one of the Asian "Tiger economies". Since the Summer Olympic Games held in Seoul in 1988, South Korea has gained a place on the mental map of the global public – which was only strengthened by the emergence of K-pop.

E.1. Look at the charts E.1.1. and 1.2. in SB! **Decide whether the following statements are "true" or "false" or if the mark "cannot be decided – CD"** if there is not enough information provided on these charts to answer the question. [10]

		True	False	CD
1.1	Between 1990 and 2000, the GDP in South Korea has been doubled			
1.2	The highest 10-year average the Korean economy has reached since 1961 is bigger than the best average of the Japanese economy			
1.3	Korean economy overtook the Japanese economy in per Capita GDP after 2000			
1.4.	Korean economic growth used to be balanced with less recession years as the growth in Singapore			
1.5.	The economy of Taiwan had an average growth rate 50% higher than the economy of South Korea			
1.6	The nominal value of the Japanese GDP tripled between 1970 and 1990			
1.7	The economy of the USA has the same average growth in every decade depicted			
1.8	The economies of Korea and Japan developed in similar paths but with a difference of approximately 20 years			
1.9	In both Korea and Japan, average economic growth decreases with the increase in per capita GDP			
1.10	The Chinese economy slowed down to a much lower level of development than Korea or Japan			

E.2. **Study** the charts in SB at E.2.1, 2, 3. **Mark** the correct answer! [6]

2.1	The economic growth in South Korea is based predominantly on…	
	A	dynamically increasing labour force
	B	rich deposits of rare mineral resources
	C	effective use of existing labour force, high added value in the economy
	D	the control of global trading routes
2.2	South Korea is currently one of the…	
	A	developed countries.
	B	semi-peripheries.
	C	developing countries.
	D	least developed countries.
2.3	The manufacturing sector of South Korea…	
	A	shows a monocentric structure.
	B	provides the most workplaces for large enterprises.
	C	concentrating mainly in the capital region and in the Southern port cities.
	D	hardly appears in the North-Eastern region of the country.

2.1	South Korea's foreign trade shows…	
	A	a surplus in exports.
	B	a deficit.
	C	a trade balance.
	D	a deflation.
2.1	Comparing the 2021 export and import chart:	
	A	The export of food/agricultural products exceeds the import of these products.
	B	South Korea imports a significant amount of refined oil products.
	C	The textile industry produces 20% of all exports.
	D	Electronic integrated circuits have a bigger share in exports than motor vehicles.
2.1	Comparing the 1996 and 2021 export diagrams, the most significant change is that…	
	A	the export of agricultural products decreased.
	B	the share of textile industry products dramatically decreased.
	C	the share of transport services doubled.
	D	the share of chemical industry products grew significantly.

E.3. Innovation is the main driving force of long-term economic development, and South Korea is usually thought to be one of the world's most innovative countries. Study charts E.3.1-2. and answer the questions!	
E.3.1.	The innovativeness of a country's economy is based on complex structural conditions. **Name four factors** making a country successful regarding innovations. [4]
3.1.1.	
3.1.2.	
3.1.3.	
3.1.4.	
E.3.2.	Because of its complexity, measuring the innovation capacities is often challenging. **Name three possible economic or social indicators** used for measuring innovation capacities! [3]
3.2.1.	
3.2.2.	
3.2.3.	

E. 3.3.	It might surprise you (or not) that China is not listed among the world's most innovative economies. What could be a possible reason for this? **Write 3-6 sentences to explain the problem!** [2]

F. Stuttgart 21 [21 points]

Stuttgart 21 is a railway and urban development project in Stuttgart, Germany. It is a part of the Stuttgart–Augsburg new and upgraded railway and the Main Line for Europe (Paris—Vienna) within the framework of the Trans-European Networks. Its core is the renewed Stuttgart Hauptbahnhof [Main Station]. The new main station will be an underground structure, and unlike the old building, which was a traditional terminal station, the new station will allow the handling of transit traffic, too. The new building was rotated 90 degrees compared with the old one. The project also includes some 57 kilometres (35 miles) of new railways, including some 30 kilometres (19 miles) of tunnels and 25 kilometres (16 miles) of high-speed lines. The project was officially announced in April 1994. Construction work began on 2 February 2010. In March 2013, total costs were officially estimated at €6.5 billion, the previous estimate being €4.5 billion in 2009. In March 2022, Deutsche Bahn estimated the total cost at €9.15 billion. A heated debate ensued on a broad range of issues, including the relative costs and benefits, geological and environmental concerns, as well as performance and design issues. In 2019, operations were expected to start in December 2025, which was delayed from the initial estimation of 2019 (made in 2010). In 2024, the project's main elements' opening date was postponed again, to December 2026.

F.1. Study sources F1-F6. in SB and **answer the questions**!

F.1.1.	**Name and shortly describe four different factors,** and how the project will benefit the citizens of Stuttgart. [4]
1.1.1.	
1.1.2.	
1.1.3.	
1.1.4.	

F.1.2.	Despite all the benefits, the project has been heavily criticized and debated since the first draft of plans was announced, even a referendum was held with quite close results. **Describe three risks and/or possible negative effects of the project.** [3]
1.2.1.	
1.2.2.	
1.2.3.	
F.2.	Study map F.7. in SB! Despite the transport development, the plan calculates with the creation of new built-up zones.
2.1.	Why are these new development zones essential for the project? [1]
2.2.	What makes this development possible during the project? [1]
2.3.	**Name three possible functions** for the newly constructed buildings! [3]
2.3.1.	
2.3.2.	
2.3.3.	

2.4.	Urban renewal and development issues are often criticised because of the drastic urban social transformation they might cause. **Name** the process! [1]

F.3. 21st-century cities are trying to offer different mobility options, creating a flexible environment for citizens. However, it is not easy to reduce individual automotive transport and most of the cities fight with serious traffic jams and air pollution. We listed attributes attached to the mobility form. Mark the valid connections between statements and transport types, multiple marking is allowed! [8]

	Metro lines	Bus lines	Tramlines	Carsharing*	Bicycle	Scooters
Reduced need for space per capita						
Creates the largest transport capacity						
Creates demands for parking space						
Usage is highly dependent on the weather						
Allows a dense network of stops/stations						
High investment costs by creating lines						
High maintenance costs						
Increased hazards of road accidents						

* Company based