

1984

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## Geography Test Energy & Resources 19, Name: Tuttman Mich

1. Define following words in one sentence each: (2p)

Secondary Energy:

Energy that is transported from the producer to the end-user.

Reserves:

All currently known and probably ~~exploitable~~ oil or gas etc. reserves.

Blow out:

Spill of oil at a borehole due to the enormous pressure of the oil.

Statistical life of reserves:

The amount of time the known and probably ~~exploitable~~ reserves will last without considering the future ~~use~~ <sup>or decline</sup> consumption.

2. Answer with yes or no: to oil: (1p)

- The expenses to produce a barrel of crude oil is higher than it used to be 20 years ago.  Yes
- The statistical life of oil reserves is much longer than the dynamic life of oil resources.  No
- The theory of peak oil was claimed by a scientist in the last century.  No
- Peak oil is the time when costs for oil extraction start to increase.  No

3. And again: (1p)

- If the crude oil price rises, oil reserves change to oil resources.
- If the technology of oil production improves, the oil price will therefore fall.
- The amount of useful energy is bigger than the amount of secondary.  No
- The advanced technology in oil production will enlarge the total oil reserves.

4. How do you think the oil price can be influenced by the following topics: (1.5p)

Speculation: Speculators lead to huge fluctuations in the oil price, but in both ways (up and down). This is due to the nature of speculators: they are very unstable and most likely to be the smallest experts.

OPEC-States agreements: The OPEC States can largely determine the price of oil because they have the majority of oil. What is the price now? <sup>about 100\$?</sup>

be about 75 billion per barrel, but nowadays it is actually 100 dollars per barrel!

Holiday season: We know that we do the winter holidays demand for electricity (heating, lighting etc.). Higher price for energy and thus oil.

Many Holiday presents are made out of plastic, which requires oil to be produced.

Source!

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5. Why do you think the electricity consumption in Switzerland is not rising any more? (1p)

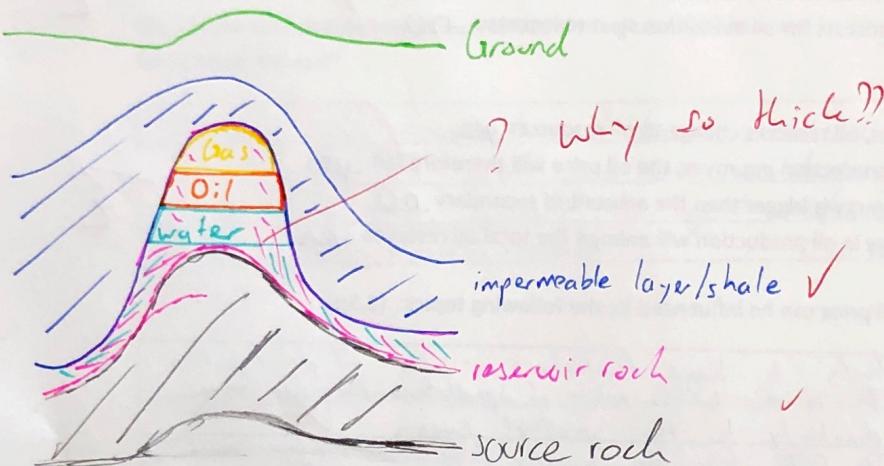
Our population only grows slowly. We are aware of the problems and use energy efficient devices. We (try) to use less energy because we are aware of the problem.

6. What are the risks of the future arctic oil exploitation? Explain two of them. (2p)

An oil spill would have huge effects on the environment. Many species would die. Because it is so cold, the oil would remain basically forever. And the ecosystem in the arctic is very, very sensitive.

The coast of oil or petrol could drastically sink, thus encouraging the use of carbon based energy. It would also attract many other companies to work in the arctic.

7. Draw an anticline oil trap and name the important layers. Mark with colours the area where water, gas and oil can be found. (2p)



8. Why are the conversion losses in a diesel engine much bigger than in a hydropower generator? (1p)

In a diesel engine, heat is used to transform energy ✓  
Because heat is a low energy carrying form of energy, the losses are big. Secondly, in diesel engines there are two energy conversions (chemical  $\rightarrow$  heat  $\rightarrow$  mechanical), whereas in hydro power there is only 1 ~~(kinetic potential  $\rightarrow$  mechanical)~~

Answer with "Yes" or "No" to your presentations.

9. OTEC and Wind Power: (1p)

- Open cycle OTECs produce as side products salt and water yes
- Ammonia is used in some OTECs as a fluid to convey the heat flow yes
- In Switzerland only around 10% of the total energy is produced by wind power no
- Horizontal-axis wind turbines have the higher efficiency than vertical axis turbines yes

10. Waves and tidal energy / geothermal energy (1p)

- There are only experimental tidal energy power plants at present yes ↗
- Jelfa Estuaries are good places to install tidal barrages yes
- The best places for geothermal energy use in Switzerland are in the northern parts yes ↗
- A major problem of geothermal energy is the fact that it cools down the inner of the earth no

11. Nuclear fusion / solar power plants (1p)

- At a nuclear fusion helium cores change to deuterium and tritium no
- The first nuclear fusion power plant was installed in 1951 no
- The energy of a solar updraft tower is produced by steam pressure no
- CSP stand for concentrated solar power yes

12. Hydrogen / photovoltaic energy (1p)

- An on-grid photovoltaic system is cheaper and more often installed than off-grid systems yes
- Only one year after photovoltaic cells are installed, the installation costs are smaller than the gain from the electricity they produce no
- The energy in hydrogen fuel cells is gained by nuclear fusion no
- It is easier for cars to have zero-fuel emission than zero-emission yes

13. Yes and no once again: (1p)

- Below Switzerland the temperature is around  $200^{\circ}\text{C}$  in a depth of 5000 meters yes
- Hydropower in Switzerland produces more energy than atomic power yes
- Switzerland uses its nuclear material for the production of nuclear weapons no
- There are plans of the Swiss government to install more wind energy plants yes

3 all

15 500

15 100

ground

14. What is meant by ambient heat? Give an example how it is used normally in Switzerland. (2p)

Ambient heat is warmth that is normally around us. This can be in the form of warm air, water or warm ground. In Switzerland, geothermal energy usage (using the ambient heat of the ground) is the most common. It is mainly used for heating of homes.

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→ airguns

15. Why could the exploration of oil below sea ground damage the environment? Explain. (1.5p)

Because in seismic operations, which are most common below sea ground, an airgun is used to produce shockwaves. These shockwaves however can erupt fish bladders and interfere with communication of certain animals like whales. The large ships and hydrophones can also be problematic for the marine life.

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Bonus Question: (1p)

Why is the CO<sub>2</sub>-problem even not solved if the global CO<sub>2</sub>-emission is reduced to zero? What would be needed instead?

Because we already moved huge amounts of carbon from the big to the small cycle. We would need to put it back into the ground to get back to the time before the industrialisation.

Bonus Point from homework \_\_\_\_\_

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