GEOGRAPHY NOTES FORM 1

MINING

Specific Objectives

By the end of the topic, the learner should be able to:

1. define the term mining.
2. explain the factors influencing:
   the occurrence of minerals
   mining activities.
3. describe methods of mining
4. locate major minerals on the map of East Africa
5. explain the significance of minerals in Kenya
6. account for problems facing the mining industry in Kenya
7. explain the effect of mining on the environment
8. describe the occurrence of specific minerals and their exploitation in selected countries.

MINING

Mining is the process of extracting valuable minerals from the earths surface.

Formations in Which Minerals Occur

1. Veins and Lodes

Occurrence of minerals in crevices, cracks or faults in igneous rocks.

- They are said to occur in **veins if they** occur there in small quantities.
- Said to occur in lodes if they occur there in large quantities e.g. zinc, copper and silver.

2. Reefs

Veins and lodes which are exposed on the surface.

3. Seams/Layers/Beds

Occurrence of minerals as sedimentary or as a result of compression of accumulated organic or inorganic material e.g. coal and halite.

4. Alluvial Deposits

Occurrence of minerals while mixed with materials such as sand, gravel, silt, etc.

These were minerals which were detached from the veins by weathering and carried away by streams and rivers and got deposited e.g. gold, diamond and platinum.

5. Weathering Products

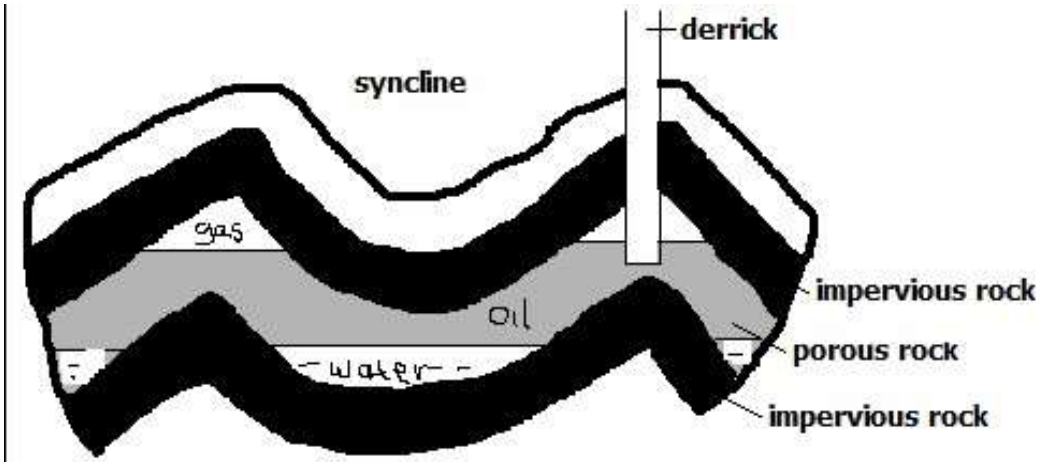
Minerals formed by deep weathering of rocks then leaching carried minerals from the top to lower layers where they accumulated e.g. aluminum, nickel, iron and manganese.

6. Oil pools/Wells

Occurrence of minerals in pools or wells in sedimentary rocks e.g. petroleum and natural gas.

Learner's Short Notes

Conditions Necessary for Formation of Petroleum



a) Presence of fossils or organic remains

b) Presence of sedimentary rocks for burying organic remains.

c) Presence of pressure to compress organic remains to cook the oil and naturalgas out of organic matter.

d) Presence of a porous reservoir rock to store and transmit petroleum to the oil pools e.g. limestone and sandstone.

e) Presence of a trap like a syncline to hold petroleum in a reservoir to prevent its escape.

f) Presence of impermeable rocks below the trap or syncline to prevent petroleum from percolating further underground.

Factors Influencing Exploitation of Minerals

1. Value of Mineral

Minerals of high value will be mined even if they occur in small quantities because one sold it will be possible to offset mining costs and make a profit and vice versa.

2. Quality of Ore

Mining can be done if the mineral deposits have high mineral content because they are economical to work on but deposits with low mineral content are rarely worked on except if the mineral in them is rare e.g. uranium.

Learner's Short Notes

3. Size of Deposit

Minerals which aren't of high value have to occur in large quantities for them to be mined so that it will be a possible to recover mining costs and make a profit.

4. Capital

Lack of capital causes developing countries not to exploit minerals and leave it to international companies because a lot of money is needed for exploration, infrastructure, salaries, energy etc e.g. titanium mining at Kwale is being done by Tiomin company from Canada.

5. Method of Mining

A mineral requiring open cast mining will be mined even if the mineral deposit is large but one requiring underground mining will be extracted if its in large deposit or if its of high value or rare.

6. Transport costs

Minerals occurring in remote areas far from the markets are not likely to be exploited if the transport system is poorly developed since mineral ore is heavy and bulky and transporting it by road and railway is expensive.

7. Market for the Mineral

Mining can be done if the mineral is in demand and if the prices are reasonable so that mining costs are offset and a profit is realized.

8. Political Influence

Mineral deposits at the borders of two countries may not be exploited as a dispute may arise concerning whom mine it e.g. dispute between Iraq and Kuwait over Rumaila should oil field.

9. Labour

Exploitation of some minerals require skilled workers and if they lack it may not be done as is the case in developing countries because expatriates have to be engaged and are very expensive to pay which may reduces the profits accruing from mining.

Learner's Short Notes

Methods of Mining

1. Open Cast Mining

Method of extracting minerals which are near the earth's surface.

Types

a) Stripping

Stripping off of the unwanted material lying on top of the mineral deposit and then digging to remove the mineral bearing rock if it's soft or if it's hard explosives may be used to loosen it and then huge power shovels are employed to dig up the mineral deposits.

b) Hill-slope Boring

Using boring instruments known as augers to drill out mineral deposit and bring it to the surface.

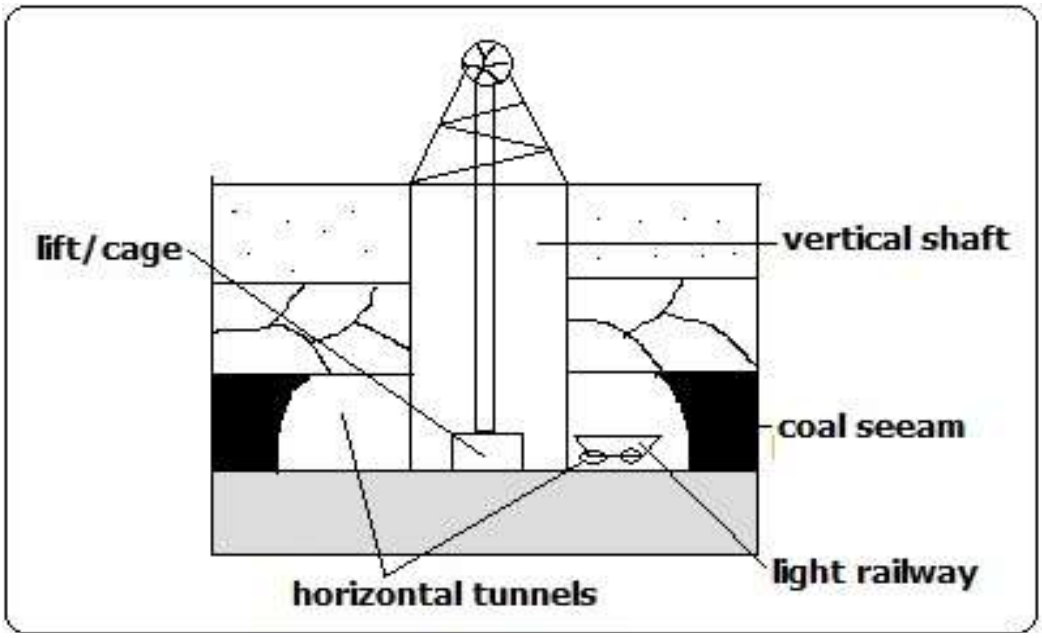
2. Underground Mining

Method employed when the mineral lies very deep below the surface and the overburden is too thick to be removed by mechanical means.

Types

a) Shaft Method

Method employed when the mineral bearing rock doesn't out crop.



Learner's Short Notes

How it's carried Out

- Vertical shafts are sunk into the earth's crust to reach the layer with the mineral.
- Horizontal tunnels are dug from the vertical shaft to reach the mineral.
- Props are erected to support the roof to prevent it from collapsing.
- The mineral bearing rock is blasted loose by explosives.
- The deposit is transported on light rail or conveyor belt to the bottom of the shaft.
- It is then brought to the surface in a crane or a lift called cage.

a) Drift/Adit Mining

Method employed when the mineral deposit can be reached from the valley sides.

• Horizontal tunnels (adits) are constructed from the side of the hill.

• Railway line is constructed into the mine to bring out the mineral e.g. mining of copper at Kilembe in Uganda.

b) Solution Method

Method used in mining soluble minerals such as sulphur, salt, potash, etc.

• Superheated water is ejected into salt deposits.

• The mineral dissolves or melts.

• The solution is then pumped into the surface.

c) Drilling

Method employed in exploitation of petroleum.

• Wells (oil derricks) are drilled.

• Oil and natural gas are brought to the surface under their own pressure or by pumping.

3. Alluvial/Placer Mining

Method used to extract minerals occurring in alluvial deposits e.g. gold, tin, diamonds and platinum

Learner's Short Notes

Types

a) Panning

It involves:

- Digging a mixture of sand, gravel and mineral from the river bed.
- Putting it in a pan and rotating the pan while tilted.
- The lighter sand or gravel is washed on the side leaving the heavier mineral at the bottom of the pan e.g. gold mining in Migori and R. Morun Beds in W. Pokot.

b) Dredging

- A dredger scoops water logged alluvium from the bed of a lake.
- The alluvium is passed over sloping channels with series of traps.
- Wastes are washed away and denser materials are left at the bottom of the trap e.g. mining of soda ash at L. Magadi.

c) Hydraulic Mining

Method used when alluvial deposit occurs on a valley side.

- A powerful jet of water is directed at the deposit.
- Gravel and mineral collect at the valley because of the great pressure.
- The mineral grains are recovered and washed out.

d) Sub-marine Mining

Method employed in extracting minerals in alluvial deposits lying deep down the ocean floor.

- A sub-marine dredger goes down the ocean floor.
- It scoops mineral deposit and rises to the surface.
- The alluvium is passed over sloping channels with series of traps.
- Wastes are washed away and denser materials are left at the bottom of the trap.

Learner's Short Notes

Significance of Minerals/Mining in Kenya

1. Kenya earns foreign exchange from exportation of minerals which is used to import goods and services and fund development projects.
2. Mining is a source of employment to people such as those who work in mines, in cement factories, in transport sector, etc.
3. Mining has led to development of industries by providing raw materials used in those industries e.g. limestone used in cement factories, coal used in iron and steel industries, soda ash used in glass industry, etc.
4. Mining has led to development of transport system to make mining areas accessible e.g. Magadi soda mine is connected to the main Mombasa-Nairobi railway line.
5. Mining has led to development of settlements e.g. Magadi town which originated from the mining of soda ash.
6. Mining is a source of market for goods and services e.g. there are shops and markets, banking and insurance services offered to people working in mines and related industries.
7. Has led to development of social amenities by providing social facilities such as housing, health, and education alongside infrastructure.

Distribution of Minerals in E. Africa

- **Phosphates** used in the manufacture of fertilizer-Tororo in Uganda and Majingu Hill in Tanzania.
- **Limestone** used in cement manufacturing-Hima in N.W Uganda, Tanga in Tanzania, Athi River and Bamburi in Kenya.
- **Fluorspar** a source of fluorine used in chemical industries-Kerio Valley in Kenya.
- **Common salt** used for consumption-Kilifi and Magadi in Kenya and L. Kitwe in Uganda.
- **Diatomite** used in making insulators –Kariandusi near Gilgil and Gicheru in Nyandarua.
- **Stones** in Machakos, Mutonga and Mbeere.
- **Carbon dioxide** used in making dry ice and in beer and soft drinks industry- Esagari in Baringo and Kagwe in Kiambu.
- **Diamond** used to make ornaments, glass cutters and drills-Mwadui in Tanzania.
- **Titanium** used in the manufacture of insulators for aircraft- Kwale district.
- **Gemstones** near Voi and Mwatate.
- **Soapstone** used for sculpture-Tabaka in Kisii.

Learner's Short Notes

- **Copper** used to make electrical wires and coins-Kilembe in Uganda.
- **Gold** used to make medals and jewellery and as a basis of world currency-Musoma in Tanzania, Kakamega and Migori in Kenya.
- **Coal** used in smelting of iron and generation of thermal electricity-in Ruvuma River Basin and Kivira Songwe in Tanzania

Problems Facing Mining Industry in Kenya

1. Inadequate capital making Kenya not to benefit from mineral resources because mining is left to multinational companies who pocket all the money to recover mining cost.
2. Areas where mineral deposits are inaccessible due to poor transport and infrastructure which makes prospecting and mining difficult.
3. Insufficient skilled personnel causing dependence on expatriates who are expensive to pay which reduces profits accruing from mining.
4. Most of mining is controlled by foreign companies so most of the mineral revenue ends up to them as salaries and dividends.
5. Occurrence of minerals in very small deposits which are not economically viable.
6. Lack of power supply especially in remote areas with minerals.
7. Land use conflicts which affect mining e.g. in Kwale between Tiomin and the local people due to inadequate compensation.

Effect of mining on the Environment

1. Renders land useless for other economic activities such as agriculture (dereliction) due to open pits left on land and heaps of rock waste litter dumped on land.
2. Pollutes the environment e.g. atmospheric pollution from dust and smoke from tractors and trucks, water pollution from spilling of oil from offshore oil drilling and soil pollution from chemicals and explosives used in mining.
3. Leads to loss of bio-diversity due to destruction vegetation which also destroys habitats of various animals leading to their destruction also.
4. Causes soil degradation e.g. by loosening the soil which makes it vulnerable to agents of erosion like wind and water, tractors and trucks compact the soil making water infiltration difficult and chemicals used interfering with soil chemical composition making it unsuitable for agriculture.

Learner's Short Notes

5. Causes mass wasting when explosives and heavy equipment used in mining shake the ground making weathered materials to move faster down slope under the influence of gravity

Trona mining on L. Magadi

Location

L.Magadi is 120km S.W of Nairobi on the floor of the Great Rift Valley.

Occurrence

Trona deposits occur as a solution of sodium salts the main ones being sodium sequicarbonate and sodium chloride.

Mode of Formation

- Rain water dissolves soda salts in volcanic rocks.
- The solution percolates through the rocks and soil and gets beneath the basin.
- The accumulated solution is heated by the hot rocks beneath.
- Pressure builds up and the heated solution is pushed to the surface.
- It comes out of the ground inform of hot springs below or on the sides of the lake.
- Due to high temperature water evaporates leaving behind crystals of trona.

Extraction and Processing A dredger scoops trona out of the lake.

- It crushes it into smaller pieces and separates it from rock debris.
- The material is mixed with water to form slurry and transported to factory on the lake's shore.
- In the factory the slurry is mixed with water to wash out impurities such as mud and salt and dried.
- It is sent to desiccators and heated to remove moisture and hydrogen to form soda ash.
- Soda ash is cooled and ground into powder and sieved.
- It's packed into paper bags, weighed and transported to the market.

Learner's Short Notes

Uses of Soda ash

Used in the:

i) Glass industry in the manufacture of glasses and bottles.

ii) Manufacture of soaps and detergents.

iii) Softening water in paper making.

iv) In textile industry.

v) In oil refining.

Benefits to the Economy

1. Has led to growth of Magadi town ship.
2. Has led to development of social amenities such as hospitals and schools and water from Oloibortoto River which has benefited the local people.
3. Has led to development of infrastructure e.g. railway line from Konza to L. Magadi.
4. The Magadi Soda Company employs many Kenyans including the nomadic Maasai.
5. Exports of soda ash earn Kenya a substantial amount of foreign exchange.

Problems

1. Stiff competition from developed countries with large soda deposits e.g. U.S.A and Israel.
2. Low value of salt is insufficient to meet its production cost.
3. High labour costs due to incentives given so that workers agree to work in the hostile environment of L. Magadi.

Gold in S. Africa

Gold occurs as small grains in a hard rock. It's mined by shaft mining since its bearing rocks are deep below the surface. The main mining area is the Witwatersrand and others are Ogendaalrus and lydenburg.

Learner's Short Notes

Processing

Ore is crushed to a fine powdery dust.

- Mixed with water until it is fluid mud.
- Cyanide is added to dissolve gold.
- The fluid is runoff with gold dissolved leaving behind waste salts.
- Zinc dust is added to filter gold for solidification.
- Gold sinks as it is denser.
- Gold is smelted and cast into ingots.

Significance to the Economy of S. Africa

1. Earns the country foreign exchange used for paying foreign debts.
2. Offers employment to many people raising their living standards.
3. Has led to widespread urbanization contributing to formation of Witwatersrand conurbation.
4. Has formed a broad market for other industries e.g. engineering, foot wear, electrical and construction industries.
5. Has led to improvement of infrastructure and social amenities e.g. roads, schools, hospitals, etc.
6. Led to development of agriculture.

Problems Facing Gold mining

1. Expensive to mine for lying deeply.
2. Large capital is required to start mines.
3. Complication of mining by folds and faults in the crust.
4. Low gold content in the ore.
5. Problem of removal of underground water.
6. Lack of adequate supply of fresh water on the surface in mining areas.
7. Accidents resulting from collapsing of mine roofs.

Learner's Short Notes

Diamond Mining in S. Africa

Diamond is the hardest known substance.

Mined in Kimberly, Bloemfontein and Alexander Bay.

Mined by underground mining or alluvial mining.

Processing

(i) Diamond bearing kimberlite is crushed rock is mixed with water

(ii)Diamond sinks to the bottom as it's denser

(iii)Water and less dense residue are drained off

(iv)Remaining material is put on heavily greased trays and washed

(v)Diamond repels water so it sticks to grease while remnants are drained off

(vi)Diamonds are then sorted out and graded into gem diamonds and industrial type (for cutting purposes).

Contribution to the Economy

1. Provides employment to thousands of people
2. Earns the country substantial foreign exchange
3. Has led to growth of urban centers e.g. Pretoria and Kimberly.
4. Has contributed to development of infrastructure

Problems Facing Diamond Mining

1. Fluctuation in the world market prices
2. High cost of mining and processing diamond
3. depletion of mines
4. Low mineral in the ore making mining expensive
5. Labour competition with other sectors e.g. manufacturing and gold mining

Learner's Short Notes

Petroleum in the Middle East

Oil is a thick black sticky liquid called crude oil

- It was formed from small creatures that lived in shallow lagoons about 100200m ago.
- Decaying remains of those creatures mixed with mud at the bottom as sediments
- The sediments piled on each other and slowly transformed into sedimentary rocks
- Gradually the remains were converted into oil and gas.

Major oil producers in the Middle East are Saudi Arabia with the largest reserves, Iraq,

Kuwait and United Arab Emirates.

Middle East accounts for 64% of world oil reserves.

There are several giant oil fields in Ghawar in Saudi Arabia and Kirkuk in Iraq.

Processing

Crude oil is processed by refining using a technique called fractional distillation.

The process takes place near as possible to the market as it's cheaper to transport crude oil than the different refined products.

It's processed into secondary products such as petrol, paraffin, lubricating oils, dyes, fertilizers and plastics.

- Impurities are removed from the crude oil
- Crude oil is heated before entering functionating column
- It's turned into vapour or gas
- Different ingredients turn back to liquid at different temperatures.
- Ingredients gradually cool, condense and collect in various trays and allowed to overflow until they reach an outlet.

Contribution to the Economies

1. Arab's investments overseas have increased due to oil reserves.
2. High income per capita due to oil profits.
3. Has led to development of cities e.g. Tripoli in Libya.
4. Investment of oil money in other sectors e.g. power stations, cement factories and exploitation of other minerals.
5. Earns the countries substantial foreign exchange 6. Increased political and military power.
6. Artesian water is made available for domestic and irrigation purposes e.g. in Libya.
7. Oil companies help in fixing down the sand dunes and planting trees in the deserts.

Learner's Short Notes

MINING

PAST KCSEQUESTIONS

1. The table below shows petroleum production in thousand barrels per day for countries in the Middle East in April 2006. Use it to answer question (a)

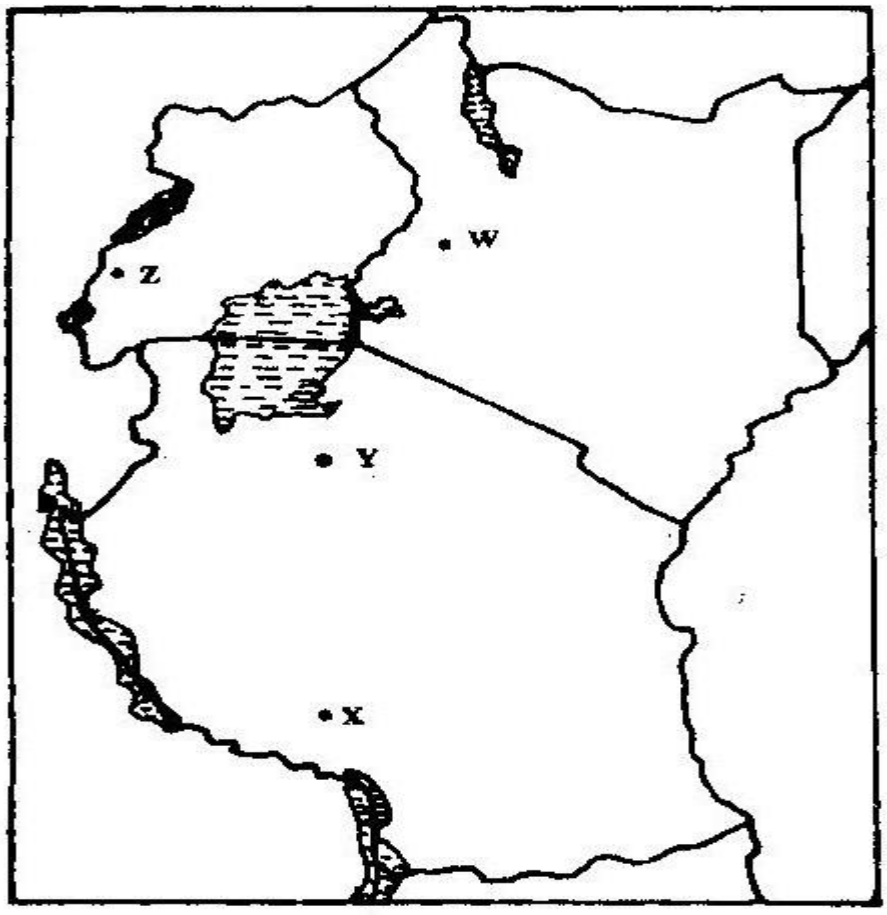
Country	Production in '000" barrels
Iran	3800
Kuwait	2550
Qatar	800
Saudi Arabia	9600
United Arab Emirates	2500
Iraq	1900

a) (i) What is the difference in production between the highest and the lowest producer (1mk)

(ii) What is the total amount of petroleum produced in April 2006 in the region? (1mk)

b) State three conditions that are necessary for the formation of petroleum (3mks)

2. Use the map of East Africa below to answer questions (s).



a) (i) Name the railway terminuses marked P, Q R (3mks)

(ii) In each case give the main commodity transported by the railway lines marked s and T. (2mks)

b) (i) State four reasons why road network is more widespread than railways in East Africa. (4mks)

(ii) One of the problems facing road transport is the high frequency of accidents. Explain four conditions of roads in Kenya that may lead to accidents. (8mks)

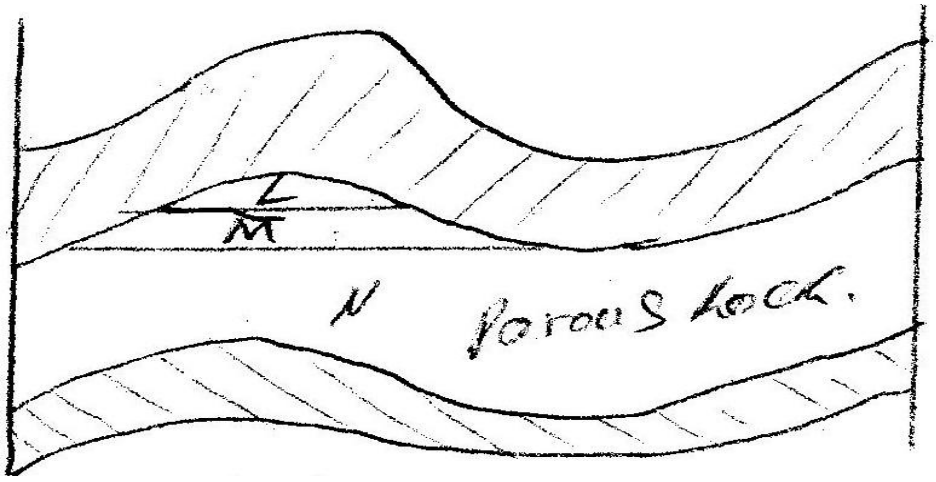
c) i) Name three physical regions through which River Tana passes (3mks)

ii) Explain thee effects of land pollution can be control.

d) State four ways through which land pollution can be controlled (4mks)

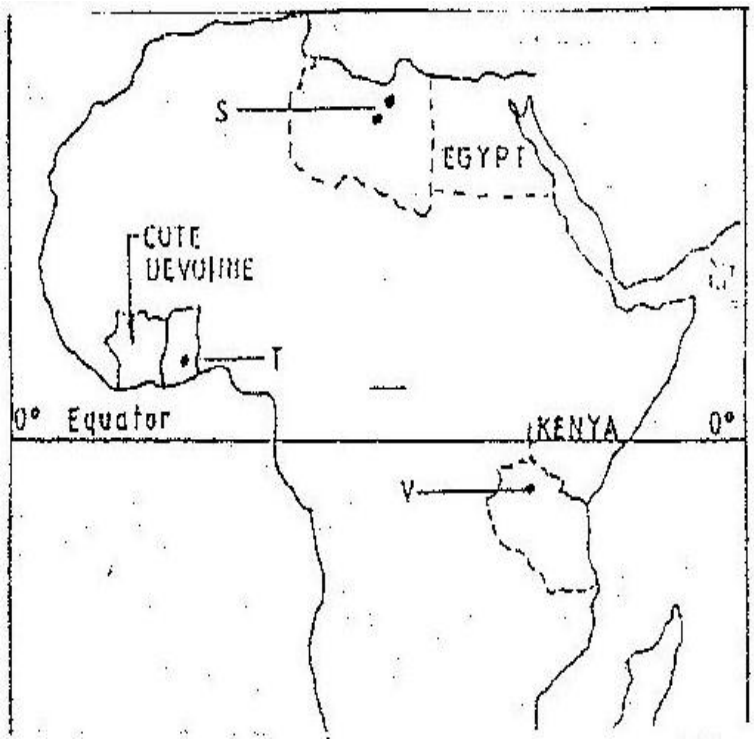
3. The diagram below show the occurrence of petroleum in the earth's crust.

Use it to answer questions (a)



a) Name the substances in the areas labeled L. M and N (3mks)

b) Give two by-products obtained when crude oil is refined (2mks)



i) Name the minerals mined in the areas marked S, T and V.

ii) State two formation in which mineral ores occur.

b) Explain four problems, which Zambia experiences in the exportation of copper.

c) Explain three ways in which coal contributes to the economy of Zimbabwe.

d) Describe three negative effects of open cast mining on the environment.

5.

a) Explain how deep shaft mining is done (2mks)

b) Disadvantages of using the above method (2mks)

6. Explain four effects of land dereliction on the environment. (4mks)

7. Describe how panning mining is carried out. (3mks)

8. Identify four problems facing gold mining in South Africa. (4mks)

9.

(a) In what ways has Kenya benefited from the mining of soda ash in Lake Magadi? (2mks)

(b) What are the negative effects of mining on the environment? (4mks)

10.

(a) Explain what is meant by placer mining. (2mks)

(b) Name three mining methods.

11. Describe the occurrence and exploitation of Trona in Kenya till it is ready for marketing.

12. Name seven significances of minerals in Kenya. (7mks)

13. Explain diamond and gold in South Africa under following headings:

- Occurrence
- Extraction
- Benefits to the economy
- Problems (10mks)

14. Name five uses of soda ash. (5mks)

MARKING SCHEME

MINING

1. Conditions that are necessary for the formation of petroleum.

- Presence/deposition of remains of flora and fauna fossils over a long period of time.
- Presence of non porous rocks underneath the deposits of flora and fauna
- Deposition of other layers of rocks/ non -porous rocks over the remains of flora and fauna.
- Compression of remain of flora and fauna due to folding of the layer of rocks.

2. (a)

(i) Minerals mined in area marked

W - Fluorspar

X - Gold

Y - Diamonds

Z - Copper

(ii)

- Alluvial mining
- Underground mining
- Open-cast mining

(iii) Sea ports through which some minerals mined in East Africa are expected through. -Mombasa, Dar-es-Saalam.

(b) Factors that influence exploitation of minerals.

- Modes of occurrence
- Economic value of the mineral/quality of the minerals/cost of mining.
- Size of the mineral
- Level of technology
- Availability of capital
- Labour supply
- Availability of transport facilities
- Government policy/political influence
- Availability of market

(c) Significance of soda-ash mining

- Creation of employment opportunities.
- Development of infrastructure.
- Development of related industries.
- Improvement of social facilities.
- Earns Kenya foreign exchange.

(d)

- Planted trees
- Creating a park to attract tourists
- Introducing aqua culture
- Landscaping for settlement /farming
- Refilling

3. (a)

- Gas
- Oil\petroleum
- Water

(b)

- Wax
- Bitumen\pitch\asphalt
- Grease lubricants
- Resin\petrol-chemicals

4. Use the map of Africa below to answer the questions below.

(a) Name the minerals mined in the areas marked S, T and V.

S - Oil/Petroleum

T - Bauxite/Gold

V - Diamond

(b) State two formations in which mineral ores occur.

- Some minerals occur as evaporates.
- Others occur as veins/lodes.
- Some minerals occur as alluvial deposits.
- Some occur as weathered products.
- Some minerals are found in seam

c) Explain four problems which Zambia experiences in the exportation of copper.

- Zambia is landlocked/ has no coastline hence copper has to pass through other countries to reach the seaport.
- The distance from Zambia to the coast is long which makes transportation of copper expensive.

• Political instability in the neighboring countries makes it insecure to transport copper through them to the coast

• Congestion at the seaports causes delays in loading and off-loading of copper

• Loss of copper through theft while on transit deprives Zambia of the part of the expected revenue.

• Copper is bulky thus it can only be transported by rail which is slow.

(d) • Describe three negative effects of open cast mining on the environment

• The land is left with gaping quarries which are ugly interfere with the natural beauty of the landscape.

• The heaps of rock waste hinder any other forms of land use/create a landscape that is expensive to rehabilitate/barren landscape.

• The dust produced during the mining pollutes the atmosphere/is a health hazard.

• Open cast mining causes shortage of land as it hinders settlement/leads to displacement/hinders agriculture.

• Large scale blasting of rocks leads to instability of the basement rocks.

• Water collects in the hollows left by open cast mines creating ponds which become habitats for disease causing organisms

• It interferes with the natural vegetation which is cleared before extraction of the mineral begins/takes time to regenerate.

5. (a) • A vertical shaft is dug to reach the mineral Tunnels are then dug horizontally.

• The roof of the tunnel must be supported to prevent it from collapsing.

• The mineral is then removed by blasting using explosives.

• Its then brought to the surface using a lift.

• The mineral is then transported to the factory for processing.

(b) • It is an expensive method

Accidents due to collapsing of mines.

6. (a) • Ugliness of the land.

• The open pits are health hazards once filled with water.

• The land losses productivity.

- Accidents are likely to occur especially children falling into pits.

7. • It involves digging out sand from river beats and swirling it around with water in a shallow pan.

• This pan is tilted such that lighter sand is washed over leaving the mineral behind.

8.

• Water shortage for power supply and processing

• Labour shortage

• Increased depth of mines

• Increased cost of mining

• Decreasing availability of ore

9. (a)

• It earns the country foreign exchange

• It generate jobs to Kenyans

• Leads to uplifting of living standards

• Development of settlements e.g. Magadi town.

• Development of transport system

(b)

• Causes scenery ugliness

• Pollution of dust, noise and overburden

• Dereliction of land

• Loss of land productivity which can lead to desertification.

10. (a) • It involves mixing the alluvial deposits with water in a container. The mixture is rotated until light particles (sand, mud) are washed off

• Leaving minerals particles such as gold behind. This is called panning,

(b) Three mining methods

• Open-cast mining

• Underground mining

• Alluvial mining

11. • Occurrence It forms when rain water seeps down through volcanic rocks which contain soda ash. The water is heated by underground hot rocks. This forces the water to move upwards into Lake Magadi.

Exploitation Its extracted using the dredger which floats on the lake. Pumps the mixture of trona and water to the factory on the shores through a pipeline. At the factory impurities are removed. This is heated and turned to soda ash ready for packaging and export.

12.

- Earns foreign exchange
- Generates employment opportunities
- Development of settlements
- Lead to development of industry
- Earning higher income hence better living standards.
- Land dereliction
- Pollution
- Loss of biodiversity
- Soil degradation
- Enhancing mass wasting

13. **Gold** is found in quartz or redistributed sediments. Gold is extracted using the deep shaft method. Gold ore is crushed, dissolved and then precipitated to obtain the gold. Gold is used in making of jewellery and ornaments, in chemical industries, in density and for medals. Gold earns export revenue, has led to infrastructure development and provide employment. Rising costs of production, high labour costs and low quality gold are some of problems facing gold mining.

Diamonds are associated with volcanic activities. They occur in igneous rocks in pipes. The ore is blasted crushed and washed. It is then passed through filtering screen and then through a special solution. Diamonds are used in the jewellery industry, for polishing, for drilling, and for cutting instruments. Diamonds; earn foreign exchange, have led to development of towns, have created employment and contributed to development of infrastructure. The problems facing diamond mining to include exhaustion, unstable world market prices, high costs of processing and inadequate labour.

14.

- Uses of soda ash
- Glass manufacture
- Paper making
- In oil refinery
- In textile industry
- In soap manufacture