

GEOGRAPHY

Time Allowed: 3 hr.

Max. Marks: 250

Instructions to Candidate

- There are EIGHT question divided in Two Sections.
- Candidate has to attempt (FIVE) questions in all
- Question No. 1 and 5 are compulsory and out of the remaining, three are to be attempted choosing at least one question from each section.
- The number of marks carried by a question/part is indicated against it.
- Answers must be written in the medium authorized in the Admission Certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in medium other than the authorized one.
- Word limit in questions, wherever specified, should be adhered to.
- Attempts of questions shall be counted in chronological order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-Cum-Answer booklet must be clearly struck off.

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1. Invigilator's Signature

2. Invigilator's Signature

Name Ravi Kumar

Mobile No. _____

Date _____

Signature Ravi

Rohit Lodha

REMARKS

GS SCORE

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SECTION-A

Attempt all questions:

1. Answer the following questions in about 150 words each:

(10 × 5 = 50)

- (a) Write a short note on the contribution of Ancient period historians and philosophers in the evolution of geomorphological thought.
- (b) Write a short note on Bowen's Reaction Series.
- (c) Describe the terms in detail,
1. Podzolization
 2. Gleying
- (d) Discuss the continental drift theory of Taylor.
- (e) Write a short note on Misfit meandering.

Could have explained in more comprehensive manner

Q1. (1) Podzolization: → It is the process in which iron and aluminium form sesquioxides when they leached downward. This is a common phenomenon in Boreal type of climate where podzols of Fe and Al are formed. Extensive podzolization can render soil infertile and unfit for agriculture.

(2) Gleying is the phenomenon where combination of laterization, leaching and mineralisation occurs.

It is characterized by the leaching out of silica and other minerals and simultaneous formation of humus and fixation of other nutrients. Excessive leaching and laterization can cause acidification and make land infertile.

2

Remarks

e) Artificial Meandering :-

Meandering is curving in the path of river channel in the mature age.



Remarks

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2. Answer the following questions:

- (a) What is geomagnetism? Explain and discuss the causes of geomagnetism & also explain how geomagnetism & its application help us understand some aspects of the earth's crust? (250 Words) (20)
- (b) It is said that the Holocene epoch which started at the end of the ice age has given rise to Anthropocene epoch. In light of the above statement discuss the significance of Anthropocene epoch. (200 Words) (15)
- (c) What do you understand by Social Forestry? Describe its role in sustainable rural development. (200 Words) (15)

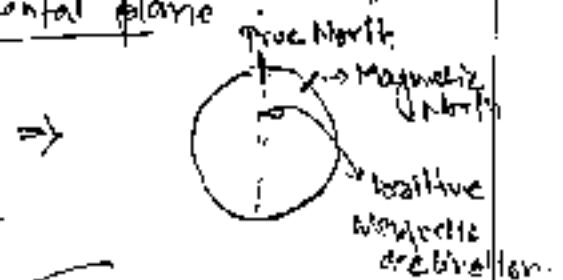
Q1) Geomagnetism refers to the magnetic property exhibited by the Earth.

Reason → The molten outer core due to high temperature is built of Nickel and Iron. Its movement causes the dynamic property to create magnetism. Too generated

Major Characteristics of Geo. Magnetism:

① Magnetic Declination → Angle between magnetic North and Geographical North. In horizontal plane

Mag. Declination is positive
 if Magnetic North is
 East of ~~Geog. North~~ True North.



② Magnetic Inclination / Dip → The angle in a vertical plane between freely hanging magnet and horizontal.

Dip is zero at equator and 90° at magnetic pole

③ Magnetic equator → Line of point where dip is zero.

Causes of Geomagnetism -

① The dynamic movement in the outer core which has iron and nickel in molten state due to extremely high temperature cause geomagnetism.



This dynamic feature is responsible for the magnetic pole shifting and polar wandering.

Eg: Stanley Keith Runcorn stated that the magnetic North Pole has moved from Hawaiian Island to Admiralty Island in Canada, via Eastern Siberia over a past 3000 years.

Evidence of Changing Geo-magnetism

→ The basin of sea floor contains rocks away from the mid oceanic ridge which have show magnetic anomaly in the constituent atom.

→ The rocks cool and solidifies and are ejecting from oceanic ridge and get magnetise according to current magnetic condition.

→ This show the geo-magnetism shifts through time.

Geomagnetism Application

① Navigations in ships and other devices.

② Birds and animals use geomagnetism for migration.

③ Aurora Borealis and Aurora Australis occur due to interaction of charged particles from sun and earth magnetic field.

Remarks

Geomagnetism in Underlying Earth Crust

- ① The Earth crust is continuously being formed at mid oceanic ridge but upwelling magma this magma cools, solidifies and magnetize ~~it~~ coming up to top.
- ② ~~By~~ Having an understanding of Geomagnetic properties of past, we can infer the geo. magnetic property of Earth crust away from the mid oceanic ridge formed during that past.

↳ No diagram
↳ Explanation is bit general

6.5

c) Social Forestry — The combined development and protection of forest and tree cover by forest officials and community is known as social forestry.

It facilitates the logo of 'of the people, by the people, for the people'.

This term was first used in National Commission on Agriculture by Government of India in 1978. 1976

Characteristics of Social forestry

- ① Involvement of community, ^{not} elimination, in the forest protection.
- ② Realising the rights of community on forest produce and their responsibility.
- ③ Healthy co-ordination between officials and villagers.

Benefit of social forestry

- ① Environment →
 - Atmosphere is purified by larger forest cover and decrease intensity of pollutants.
 - Biodiversity → Protection of flora and fauna and enrichment in the diversity.
 - Hydrology → The cycle of Evaporation condensation — Rain — Evapotranspiration is restored and less incidents of drought and flood.
 - Soil erosion and degradation is prevented.
 - ② Economy → since forest produce can be sold in market and forms an economic alternative for villagers.
 - Timber availability
 - ③ Social benefit → eg:- In Bihar, SM Raju combined social forestry and MNREGA to provide the ownership of trees after 5 years of plantation if taken good care of. It provided employment to women, handicapped and poor.
- Also the forest of Bihar went from 7% to 12.86% in 5 years.

Remarks

Role of Social Forestry In Sustainable Rural Development

- ① The trees grown in flood prone area with the coordination of community inhabiting such areas can save life and property and livelihood of many families.
- ② Planting trees at community land better for commercial (such as timber, fruit) and Non-commercial (shade and soil regeneration). Can & incur private development at village community.
- ③ Giving rights to owner and planter of tree can significantly increase forest cover and economic alternatives.
- ④ Planting trees can help in developing sustainable environment such as regeneration of soil moisture, soil nutrient and stopping soil degradation and soil erosion. This will ensure not only the present need but also the future generation need.

As the saying goes 'we have not received this earth as gift from our ancestor but as loan from our sons and daughters', social forestry can immensely work on this line of preserving the land through sustainable development and rural development.

Remarks

In such questions, diagrams & case studies will fetch you more marks

b) The Holocene epoch is the time period after ice-age in geological time scale. This stage has seen the emergence of various species of plants and ~~animals~~ animals. The evolution of Human ~~from~~ homo-sapien from chimpanzee.

The ~~human~~ has changed these

Humans have adapted and changed ~~a~~ the surrounding that they inhabited it has marked a new beginning of Anthropocene epoch.

~~Incomplete~~

Remarks



Remarks



Remarks

3. Answer the following questions:

- (a) The complexity of geomorphic evolution is more common than simplicity. Elaborate. (250 Words) (20)
- (b) Discuss the Morisawa's unified classification of channel pattern. (200 Words) (15)
- (c) Plastic is considered as "Chemical of emerging concern". In light of the given statement discuss the impact of plastic on the soil and human health. (200 Words) (15)

Remarks

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4. Answer the following questions:

- (a) Interactions between various plates form the most important reason behind the formation of various landforms according to Plate Tectonic theory. Illustrate. (250 Words) (20)
- (b) Among all the factors, changes in the channel gradient is the most important factor for creating disturbance in graded profile. Explain with the process of rejuvenation. (200 Words) (15)
- (c) The channel morphology of bedrock channels is largely determined by structural and lithological controls. Elaborate. (200 Words) (15)

Q. Plate Tectonic theory was propounded by 'Wegener and Parker' and Morgan.

Various landforms are formed as a part of interaction between the plates of lithosphere. In following way:-

(A) Plates moving towards each other

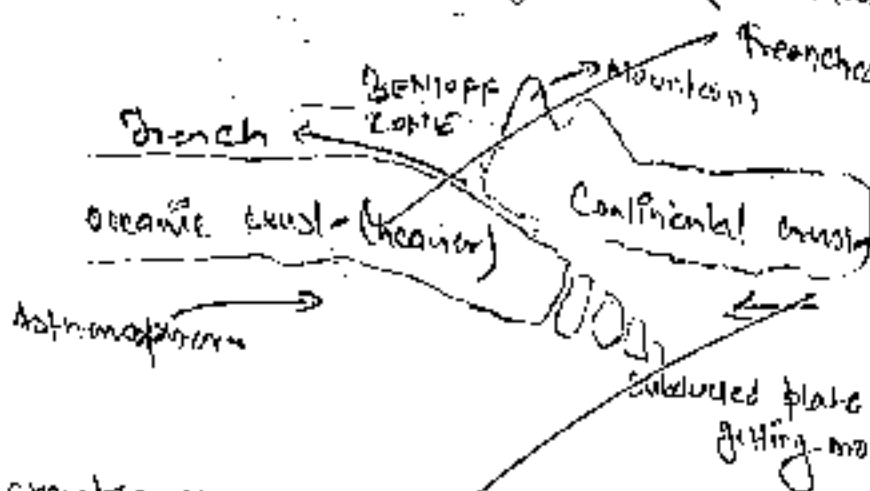
Convergent plate boundary

It is also called

Such plate boundaries are also called destructive or converging boundaries. The heavier plate, subducted under the lighter plate causing the folding in the region.

Some features formed in this way are

- Mountains (eg Himalayas)
- Volcanoes (eg Mt. Fujiyama)
- Trenches (eg: Mariana Trench)



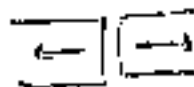
eg: Examples of convergence - Indian plate subducted under

Remarks

Collision plate forming young fold mountains.

Divergent plate boundary

② Plates moving away from each other

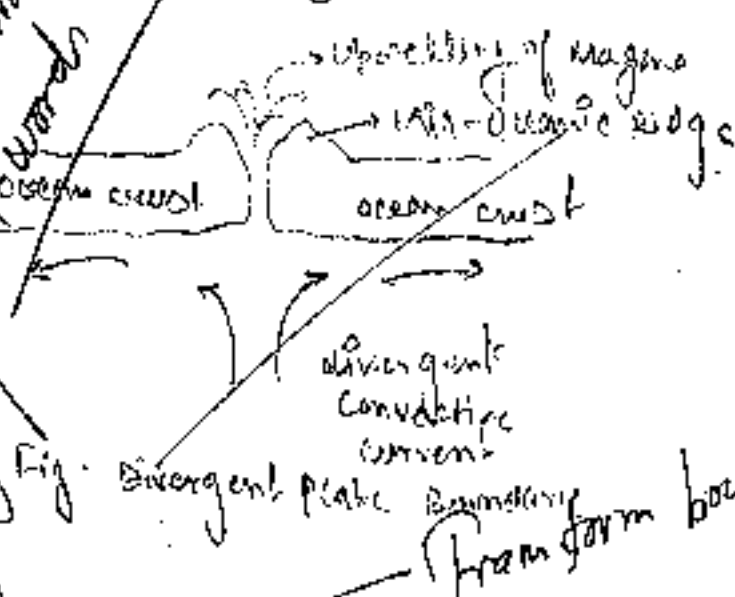


both plate boundaries are called divergent or constructive plate boundaries.

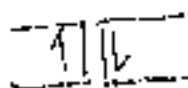
These regions are characterized by constant and slow upwelling of magma due to thermal convective currents.

Some features such as ridges can be founded at such plates. eg: Mid. Atlantic Ridge

Use max of 1000 geographical words



③ plates moves past each other



When the plates slides against each other transform boundaries are formed. This movement has little significance in directly forming a feature yet it affects the formation of lot of features ~~in~~.

b) The profile of any topography depends on a range of endogenetic and exogenetic factors. ~~8/6/1/1/11.~~

During the development of graded profile, disturbances can occur due to various reasons such as:-

- ① Climatic change
- ② Channel gradient change
- ③ Vegetation cover change.

However channel gradient is the most important factor for creating disturbance.

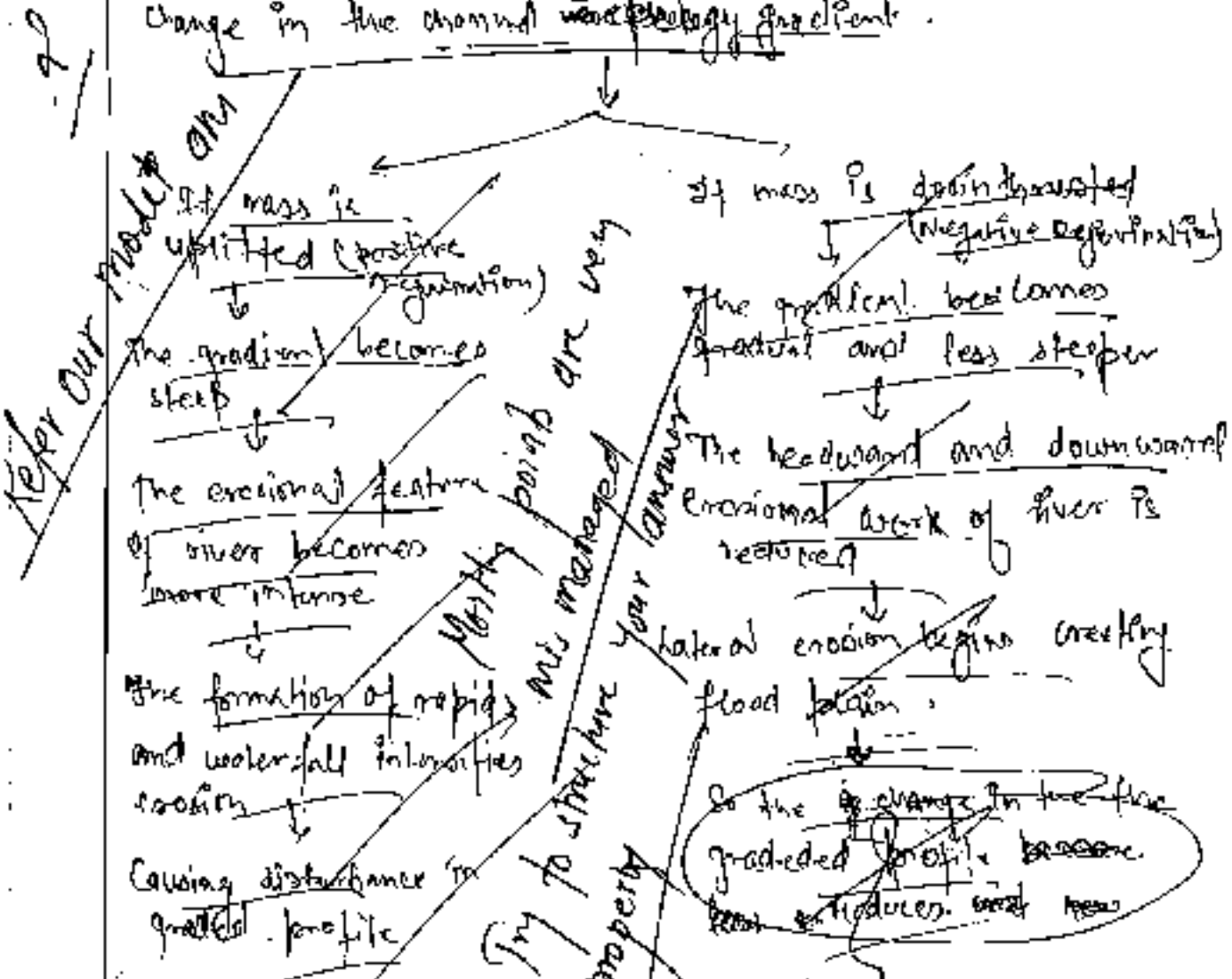
~~For example:~~

Let's take example to formation and gradual reduction of Mountain:

- ① Taking Winkler's theory of slope decline, the upliftment has over and now the degradation begins.

① In the initial phase, ~~degradation~~ ~~due to~~ downward and headward cutting by running water is predominant. This results in gradual reduction in the profile.

② However rejuvenation can occur and suddenly uplift or downthrust the mountain slope causing a significant change in the channel morphology gradient.



Since fluvial action of running water affects the profile of any topography, its intensity and channel gradient becomes most important reason behind the formation of valleys for creating disturbance in graded profile.

Remarks

c) Structural and lithological controls play significant roles in determining the channel morphology of bed rock channel. because of following reasons:-

- ① Hard rocks such as igneous rock are more resistant to erosional work of river and hence it takes more time on hard rock to steepen the bed river bend.
- ② Porous rocks can allow underground flow of water due to pores such as limestone.

Examples

Remarks

Remarks

Remarks

SECTION-B

Attempt all questions:

5. Comment on the following into 150 words:

(10 × 5 = 50)

- Explain various theories put forward by various geomorphologists regarding the formation of limestone caves.
- Explain the process of Nivation and Frost Heaving.
- Write a short note on the tectonic-geomorphic model of M. Morisawa.
- Write a short note on Cymatogenic Movements suggested by L.C. King.
- Why Continental Drift theory is also called as an impossible hypothesis?

Q.5) a) Limestone caves are the topographical features of karst topographical cycle which are postulated by various geomorphologist such as Beede (1911) and Giff (1917).

It is a unique feature attributed to selective action of rainwater and running water.

Stage of development of Limestone cave :-

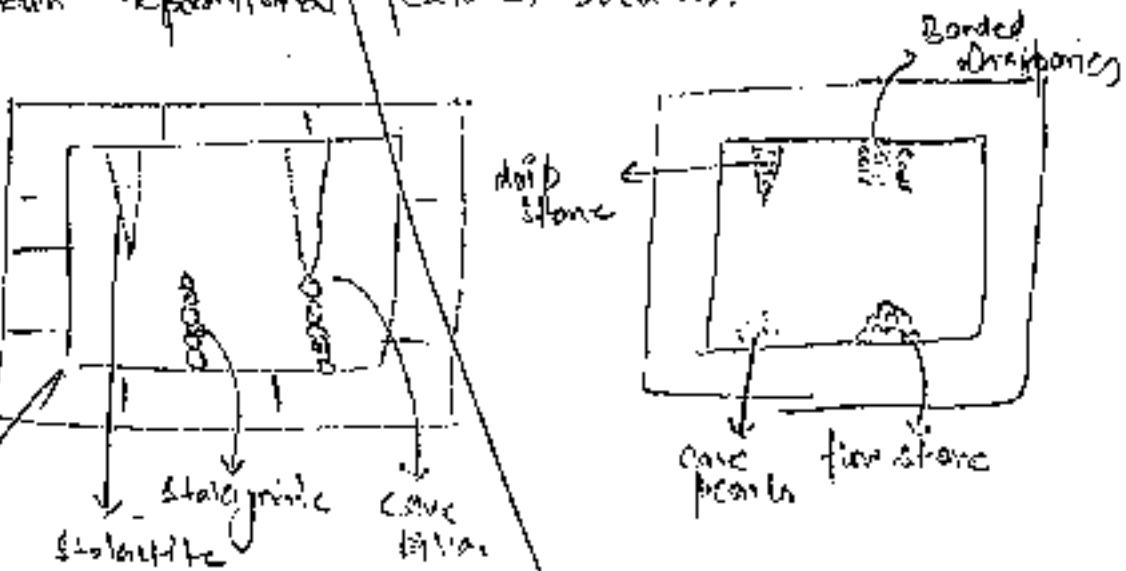
- Young → Rainwater and runoff in stream dissolves solubled rocks such as limestone when they are exposed. This lead surface stream to become sub-surface stream and the erosional and depositional features in limestone bed rocks begin.



Fig: Entry of water into underground.

Remarks

- ② Nature → The ~~process~~ erosional and depositional features are created due to sub-surface flow. As a result underground limestone cave is formed which contains depositional features such as:-



- ③ Old → If the cave top collapses an ~~exit~~ exit
 → Sub-surface stream becomes surface stream.

④ To allow limestone cave to develop, there is an inlet and outlet required which facilitates continuous inward and outward flow of water.

- ⑤ Continental drift theory was propounded by German geologist Alfred Wegener in 1912 and further in his book 'Die Entstehung der Kontinente und Ozeane' in 1922. Taking Edward Suess's ~~real-sima. nife~~ classification he ~~is~~ assumed that climatic regions remain stationary and continental landmasses moved, and current location is achieved.

Remarks

However COT is an impossible hypothesis.

Reasons

- ① He took the tidal force due to Sun and Moon as the factor for westward movement of South America and North America which is too weak to cause such a massive movement.
- ② He talked about frictionless movement of slab over slab. This is incorrect otherwise the crumpling of the western part of North and South America into Rockies and Andes could not be possible.

Rockies mt. System

Andes mountain system

- ③ Plate movement theory later developed by Morgan and Parker and Morgan prove to be highly accurate ~~and convincing~~.

- ④ This theory does not provide any justification in Pre-Carboniferous period.

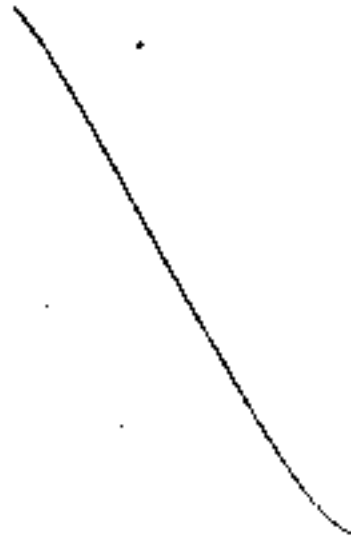
- ⑤ The climatic zones rigidity is criticised.

Draw diagram

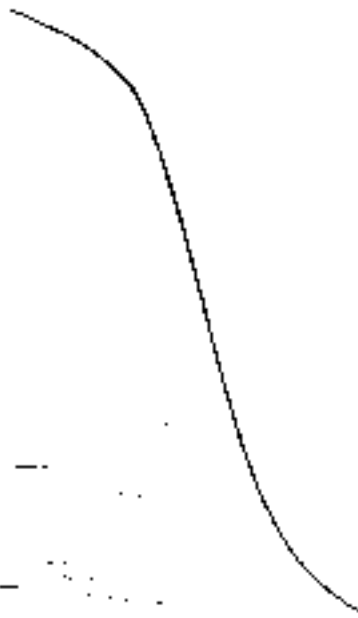
This is not correct

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~~XXXXXXXXXX~~
XXXXXXXXXX



Remarks



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6. Answer the following questions:

- (a) Discuss the role of the geomorphology in hazard management and the urbanization. (250 Words) (20)
- (b) Explain the concept of the cycle of erosion put forward by Beede and Cvijic. (200 Words) (15)
- (c) How are minerals formed in Igneous and metamorphic rocks? Also Explain various types of sedimentary rocks. (200 Words) (15)

⑥ Beede and Cvijic (1877) gave the concept of Kant topography's cycle of erosion, which is unique as it requires limestone rock and humid environment.

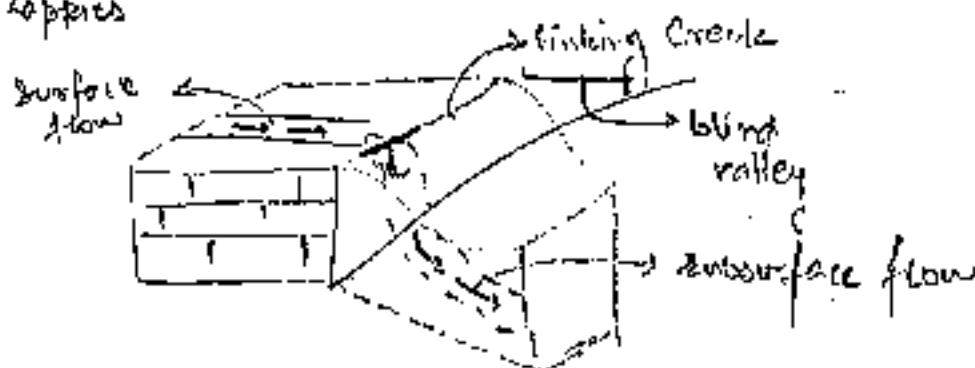
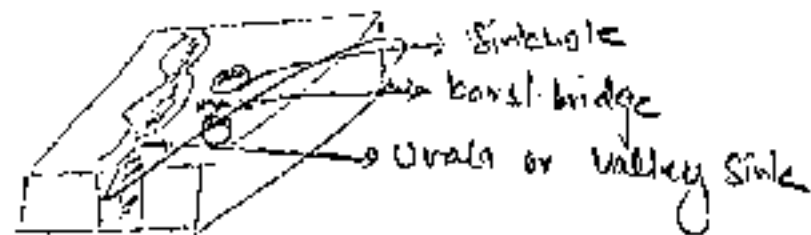
Limestone and other carbonated rocks are soluble in rain water and can easily be eroded and deposited by running water developing a range of features.

However there are 2 major issues in understanding the concept there are 2 different stages:-

Baseline is unclear
 Under ground water can not be island and...

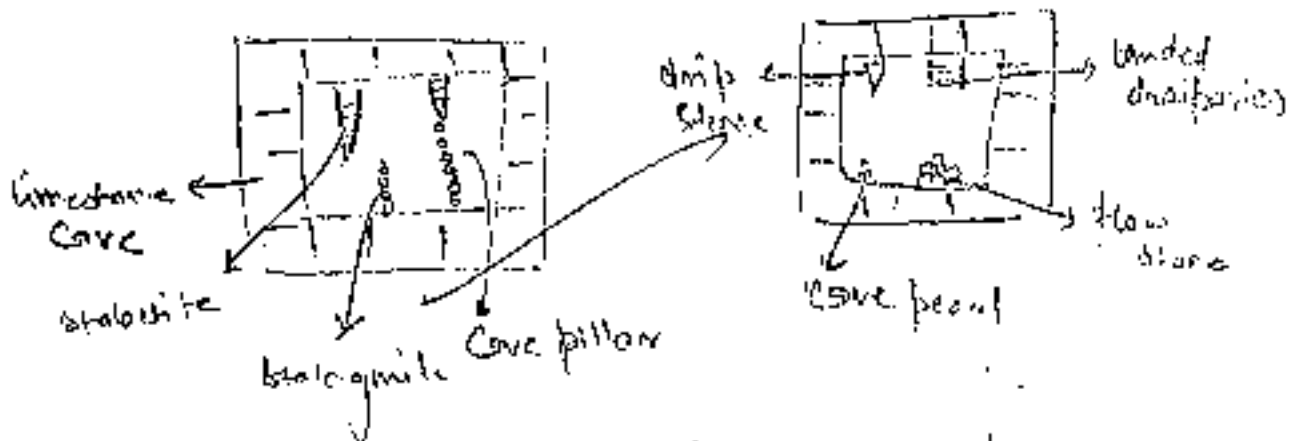
① Youth stage → Solutional erosion is dominant creating range of features. It is done both by running water and rain water to the exposed surface of limestone.

Feature:-



Remarks

② Mature Stage :- The water get enough time to form and further ~~ent~~ intensify the formation of Caves. Various depositional features ~~ar~~ can be found. :-



③ Old stage :- This stage is characterised by 2 phenomenon
 • → Collapse of the cave roofs and destruction of depositional features
 • → Appearance of subsurface flow.

The end stage of the cycle of erosion for karst topography is ignobtain.

This concept was highly useful in understanding the features in karst province of eastwhite Yugoslavia along Adriatic sea.

The discovery of wonderful underground caves in Indonesia and Mexico has led to new recreational economy.

① Geomorphology as a subject of science has useful application in various walks of life.

Geomorphology in Hazard Management

① Geomorphology can help in understanding the potency of any region to encounter a severe hazard such as volcanoes and earthquakes. We can then employ important measures to counter such situations.

Eg: ① Unstable hill slope can cause severe damage to life and property in case of mass wasting, solifluction, liquefaction.

Eg Kunlun Mountain slopes and south Southern Himalayan slopes of Kumaon and Garhwal region are highly prone.

These areas should be protected by artificial bunds, tree cover etc.

② Buildings dams on limestones can be costly and failure chances are increased which can trigger flood or even minor earthquake.

③ Regions which are near tectonically active zones such as Japan, Himalayas should be made earthquake proof building. The up. Himalayan region is kept under Zone V and the buildings are provided with sufficient reinforcement.

④ River channel changes rapidly causing flood in adjacent regions. Eg Kosi is known as Sorrow of Bihar. Flood barriers, uplifted plane can be provided to such regions.

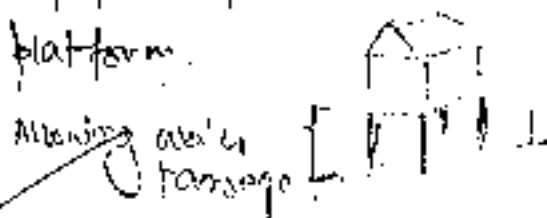
Geomorphology in Urbanization

- ① The urban planning is crucial to cater to the demands of the people and a deep understanding of Geomorphology can help in this respect.

Ex: Urban areas in mountainous region should be selected at such sites where slope is stable, which is tectonically less active and gradual sloped.

- ② Setting up urban centres away from the mineral rich regions such as Chhota Nagpur plateau should be recommended as these areas ~~are~~ provide economical sites of extraction.

- ③ At coastal plains, due to frequent flood, the houses should be built on wooden platform.



- ④ Setting up urban centre in glacial regions ~~where~~ where the glacier is moving down slope should be avoided. Stable zones should be found.

DIAGRAMS ARE MUST

1) Igneous Rocks → These rocks are formed when the ejected lava ~~is ejected~~ cools and solidifies.

These rocks may contain minerals such as Basalt, silica.

Magma is rich source of minerals from deep inside the earth.

Two types of Igneous rocks -

① Intrusive Rocks ~~is also known as~~ also known as plutonic rock are formed when lava cools inside the earth's surface only.

eg: Granite.

② Extrusive Rocks are formed after ejecting of magma and subsequent cooling and solidifying.

eg: Basalt ~~is a~~ rock which is spread out by in particular India. It can also be found in Hawaiian Island where less-viscous lava has spreaded over entire island.

These rocks are hard and ~~are~~ more resistant to erosion.

The silica rich magma is ejected in mid oceanic ridge due to magmatic differentiation.

Metamorphic Rocks → These rocks are formed when the already existing rocks undergo changes due to high temperature and pressure. The mineral composition can ~~be~~ change significantly due to orphic activities.

Remarks

Types of sedimentary rocks missing

Sedimentary Rocks → These rocks are formed when the sediments of existing rocks are accumulated, squeezed and under pressure and over a long period of time.

Remarks

Remarks

Remarks

7. Answer the following questions:

- (a) Discuss the view of Airy and Pratt regarding the concept of Isostasy. Also, give the interpretation of the theory of plate tectonics. (250 Words) (20)
- (b) What is a Zoogeographic region? Provide a classification of major faunal regions of the world and discuss Ethiopian Faunal Region and Oriental Faunal Region in detail. (200 Words) (15)
- (c) Write a short note on various factors causing rejuvenation in landforms and thus describe the consequent landforms. (200 Words) (15)

Remarks

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Remarks

8. Answer the following questions:

- (a) Write a short note on Johnson's Classification of Shorelines (250 Words) (20)
- (b) Write a short note on climatic interruptions in the cycle of erosion. (200 Words) (15)
- (c) Write a short note on intrazonal Soils. (200 Words) (15)

Remarks

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