

GEOGRAPHY

Time Allowed: 3 hrs.

Max. Marks: 250

Instructions to Candidate

- There are Eight questions divided in two Sections.
- Candidate has to attempt FIVE questions in all.
- Question Nos. 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.
- Illustrate your answers with suitable sketches/maps and diagrams, wherever considered necessary. These shall be drawn in the space provided for answering the question itself.
- 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 answer book must be clearly struck off.

Name YASHARTH SHEKHAR

Mobile No. _____

Date 31/10/2021

Signature [Signature]

1. Invigilator's Signature _____

2. Invigilator's Signature _____

142

- Good attempt
- Very good grasp on geomorphology
- Some concepts related to environmental geography & climate change need to be clarified.
- Keep it up. You are on the road to 300+.

REMARKS

GS SCOF

SECTION-A

Attempt all questions:

1. Write short note on following in not more than 150 words:

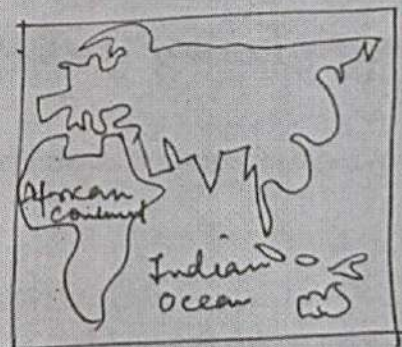
(10 × 5 = 50)

- Write a short note on different relief features on the earth's surface with suitable examples.
- Ocean bottom relief of Atlantic Ocean
- Write a Short note on Karst landforms.
- Geomorphic System
- Write a short note on 'Peneplain'

(a) As Gilbert argued earth is in dynamic equilibrium between tendencies to create vulnerability and tendencies to create uniformity and this leads to formation of many relief features.

I: 1st order relief feature — These includes Continents and oceans eg

African Continents, and Indian ocean

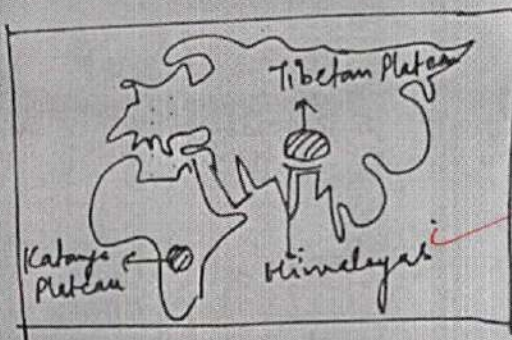


— formed due to cooling and consolidation and plate tectonic movement.

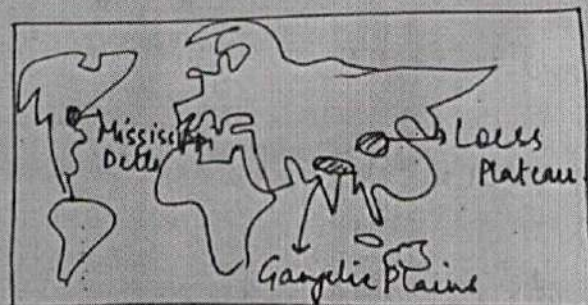
Remarks

II 2nd order relief features like mountains, plateau, plains except depositional plains
 eg. Tibetan Plateau in Asia, and Katanga Plateau of Africa; Himalaya Mountains, and Andes of South America

- formed due to orogenic and epeirogenic forces *good*



III 3rd order relief features - include those formed by agents of erosion eg. *deposition, residual, minor tectonic*
 Gangetic Plains, Mississippi Delta, *formed upon 2nd order features* or Loess Plateau.



All these features induce variability on earth's crust.

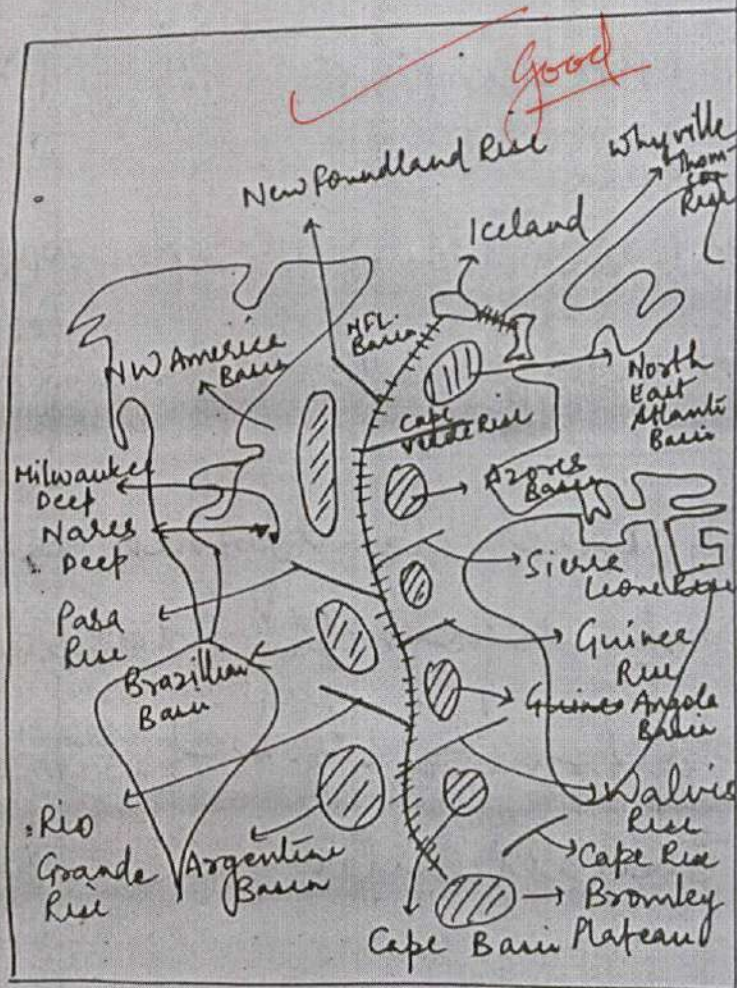
b) Atlantic Ocean is the 2nd largest ocean with ~~star~~ surrounded by Africa and Europe on the east and Americas on the west.

(i) Continental Shelves

Broad near Northern Europe include Dogger Bank

Broad near North East USA → New Foundland (NPL) all area around Plate Estuary in South America

NARROW near Western coast of Africa



(2) Ridge (i) Mid-Atlantic Ridge between Iceland and Bromley Plateau
(ii) Whyville Thomson Ridge

(iii) ~~III~~ Reykanees Rise

(iv) Pala Rise

(v) Walvis Rise

(vi) Cape Rise
etc

(3) ~~III~~ Basin (i) Brazilian Basin

(ii) Argentine Basin

(iii) Angole Basin

(IV) North West American Basin

(4) ~~IV~~ Deep → deeps are some

(i) Nahus deep &
Milwaukee deeps

(5) Islands

Continental
eg. New-
Foundland

Volcanic
eg. Antilles
St. Vincent

Coral
eg. Bahamas

(c) Karst landforms are found in area of topography dominated by limestone or dolomite. eg. Karst region of Yugoslavia.

Characteristic :

good

(1) thinly bedded and jointed
plains

(2) Area of moisture and water

(3) less vegetation

(4) Not excessively low or high rainfall

Landforms : of Erosion include

(i) Sinkholes - where stream disappears
eg. Gaping Ghyll of Yorkshire

Remarks

(iii) Polje → eg. in Yugoslavia → large depression

(iii) limestone cliff eg. Cheddar cliffs of England.

Other include Uvalas, Dry valleys, Swallow Holes etc

Depositional landforms

(i) Dripstones like Stalagmite and Stalactite of Onangade cave of Missouri or Siju Cave of Meghalaya

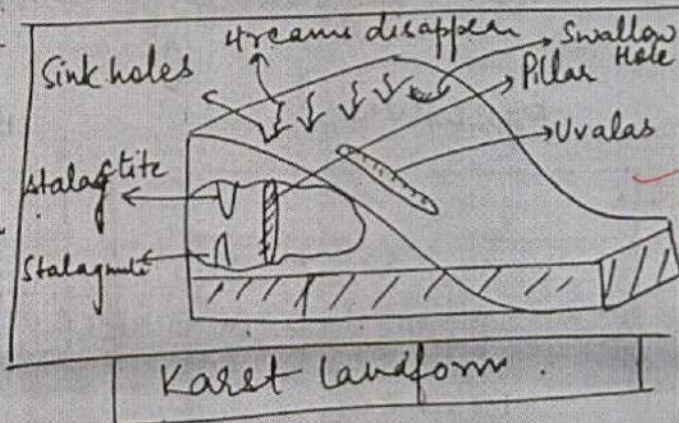
(ii) Curtain like feature formed from dripping CaCO_3 solution

(iii) limestone caves → eg. Siju Caves of Meghalaya

Main Process active

(i) Solution of limestone into carbonic acid

(ii) Hydraulic action of falling raindrops forming cliffs and other holes.



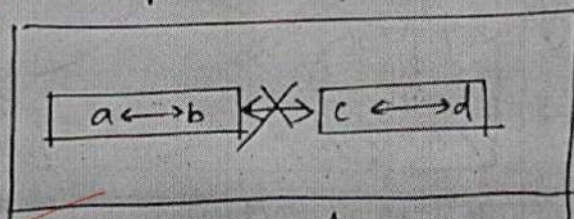
(d) Geomorphic system may be a closed or open system that works to maintain internal consistency.

It was described as a closed system ^{no input of energy & matter}

by geographers like W.M. Davis who thought that the system will undergo progressive and sequential change in form with no outside interaction.

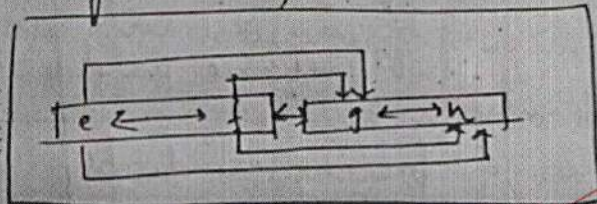
Geographers like J.T. Hack, AN Strahler or M. Morisawa described it as an open system with elements of the system interacting with outside world.

By Davis



closed system

By Gilbert, Hack, Strahler.



open system

Geomorphic system types

7
v. good

both energy & matter enter & leave the system

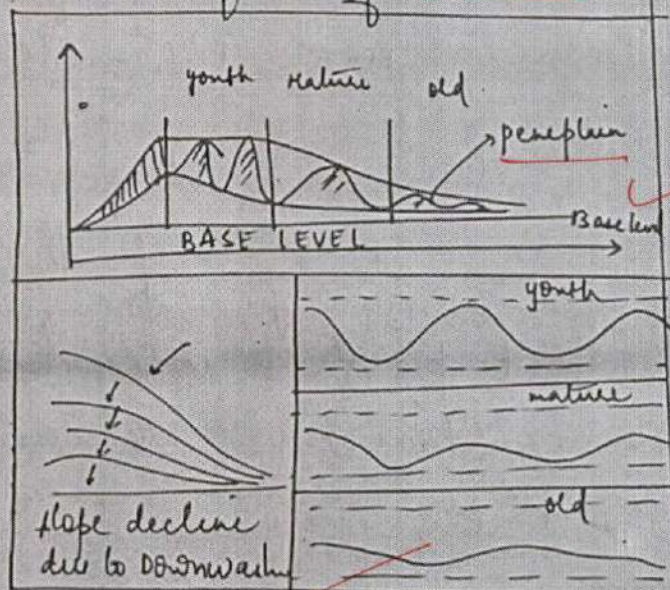
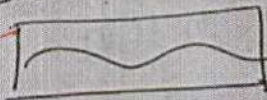
Any change may be induced in system but a geomorphic system has a tendency towards equilibrium and thus in the final form the sum of force/energy acting on any system is 0. [Gilbert] eg. a graded river is a geomorphic system. But if due to rejuvenation it is activated, it will work to restore the new graded profile.

Feedback
+ve
-ve

(e) Peneplain is the plain surface of maximum entropy found at the end stage of cycle of erosion by Davis.

Characteristics

(i) convexo-concave in nature



(ii) concave feature expand to the radius

Remarks

7

of curvature increase as time progresses

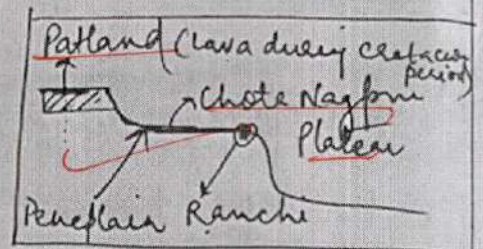
(iii) slope decline mechanism of formation
 (i) May be interrupted by resistant hillocks
 like Monadnocks

(v) featureless plane with no process acting on it

eg. South East of Orals

(2) Chota Nagpur Plateau is an
uplifted Peneplain

To study this peneplain,
 we use techniques like
Dendudational chronology



However there are many difficulties
 in the study of Peneplain

(i) Not present everywhere

(ii) technique of Dendudation chronology not
suitable everytime

Nevertheless, peneplain is a
 useful concept in the cyclic theory of
 landform development.

Remarks

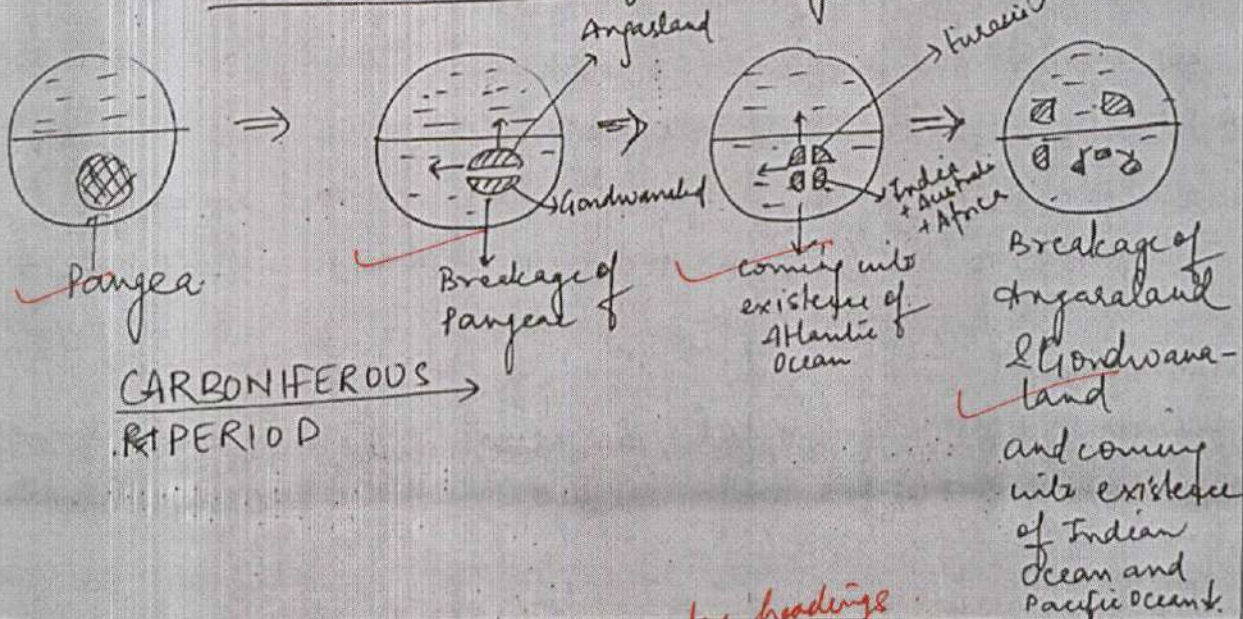
Answer the following questions:

- Discuss the various theories and models on evolution of continents and oceans. (250 Words) (20)
- Geomorphological technologies have increasingly influenced economic aspirations of Nations. Elaborate with suitable examples. (200 Words) (15)
- Critically examine the coral reef formation theory as proposed by Darwin. (200 Words) (15)

(a) Many theories and models have been given to explain the origin ^{and evolution} of continents and ocean. But most important are:

- Continental drift by Alfred Wegener (1912)
- Sea floor spreading - *Hess*
- Convectional current theory of Holmes
- Plate tectonic theory - *Wilson*

Continental Drift Theory by Wegener



Remarks

Divide your answer under headings

The theory went on to explain the present geographical existence of continental and gave evidences of geological similarity (rock of same age across continents), geographical similarity (SA), presence of tillite on South Africa, India and Australia, ~~horizontal~~ [Paleo-Paleo climatic evidence) along with presence of fossils of similar flora and fauna across continents eg. glossopteris flora ✓

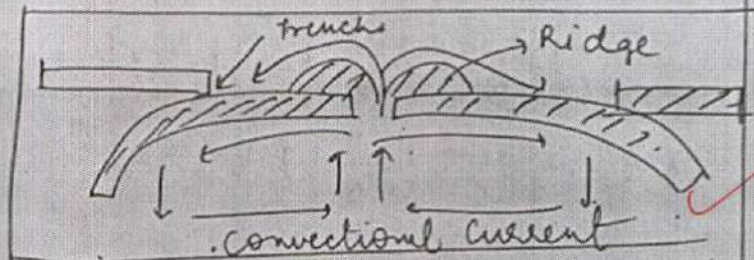
However, it was rejected because of many reasons like

- ① No true ~~geology~~ geographical similarity as proposed by Bullard
- ② Contradiction: At one point Wegner says Sialic masses drift over time, at other point he says, they have friction and cause mountain formation
- ③ Force — whether tidal or differential gravitation force not sufficient to cause drift.

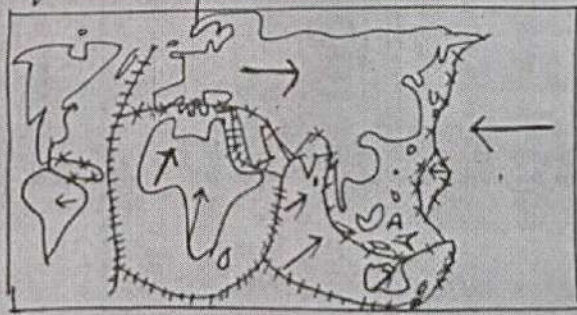
However, J.A. Steers believes the great idea of Wegner idea was acceptance of horizontal movement

Remarks

Wegener theory assumed ocean floors to be passive. However, H. H. Hertz and Harry Hess put forward the theory of sea floor spreading to explain the role of ridges and trenches and incorporate that the force of convectional current is responsible for plate movement [~~Arthur~~ Holmes]



Then came the plate tectonic theory which combined the role of continents (of Wegener) and ocean floor of Hess and force responsible of Holmes to argue that lithosphere is divided into slabs called plates and they are floating over semi molten asthenosphere and it is the interaction of these plate that lead to



formation of relief features like
mountain eg Himalayas (Convergent Plate)
Ridges eg Calsberg (Divergent Plate) and
Transform Plate eg. San Andreas Fault

(b) Resource is a function of
technology (Zimmerman) so if we
develop good tech then we can make
resources which were not exploitable,
exploitable.

7 eg. the recent development of
technology to exploit shale oil and gas
led to revolution in oil market which
not only crashes prices of petroleum but
also increased production of oil and
reduced dependence.

Remarks

Similarly, the tech development of extremely powerful submersible vehicle have led to the race for exploitation of polymetallic nodules in the EEZ of nations.

Link of us-geomorphological + technology & economy

The reason for all this are:

→ Mineral exploration & recovery

① Increase spending on R&D

→ Regional planning & development.

② Evolution of Industrial Revolution 4.0 and increasing reliance of next gen tech.

→ Engineering + construction need to be addressed.

③ Shortage of many rare earth minerals like Lithium for battery ⇒ increased creation of new exploitative tech.

④ Competition between powers like Turkey and Greece over exploitation of recently found natural gas in Eastern Mediterranean Sea

⑤ Declining levels of Petrol and coal and need to find new resource in time of climate change.

Implication

+ve

- ① help us resort climate change
- ② spillover effect of tech into different sector
- ③ Economic growth & dev.

-ve

- ① conflict eg. Turkey and Greece over oil/gas
- ② Exploitation at unsustainable pace of limited resource
- ③ limit marine ecological system with exploitation of PMN

The resource utilisation has to be on sustainable level and must not lead to geological / geo security threats

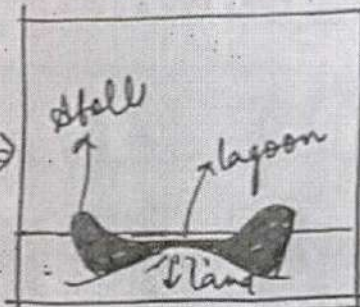
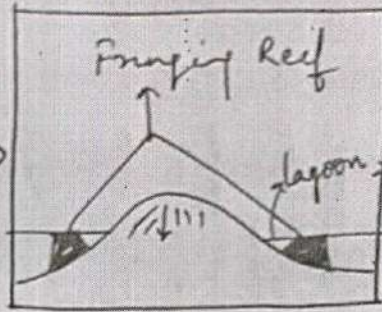
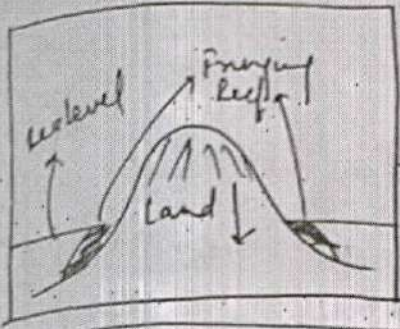
⑧

good

As per Darwin, the three type of reef i.e. Fringing Reef, Barrier Reef and Atoll are not separate element rather they are all part of an evolutionary cycle of Coral Reef i.e. stage in the formation of Atolls.

Remarks

→ 'Subsidence Theory'



Coral grow towards light

1st stage - Fringing Reef - formed on a stable land so they grow on seaward side as food is brought by ocean current now land starts subsiding →

2nd stage - Barrier Reef Now increased upward on part of coral to grow upward and outside. While on landward, erosion and weathering expand boat channel into a lagoon.

3rd stage - Atoll land goes completely under water and atolls are formed with a shallow lagoon in the middle.

Evidences

- (i) Shallow depth of lagoons of Atolls
- (ii) Absence of cliffs along coral island validates the idea of subsidence of land
- (iii) coast of island of Pacific ocean having raised beaches are devoid of barriers and Atolls
- (iv) Thickness of coral reefs increase downward

Remarks

Criticism

- ① If ~~At~~ Fringing Reef, Barrier Reef and Atolls are same process, then how are they found together e.g. Naisai Island of Fiji
- ② Acceptance of this theory should lead to submergence of all island in Pacific.
- ③ Darwin did not explain what cause subsidence (No Plate tectonic theory then)
- ④ Existence of coral on some emergence island e.g. Aldeabra Island.
- ⑤ No evidence of subsidence of Australia to suggest the formation of ^{Great} Barrier Reef.

However it is an important theory which was also supported by W.M. Davis.

Remarks

Answer the following questions:

- (a) Indian ocean is half an ocean, hence the behavior of the North Indian Ocean Currents is different from that of the Atlantic or the Pacific Ocean Currents. Discuss.
(250 Words) (20)
- (b) 'Structure is a dominant control factor in the evolution of the landforms'. Elaborate with suitable examples.
(200 Words) (15)
- (c) How geomorphology is useful in hazard management and in the urbanization. Discuss in the backdrop of some recent hazards.
(200 Words) (15)

Remarks

Remarks

GS SCORE

Remarks

Remarks

GS SCORE

Remarks

Remarks

GS SCORE

Remarks

Remarks

Answer the following questions:

- (a) What is Isostasy? Discuss the views of Airy and Pratt on Isostasy. (250 Words) (20)
- (b) Briefly analyse the difference in the models of slope evolution proposed by Davis and Penck. (200 Words) (15)
- (c) The successful implementation of the Sendai framework for disaster risk reduction for Urban areas lies on accurate collection of geomorphological information. Elucidate. (200 Words) (15)

(a) Isostasy refers to dynamic balance between standing feature, depressed features of earth when seen in context of fast rotating earth. How this balance is to be maintained is the subject matter of Isostasy.

View of Airy

As per Airy, all the crystal columns are made up of Sialic masses and have same density and they are floating over Sima.

Thus all crystal columns have same density and they form ROOT.

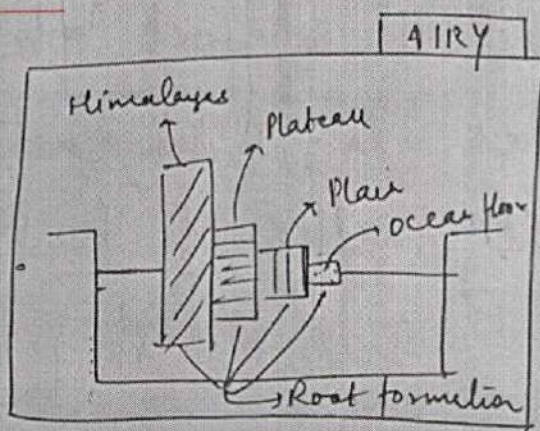
Remarks

Airy: varying depth, uniform density

in time depending upon their mass which depends upon their height (since all have same density).

The degree/length of root depends upon height of the crystal column.
 e.g. Himalayas will have deeper root as compared to plateau.

Criticism if this theory is accepted then Himalayas will have a root length of 81 km



by which depth it should melt. Therefore it is not totally accepted.

→ DOLY supported the idea of Airy
PRATT

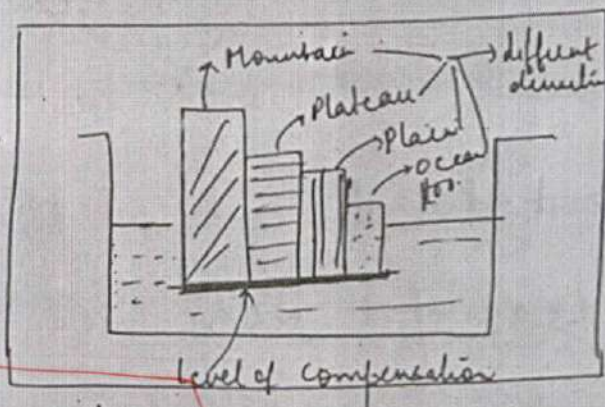
According to him, all crystal columns have different densities and all these different

Remarks

density exist above the "level of compensation" below which all the variation in densities is compensated and no difference exist below LOC in densities

"Hollow mountains"

- Pratt also believed that



density of a crystal column $\propto \frac{1}{\text{height}}$ so density will

ocean floor (s) > Plain > Plateau > Mountain

Criticism

Halford and Bowie supported the idea of Pratt

It was Heiskanen who combined the ideas of Pratt and Airy to give a more applicable model of isostasy. He supported the idea of root formation of Airy.

and differential density of Pratt, but not only densities differed from column to column but also within the column as density increases toward the bottom.

(b) Davis and Penck gave two famous model of landscape this developed and embedded within the two model was idea of slope evolution.

DAVIS

PENCK

① Model called Slope decline

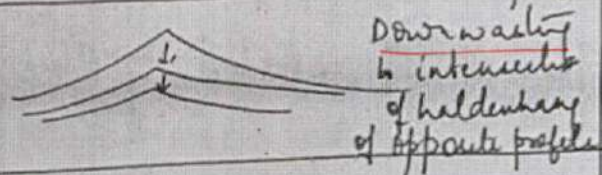
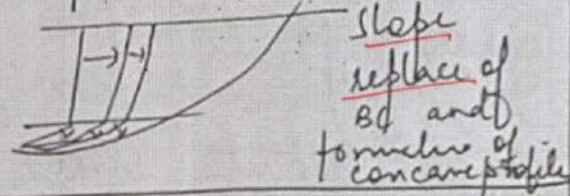
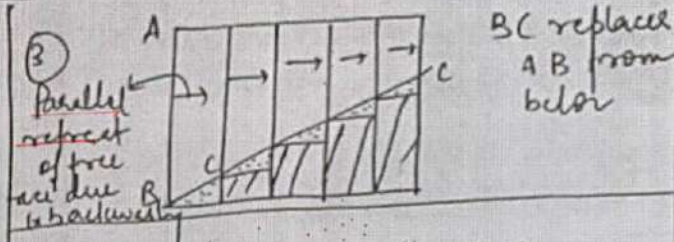
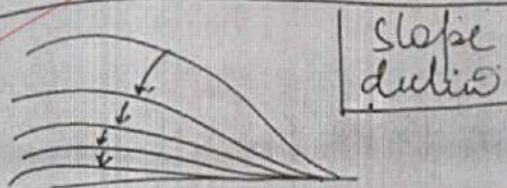
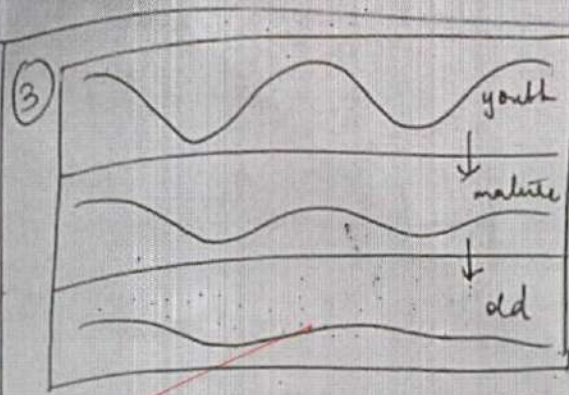
① Model called Slope Replacement theory

② Result slope decline happens due to "Downwasting" by weathering and erosion.

② Slope replacement is initially due to backwasting and later due to downwasting

Remarks

9
V. good



④ The end product is called Peneplain and has a convex-concave profile

④ the end product is Endorumpf and the has a a concave profile punctuated by an inselberg.

⑤ the slope evolution is the result of progressive and sequential change of landform through time time-dependent.

⑤ the slope evolution displays the salvo of intensity between force of variability and forces of uniformity time independent.

⑥ Davies was criticised for assumption of rapid uplift and crustal stability

⑥ He was criticised by H. Mortensen that if rockfall did not happen instantaneously then theory becomes ineffective + assⁿ of equal erosion on all the far points of free face is wrong.

Question demands answer in the context of urban areas specifically

Recent Examples needed.

⑥ Geomorphology and disaster management are related as many disaster are

result of a particular geomorphology
dispensation eg. Himalayan earthquake are
 caused by a particular geomorphical
 makes up.

Sendai Frameworks: banks upon 4-5
 aspects

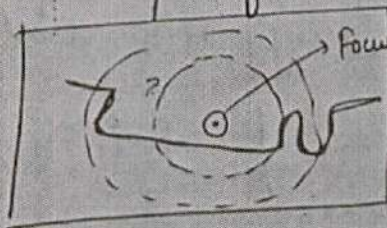
① Understanding Disaster Risk

② DRR (Disaster Risk Reduction) - structural
 measures

③ DRR → Non-structural measures

④ Capacity Building

⑤ All these 4 components can
 be exemplified using concepts from the
 information of geomorphology. Let's take
 an example of case study of Earthquake in
Nepal in 2015.



Focus
 Nepal
 Earthquake

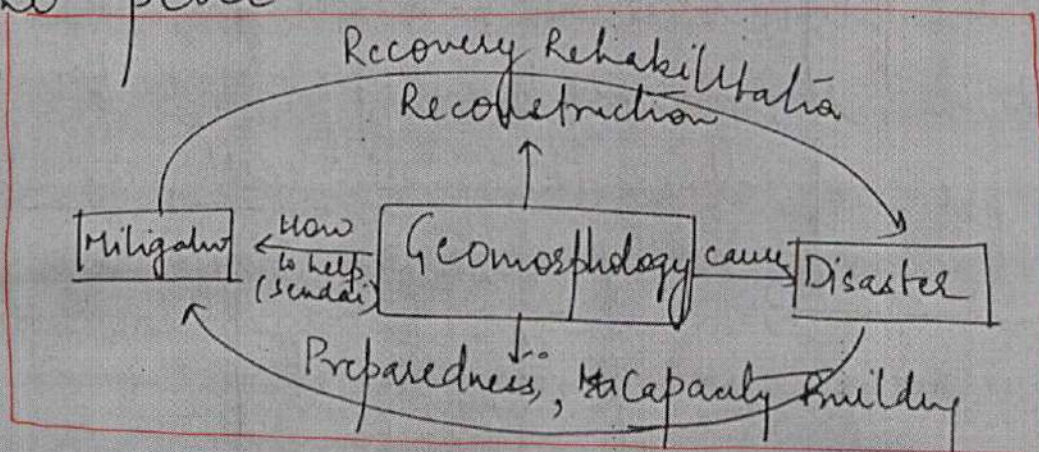
① Understanding Disaster Risk by analysing what caused earthquake in Nepal? Was it because of Plate movement or because of a reservoir e.g. Koyana earthquake

② DRR - Structural measure - What type of measure is a function of knowledge of geomorphology as we know that earthquake happen in Nepal so we must build earthquake resistant houses, create laws for that

③ DRR - Non-Structural measure - again with the collection of knowledge we create laws, institutions and personnel to enforce effective management of hazard of earthquake in Nepal

④ Capacity differ on type of risk. With knowledge of geomorphology and risk associated with a particular area we can teach/prepare people for particular scenarios e.g. in case of earthquake hiding beneath desk, Mock drills etc

Thus we see each step to manage disaster is the function of nature of information about geomorphology of the place



Remarks

SECTION-B

Attempt all questions:

5. Write short note on following in not more than 150 words:

(10 × 5 = 50)

- Ekman Transport
- Write a short note on 'Development of Palimpsest Landscapes'.
- Write a short note on 'Normal Cycle of erosion'.
- Elastic Rebound Theory of earthquake.
- Write a short note on 'Ocean deposits'.

Explain in the context of
ocean currents.
Mechanism of spiral
transport with detailed
diagram.

(Q) Ekman Transport is the phenomena described by Ekman for movement of particles in fluid eg. Air movement and ocean.

It simply states that with increasing distance from the source of friction, whether ocean current movement or wind movement, Coriolis force acting differently resulting in differential movement of fluids.

4

In ocean it indicates the

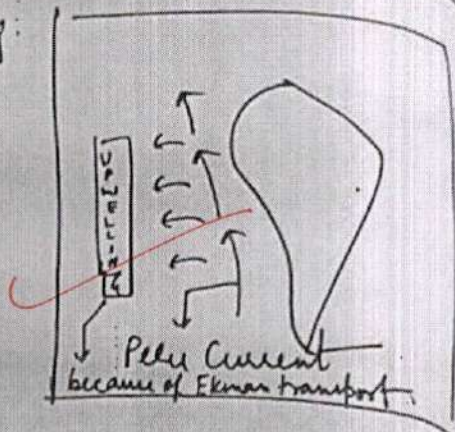
"Net movement of ocean water" eg.

- Significance of Ekman Tx is also needed

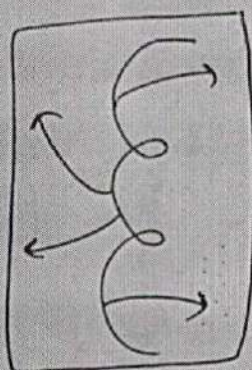
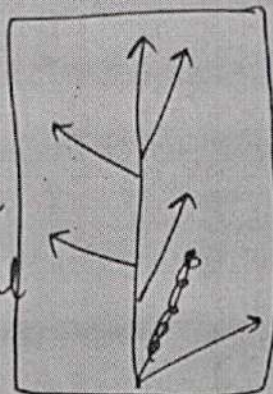
Remarks

With respect to air,
the movement different as
distance from the ground
differs because of different
frictional level.

eg:



eg. different
wind direction
due to differential
coriolis force



on account of differential frictional energy

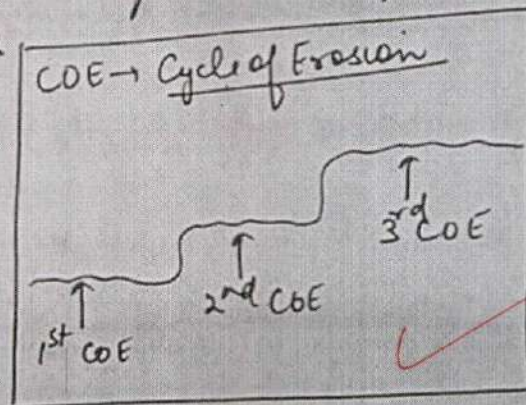
Remarks

→ Landforms of different ages → Relict, Actively Building & Regenerated.

GS SCORE

(b) Palimpsest topography is that topography that retains the imprints of previous cycle of erosion. It is a topography/landscape that has been written, erased and rewritten. Good

It derived its validity from idea of "Historical evolution" of landscape by Davis' Theory of landscape Development. However, since it takes time for one cycle of erosion to be completed, it is usually not found.



✓ as in Belan area near Allahabad we

find 3 Erosional surface : ① Kaimur surface (1200m-1400m)

② Panna (800-900m)

③ Rewa (600-800m)

All are part of different cycle of erosion.

Remarks

Technique include

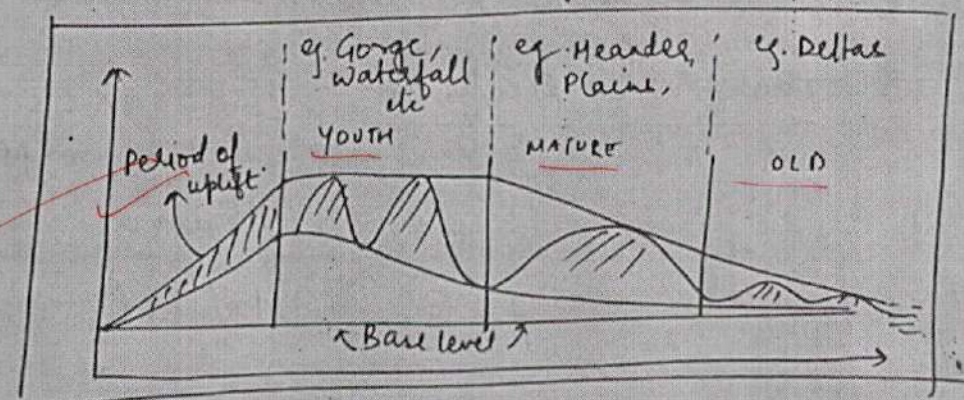
① Identifying Erosional surface

- (i) Altimetric frequency Histogram curve
- (ii) Superimposition
- (iii) Field check

② Dating using Radiometric dating, height correlation, sequence of sedimentation etc

However, many geographers believe the study of Palimpsest Topography to be a deductive and conjecture.

③ Normal Cycle of erosion was given by Davis using water as erosive agent as it is found in all the climates (Disputed by L.C. King)

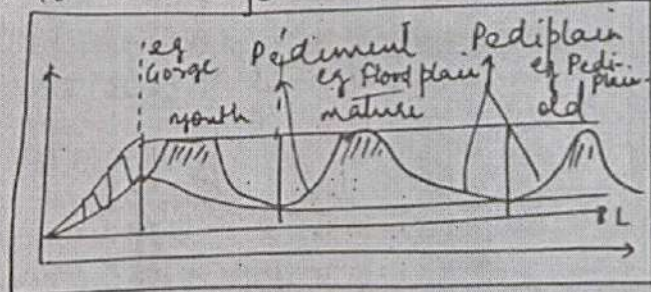


Remarks

youth stage	Mature Stage	old stage
Main work - <u>Valley deepening</u> (ii) <u>Relative Height increase</u> (iii) <u>Transporting capacity</u> > material to be transported eg. Gorge, Waterfall and Rapid formed which recede headward etc. V-shaped valley.	Main work - <u>Valley widening</u> (ii) <u>Relative Height decrease</u> as <u>absolute relief falls</u> due to <u>weathering</u> and <u>erosion</u> etc. (iii) <u>Deposition</u> also takes place and <u>deepening of valley reduces</u> eg. Meanders, levees, Flood Plains etc.	Main work <u>DEPOSITION</u> (ii) <u>Relative Height of relief is least</u> (iii) <u>Water divides almost null</u> (iv) <u>Deposition</u> leads to formation of <u>Deltas</u> etc. eg. <u>Ganga delta</u>.

good.

LC King considered Normal Cycle to be active in And & Semi And Area and he gave his own concept of Normal cycle of erosion based on experiences of Savanna region.



However it is still the Davis' cycle of erosion that command major acceptance.

Remarks

(d) Earthquake is the sudden shake of earth which leads to release of large amount of energy and loss of life and property

One the Elastic Rebound Theory of H F Reid argues: that rocks inside earth

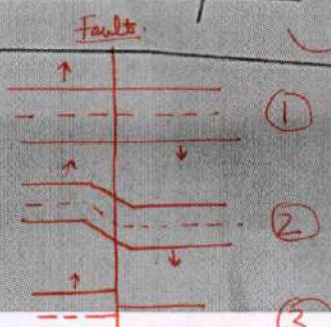
(i) Rocks inside earth have elasticity

(ii) Because of endogenic forces / press/pull, they are stretched (deformed)

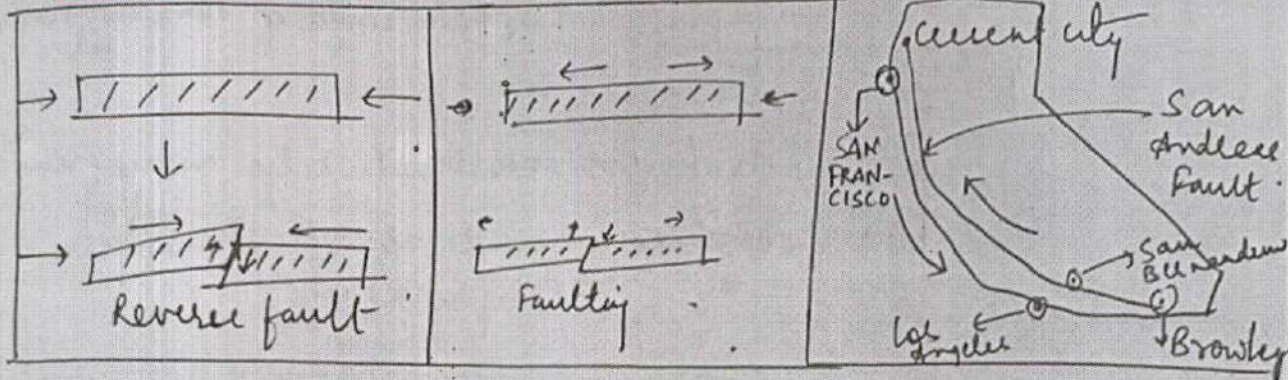
(iii) When the force of stretching exceeds elasticity of the rock, the rocks undergo breakage

(iv) the rock then try to attain the pre previous position it was at and this rebound of elastic rock to its original place of existence causes earthquake.

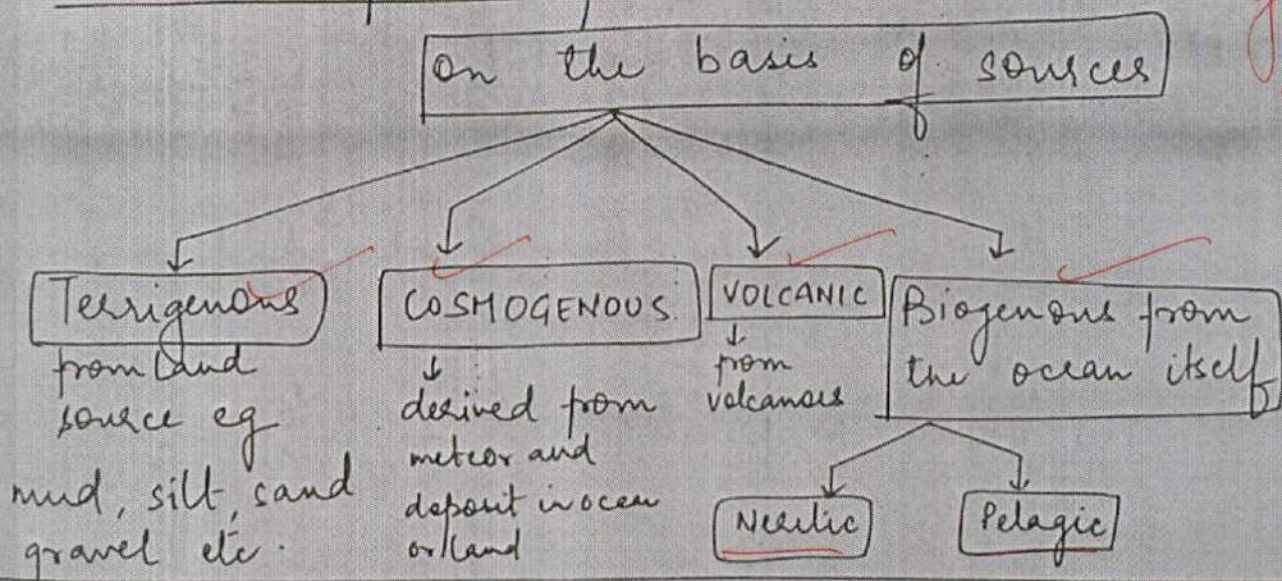
Remarks



H.F. Reid explains the San Francisco EQ of 1906 on the basis of this theory along the San - Andreas Faultline



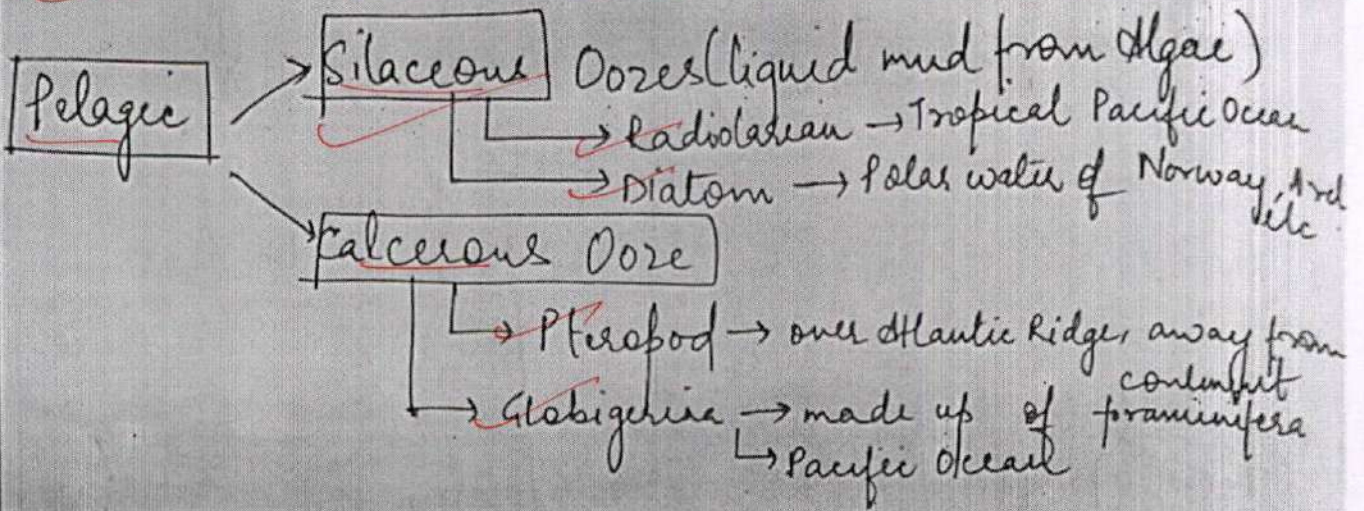
(e) Ocean deposits are unconsolidated marine deposits found on the surface of ocean ranging from Continental shelves, slope and deep sea plain:



7
good answer

Remarks

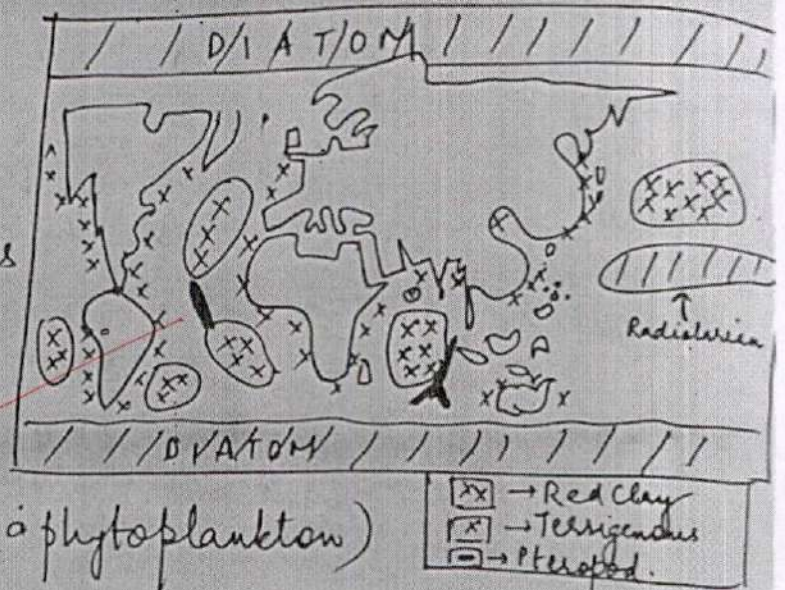
Neritic - from skeleton of plants and animal and at shallow water. eg Caribbean Sea



Importance

(i) source of energy
eg. Polymetallic nodules

(ii) source of food for marine organism especially Diatom (a phytoplankton)



(iii) they affect the movement of ocean current and tides.

However, they have also led to conflict eg. over Exclusive Economic Zone over Polymetallic nodules or exploiting energy resources.

Remarks

Answer the following questions:

- (a) Explain the concept of polycyclic landforms and present an analytical study of the polycyclic landforms of any selected region. (250 Words) (20)
- (b) Write the difference between tidal currents and tidal bores. Discuss the importance and utilization of tidal currents. (200 Words) (15)
- (c) Discuss the various stages of formation of river valleys. Also discuss the major activities involved in their development. (200 Words) (15)

Remarks

Remarks

GS SCORE

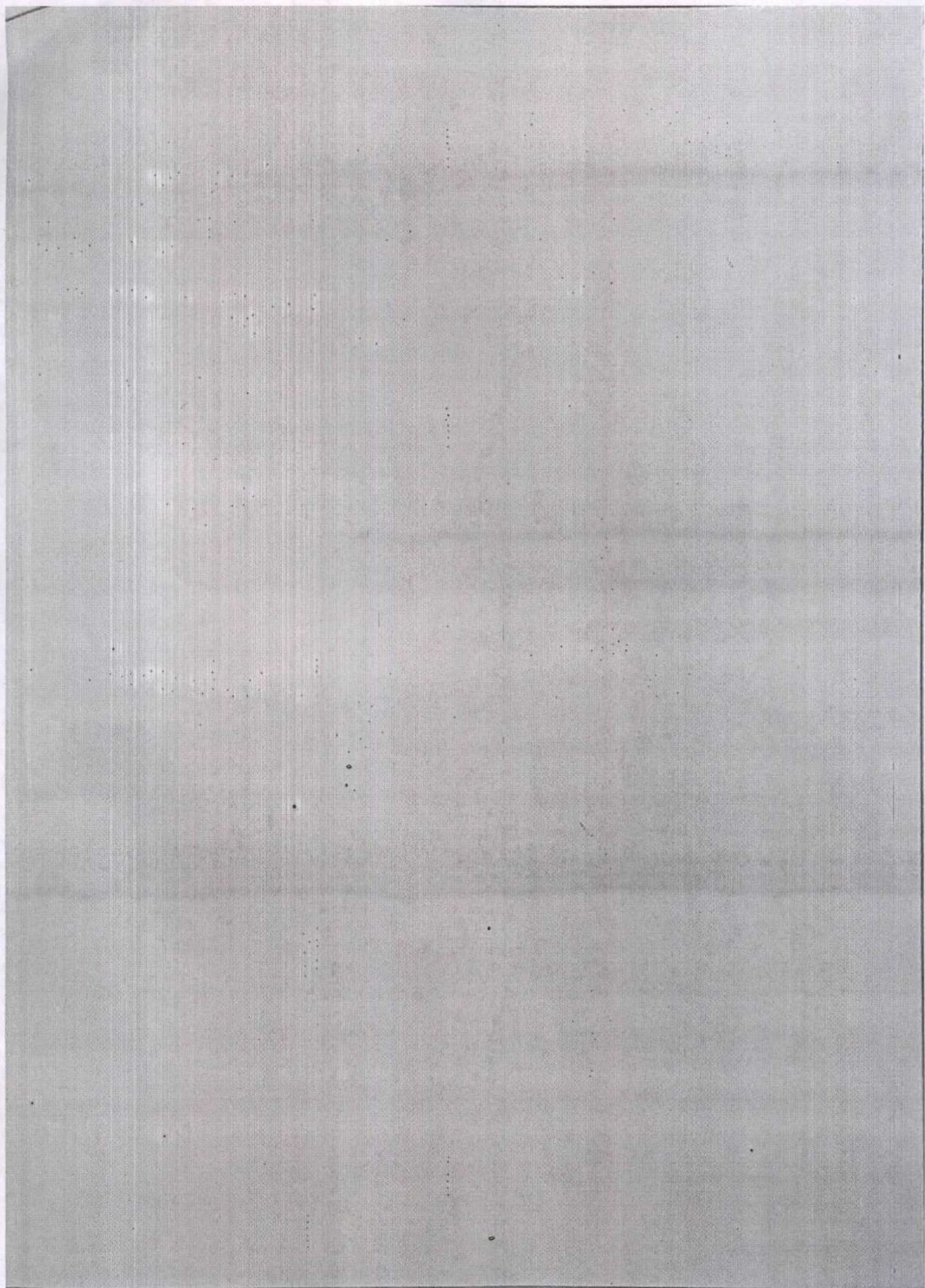
Remarks

Remarks

GS SCORE

Remarks

Remarks



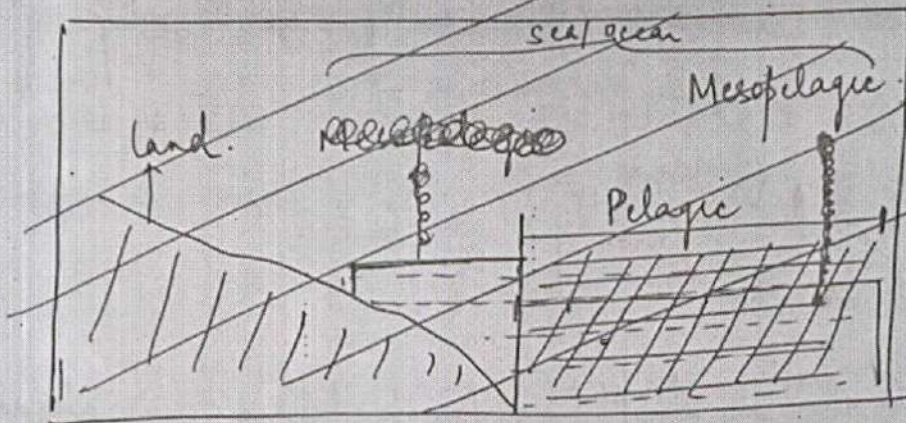
Remarks

7. Answer the following questions.

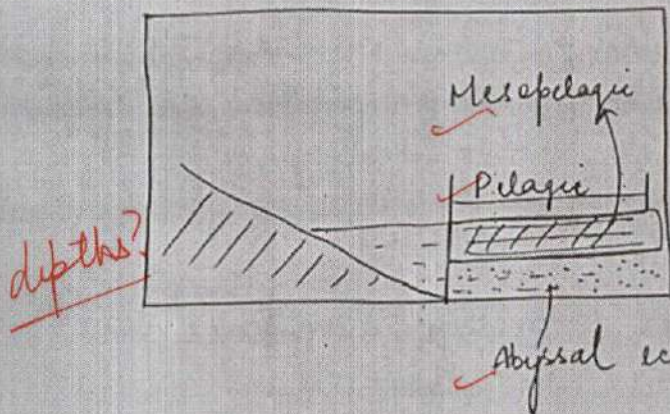
- (a) Any disruption to the abyssal ecosystem of the ocean significantly impacts pelagic and mesopelagic ecosystems. Discuss with respect to deep sea mining. (250 Words) (20)
- (b) Compare the views of W.M. Davis and Penck on the cycle of erosion. (200 Words) (15)
- (c) Discuss the Ocean plastic pollution problem and its effect over marine environment. How recent COVID-19 pandemic is intensifying this problem. (200 Words) (15)

PWM 2021

(a)



8
more clarity is needed.



Abyssal ecosystem lies at the deepest level above which lies the Mesopelagic and above which lies pelagic system.

Bathypelagic

Now Abyssal ecosystem helps Meso and Pelagic system in many ways:

- ① It is the source of nutrient for meso and pelagic system.

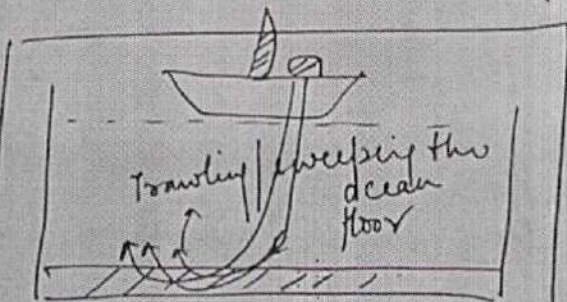
Upwelling

Remarks

- ② It houses many species which come to pelagic system for nutrition.
- ③ It influence ocean current and tides and waves which benefit pelagic system.
- ④ It is responsible for productivity of pelagic system which is necessary for food security of India.

Deep sea Mining happens in abyssal system wherein deep sea trawler or other machines are used to exploit the ocean floor for resources. This harm mesopelagic and pelagic systems in many ways:

- ① It reduce the nutrient supply the of the mesopelagic and pelagic system.



Remarks

Disposes mining tailings -
disrupts sunlight + plankton
growth → prevents food online
marine food chain.

leading to reduced production of food
and this affect the meso and pelagic
food cycle and food chain.

establish close correlation

(2) It increases the turbidity of water,
especially mesopelagic system which
affect marine life badly eg. as happened
in East coast of Sri Lanka.

(3) It leads to release of large volume of waste
including microplastic which blocks the
- nasal cavities of fisheries and organism

fish have gills

→ mining debris
blocks the food trapping
mechanism of abyssal
organisms

(4) It disturbs the distribution of
water temperature gradient between
meso and pelagic system which hurt
the ecosystem badly.

(5) Sound pollution of advanced machine hurt
animal which use echolocation

Light pollution

(6) It will destroy the primary productivity
(7) Many time so radioactive metals buried are exposed

which hurt animal life

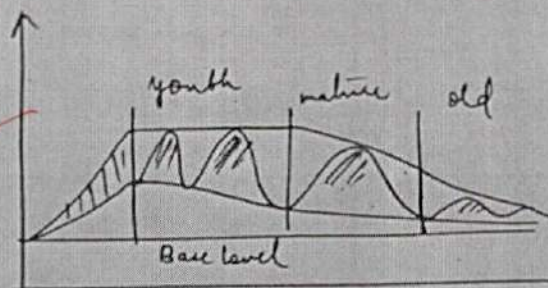
SDG 14 - talk about life under water and we need to sustainable utilize ocean for inter-generational parity.

(b) Davis and Penck proposed two very famous model of landform development

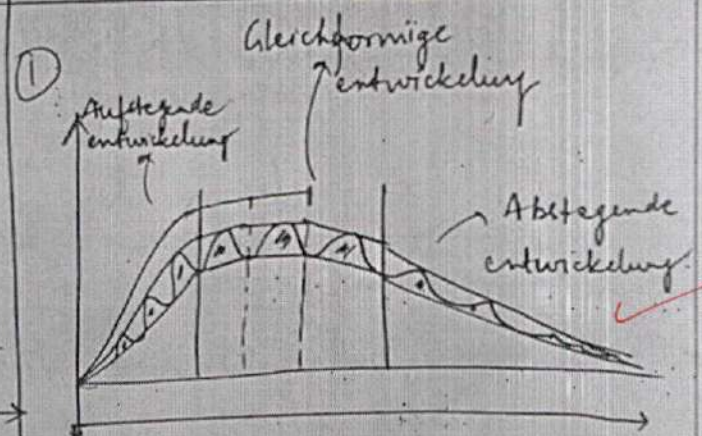
Davis

Penck

① Diagram



② Rapid period of uplift [shorter]
no erosion



② Initially slow, later ~~rapid~~ and long period of uplift. [longer]

Remarks

③ Erosion starts after Rapid uplift

④ Assume long crustal stability period

⑤ Time as a process
to argue for slow and gradually and progressive change of landform from youth to mature to old.
(Historical development, Time dependent model)

⑥ use of word "Stage"

⑦ End product →
Peneplain is concave
Concave in nature

⑧ Peneplain once formed does not undergo change

③ Erosion starts as soon as upliftment occurs

④ No such thing is assumed.

⑤ Landform development is the function of the ratio of intensity of endogenic forces and exogenic forces.
(Historical development)
(Time independent model)

⑥ use word "Phase"

⑦ End product → End rumpf.
→ concave in nature

⑧ Slope replacement keep on start with every

⑧ ⑨ slope development
through slope
decline

⑩ Criticised for

① ass^m of long
crustal stability

② Erosion after
upliftment
etc

successive epeirogenesis

⑨ Slope development
through slope
replacement

criticised for

① confusing terminology

② contradictory view

③ long ass^m rate of
upliftment

However both theories
are very important indicators in the
development of geomorphology

(c)

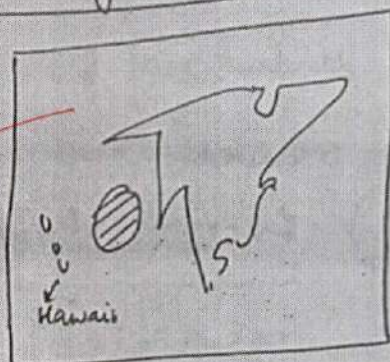
Plastic pollution in ocean is
the result of two sources - activities
within ocean like cruise, drilling, deep

Remarks

X

see many etc and activities on land
like consumption, production etc
all these plastic enter ocean by river,
or estuaries etc. ~~The R~~

One such example of case
study is Great ^{Plastic} Pacific Garbage ^{Patch} ~~Zone~~ in
Eastern Pacific where plastic
as old as of 1960s is found.



Impact

(on marine environment)

- ① It get stuck on the nostril/fine/gills of marine organisms killing them.
- ② It enter food chain and then by process of biomagnification become dangerous for all food from ocean. (45% of global protein from marine sources)
- ③ It destroys the sea aesthetics of marine environment hurling tourism and source of income of people.

→ Affects productivity of marine ecosystems

- (4) It destroys the nature of ocean water by changing ambient temperature and pressure and salinity condition of ocean

→ alters oceanic behaviour, substantial upwelling

(5)

COVID 19 and plastic pollution

- ① Diversion of attention away from plastic pollution has led to increase in discharge into ocean

- ② Increased use of syringes / blood bags / medicine sachet and improper disposal

⊗ has the potential to create new problem

- ③ Due to increase because to mine mineral to supplement energy needs post covid 19 demand revival will lead to enhance plastic usage and problem

correlation?

SDG 14 talks about sustainable development of life under water and

Plastic Waste Management Rules 2021 are in that spirit

Remarks

packaging delivery industry pandemic ↓ plastic use

8. Answer the following questions:

- (a) What is geomagnetism? Explain and discuss the causes of geomagnetism and also explain how geomagnetism helps us to understand some aspects of the earth's crust?
(250 Words) (20)
- (b) The landforms formed in glacial and peri-glacial areas vary across space and time despite being proximately located. Discuss.
(200 Words) (15)
- (c) 'Oceanic water is saline, but salinity is not same everywhere'. Elaborate this statement with suitable examples.
(200 Words) (15)

Remarks

Remarks

GS SCORE

Remarks

Remarks

GS SCORE

Remarks

Remarks

GS SCORE

Remarks

Remarks