Q.1) Consider the following pairs.

Types of volcano	Example
1. Composite	Hawaiian
2. Shield	Mt. Vesuvius
3. Fissure type	Deccan traps
4. Caldera	Krakatoa

Which of the above pairs is correctly matched?

a) 1 and 3 only
b) 1, 2 and 3 only
c) 3 and 4 only
d) All the above

Q.1) Solution (c)

Composite Type Volcanic Landforms

- They are conical or central type volcanic landforms.
- Along with andesitic lava, large quantities of pyroclastic material and ashes find their way to the ground.
- Andesitic lava along with pyroclastic material accumulates in the vicinity of the vent openings leading to formation of layers, and this makes the mounts appear as composite volcanoes.
- The highest and most common volcanoes have composite cones.
- They are often called strato – volcanoes.
- **Stromboli 'Lighthouse of the Mediterranean', Mt. Vesuvius, Mt. Fuji etc. are examples.**

Shield Type Volcanic Landforms

- The **Hawaiian volcanoes** are the most famous examples.
- These volcanoes are mostly made up of basalt, a type of lava that is very fluid when erupted.
- These volcanoes are not steep.
- They become explosive if somehow water gets into the vent; otherwise, they are less explosive.
- **Example: Mauna Loa (Hawaii).**

Fissure Type Flood Basalt Landforms [Lava Plateaus]

- Sometimes, a very thin magma escapes through cracks and fissures in the earth's surface and flows after intervals for a long time, spreading over a vast area, finally producing a layered, undulating (wave like), flat surface.
- Example: **Deccan traps (peninsular India), Snake Basin, U.S.A, Icelandic Shield, Canadian Shield etc.**

Caldera Lake

- After the eruption of magma has ceased, the crater frequently turns into a lake at a later time. This lake is called a 'caldera'. Example: **Krakatao in Indonesia.**

Do you know?

Andesitic or Acidic or Composite or Stratovolcanic lava

- These lavas are highly viscous with a high melting point.
- They are light-colored, of low density, and have a high percentage of silica.
- They flow slowly and seldom travel far before solidifying. The resultant cone is therefore steep sided.
- The rapid solidifying of lava in the vent obstructs the flow of the out-pouring lava, resulting in loud explosions, throwing out many volcanic bombs or pyroclasts.
- Sometimes the lavas are so viscous that they form a spine or plug at the crater like that of Mt. Pelee in Martinique.

THINK!

- Basic or Basaltic or Shield lava.

Q.2) Consider the following statements about earthquakes.

1. The foci of earthquakes along mid-ocean ridges are deep seated one.
2. The foci of earthquakes along alpine-Himalayan belt are at shallow depth.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.2) Solution (d)

Shallow focus earthquakes are called crustal earthquakes as they exist in the earth's crustal layer. Shallow focus earthquakes (most common at submarine ridges. Hardly felt). **Examples are earth quakes at mid-ocean ridges.**

Deep focus earthquakes are known as intra plate earthquakes, as they are triggered off by collision between plates. **Benioff zone is a zone of seismicity** corresponding with the down-going slab in a subduction zone **(Convergent Boundary).** Deep focus earthquakes (Occurs at trenches – convergent boundary. Very powerful. **Japan lies along trench line.** Hence it faces devastating earthquakes). **Examples are alpine-Himalayan belt**

Shallow-focus earthquakes occur at **depths less than 70 km**, while deep-focus earthquakes occur at **greater focal depths of 300 – 700 km.**

Shallow focus earthquakes are found within the earth's outer crustal layer, while deep focus earthquakes occur within the deeper subduction zones of the earth.

Shallow focus earthquakes are of smaller magnitudes, of a range 1 to 5, while deep focus earthquakes are of higher magnitudes, 6 to 8 or more.

Do you know?

- **Isoseismic Line** A line connecting all points on the surface of the earth where the intensity is the same.

THINK!

- Seismic waves.

Q.3) Which of the following are the chemical weathering processes?

1. Solution
2. Carbonation
3. Hydration
4. Salt weathering

Select the correct answer using the codes given below.

a) 1, 2 and 3 only
b) 2, 3 and 4 only
c) 1 and 2 only
d) All the above

Q.3) Solution (a)

Chemical Weathering Processes

- A group of weathering processes viz; solution, carbonation, hydration, oxidation and reduction act on the rocks to decompose, dissolve or reduce them to a fine state.
- Water and air (oxygen and carbon dioxide) along with heat speed up all chemical reactions.

Physical Weathering Processes

- Physical or mechanical weathering processes depend on some applied forces like (i) gravitational forces (ii) expansion forces due to temperature changes, crystal growth or animal activity; (iii) water pressures controlled by wetting and drying cycles.

Salt Weathering is a physical weathering process

- Salts in rocks expand due to thermal action, hydration and crystallization.
- Many salts like calcium, sodium, magnesium, potassium and barium have a tendency to expand.
- High temperature ranges in deserts favour such salt expansion.
- Salt crystals in near-surface pores cause splitting of individual grains within rocks, which eventually fall off. This process of falling off of individual grains may result in granular disintegration or granular foliation.

Do you know?

Significance of weathering

- Weathering is **the first step in formation of soils.**
- Weathering of rocks and deposits helps in the **enrichment and concentrations** of certain valuable ores of iron, manganese, aluminium, copper etc.
- Weathering helps in soil enrichment.
- Without weathering, the concentration of the same valuable material may not be sufficient and economically viable to exploit, process and refine. **This is what is called enrichment.**

THINK!

- Mass movement

Q.4) Which of the following are the necessary conditions for the formation of deltas?

1. The river must have large load.
2. Presence of large lakes on the river course.
3. Presence of shallow adjoining sea or continental shelf.

4. Strong currents running at right angles to the mouth of the river.

Select the correct answer using the codes given below.

a) 1 and 4 only
b) 1 and 3 only
c) 1, 2 and 3 only
d) All the above

Q.4) Solution (b)

The following are necessary conditions for formation of river delta

- **The river must have large load**. This will be possible if there is active erosion in the upper and middle stages.
- There should not be extensive deposition in the middle stage e.g**. presence of lake in between or high evaporation rate (first).**
- The river's load must be deposited faster than it can be removed by the action of currents and tides i.e no strong current should be at right angle to the mouth of the river.
- Presence of **shallow adjoining sea or continental shelf.**
- The velocity of a river must be sufficiently low to allow most of its load to be deposited in the river's mouth.

Do you know?

A delta is formed by a combination of two processes:

- load-bearing capacity of a river is reduced as a result of the check to its speed as it enters a sea or lake, and
- clay particles carried in suspension in the river coagulate in the presence of salt water and are deposited.
- The finest particles are carried farthest to accumulate as bottom-set beds.

THINK!

- Types of deltas.

Q.5) Consider the following pairs.

Plateau types	Examples
1. Intermontane	Tibetan plateau
2. Volcanic	Columbian-snake plateau
3. Dissected	Bolivian plateau

Which of the above pairs/is are correctly matched?

a) 1 only
b) 1 and 3 only
c) 1 and 2 only
d) All the above

Q.5) Solution (c)

Plateaus enclosed by mountains are called as Intermontane Plateaus, they include the highest, largest and in many respects most complex plateaus of the world.

Examples: Tibetan plateau, Bolivian plateau, Mexican plateau.

Volcanoes also form several varieties of plateaus. The largest are built by the lava flow. Smaller, degraded plateaus are formed by the resistant lava caps that protect the land from erosion and maintain its high elevation after the surrounding land has been worn away.

Examples: Antrium plateau, north-western part of Deccan plateau, Columbia-snake plateau.

A dissected plateau is a plateau area that has been severely eroded so that the relief is sharp.

Examples: Scottish Highlands etc.

Do you know?

Deccan Plateau

- Deccan Plateau is a large plateau which forms most of the southern part of India.
- It is bordered by two mountain ranges, the Western Ghats and the Eastern Ghats.
- The plateau includes the Deccan Traps which is the largest volcanic feature on Earth.
- Made of multiple basalt layers or lava flows, the Deccan Traps covers 500,000 square kilometers in area.
- The Deccan Traps are known for containing some unique fossils.

- The Deccan is rich in minerals. Primary mineral ores found in this region are mica and iron ore in the Chotanagpur region, and diamonds, gold and other metals in the Golconda region.

THINK!

- Plateaus and Minerals.

Q.6) consider the following pairs.

Plateaus	Major mineral
1. Kimberley	Gold
2. Katanga	Copper
3. Laurentian	Iron ore
4. Mexican	Silver

Which of the above pairs/is are correctly matched?

a) 1 and 3 only
b) 1 and 4 only
c) 2 and 4 only
d) All the above

Q.6) Solution (d)

Kimberley Plateau

- Lies in the northern part of Australia.
- This plateau is made of volcanic eruption.
- Many minerals like iron, gold, lead, zinc, silver and diamond are found here.
- **Diamond is also found here.**

Katanga Plateau

- It is lying in Congo.
- **It is famous for copper production.**
- Other minerals like Cobalt, Uranium, Zinc, Silver, Gold and Tin are also mined here.

Laurentian Plateau

- Lying in the eastern part of Canada, it is a part of Canadian Shield.
- Fine quality of iron-ore is found here.

Mexican Plateau

- It is called as 'Mineral Store'. Different types of metallic minerals like silver, copper etc. are obtained from here.
- World's biggest silver mine Chihuahua is situated in the plateau.

Do you know?

Patagonian Plateau

- It is a Piedmont plateau (Arid Landforms) lying in southern part of Argentina.
- **It is a rain shadow desert plateau.**
- It is an important region for sheep rearing.

THINK!

- Types of plains

Q.7) Consider the following statements.

1. Wular Lake (Jammu & Kashmir) is the largest freshwater lake in India, formed by tectonic activity.
2. Lonar in Maharashtra is a volcanic lake.
3. Lake Chilka is an erosional lake.
4. Nagarjun Sagar lake is man-made lake.

Which of the above statements is/are correct?

a) 1, 2 and 3 only
b) 2 and 4 only
c) 1 and 4 only
d) All the above

Q.7) Solution (c)

Tectonic lakes

- Due to the warping (simple deformation), subsidence (sliding downwards), bending and fracturing (splitting) of the earth's crust, tectonic depressions occur. (We have studied all these terms in previous posts)
- Such depressions give rise to lakes of immense sizes and depths.
- They include Lake Titicaca, and the Caspian Sea.
- **Wular lake in India formed by tectonic activity.**

Lakes Formed by Volcanic Activity

- Crater and caldera lakes
- During a volcanic explosion the top of the cone may be blown off leaving behind a natural hollow called a crater.
- This may be enlarged by subsidence into a caldera.
- In dormant or extinct volcanoes, rain falls straight into the crater or caldera which has no superficial outlet and forms a crater or caldera lake.
- **Example: Krakatao in Indonesia.**

Man-made lakes

- Besides the natural lakes, man has now created artificial lakes by erecting a concrete dam across a river valley so that the river water can be kept back to form reservoirs.
- **Example: Lake Mead above the Hoover Dam on the Colorado River, U.S.A., Nagarjun Sagar Lake.**
- Man's mining activities, e.g. tin mining in West Malaysia, have created numerous lakes. Inland fish culture has necessitated the creation of many fishing-lakes.

Lakes due to Marine deposits

- Also called Lagoons.
- **Example: Lake Chilka**

Note- Lonar lake initially believed to be of volcanic origin was created by a meteor impact during the Pleistocene Epoch and it is the only known hyper velocity impact crater in basaltic rock anywhere on Earth.

Do you know?

Rift valley lakes

- A rift valley is formed when two blocks of earth move apart letting the 'in between' block slide downwards. Or, it's a sunken land between two parallel faults.
- Rift valleys are deep, narrow and elongated. Hence the lakes formed along rift valleys are also deep, narrow and very long.
- Water collects in troughs (Valley in the rift) and their floors are often below sea level.
- The best-known example is the East African Rift Valley which runs through Zambia, Malawi, Tanzania, Kenya and Ethiopia, and extends along the Red Sea to Israel and Jordan over a total distance of 3,000 miles.
- **It includes such lakes as Lakes Tanganyika, Malawi, Rudolf, Edward, Albert, as well as the Dead Sea 1,286 feet below mean sea level, the world's lowest lake.**

THINK!

- Fresh water lakes of India.

Q.8) Which of the following statements regarding Rift Valleys are correct?

1. They are formed due to Continental – continental divergence.
2. They have flat bottom topography.
3. Himalayan rivers make Rifts Valleys in their old age.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.8) Solution (a)

Rift Valley

A rift valley is linear-shaped lowland between several highlands or mountain ranges created by the action of a geologic rift or fault. A rift valley is formed on a divergent plate boundary, a crustal extension or spreading apart of the surface, which is subsequently further deepened by the forces of erosion. When the tensional forces were strong enough to cause the plate to split apart, a center block dropped between the two blocks at its flanks, forming a graben. The drop of the center creates the nearly parallel steeply dipping walls of a rift valley when it is new. That feature is the beginning of the rift valley, but as the process continues, the valley widens, until it becomes a large basin that fills with sediment from the rift walls and the surrounding area. One of the best known examples of this process is the East African Rift.

Note: Himalayan rivers do not form a rift valley. Rift valley is a secondary landform and is formed because of endogenic forces and not due to erosion.

Q.9) Which of the following are evidences of Continental Drift provided by Wegener?

1. Jig Saw fit of the continents across Atlantic.
2. Similar age and crystal structure of rocks found on East of S. America and West coast of Africa.
3. Similar fossils of Aquatic animals found on the East coast of S. America and West Coast of Africa.

4. Presence of Periglacial landforms in Polar Regions.

Select the code from following:

a) 1 and 2
b) 3 and 4
c) 1, 2 and 3
d) All of the above

Q.9) Solution (a)

Evidences in support of continental Drift

(i) **"Jig saw" fit-** Wegener was struck by the geographical similarity between the opposite coasts of the atlantic ocean.the outlines of the two coasts appears to be the detached portion of the other ie. The east coast of north and South America can be exactly fit into the left coast of Africa and Europe.

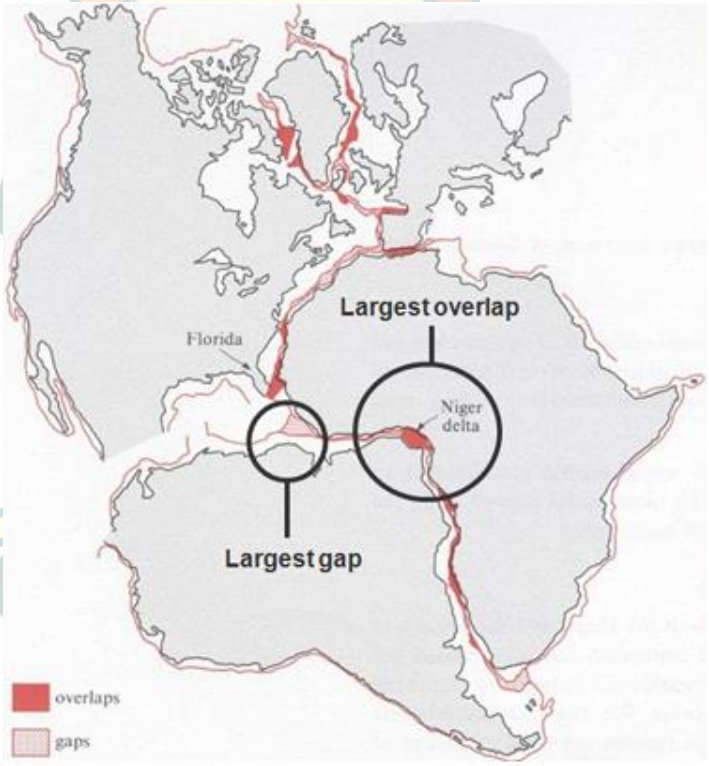


Fig: showing the Jig – saw fit

(ii) **Geological structure-** there is remarkable similarity in geological structure along the two coasts of Atlantic. The best example is provided by the Appalachian mountains of north America which come right up to the coast and continue their trend across the ocean in old Hercynian mountains of south west Ireland, Wales

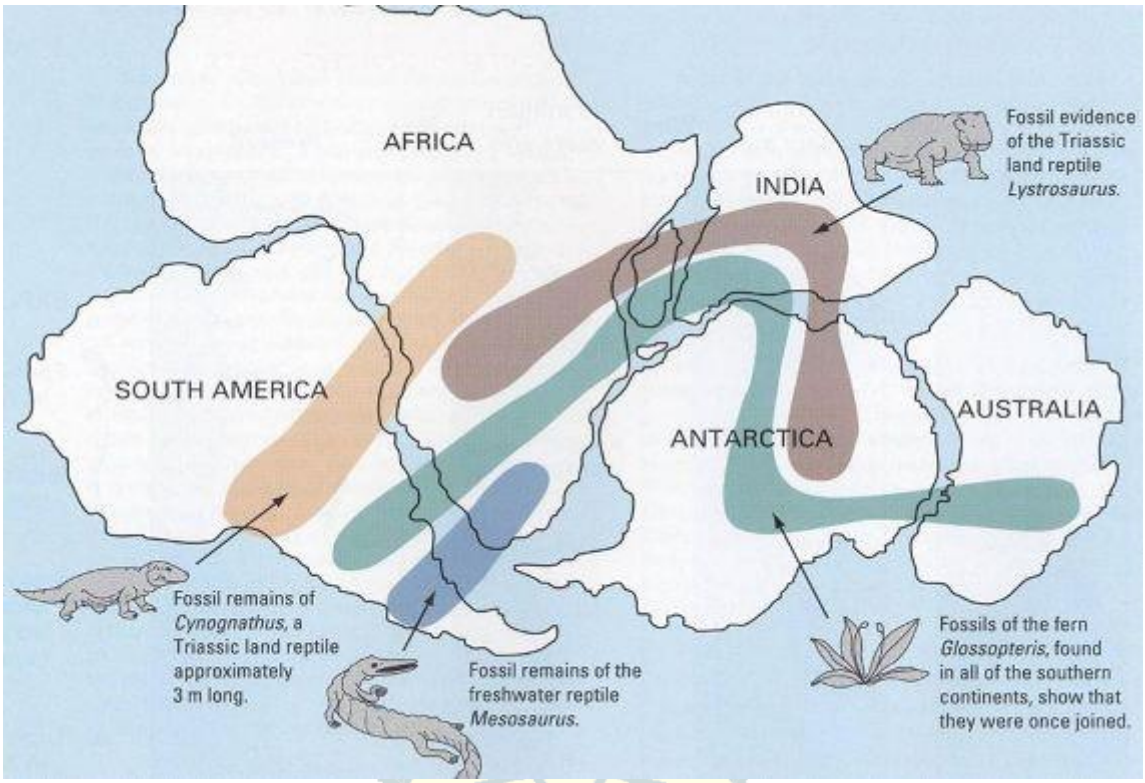
and central Europe. The opposite coasts of Africa and Brazil display even greater resemblance in their structure and rocks.

Fig: Similar Geological structure

(iii) **Permo-carboniferous glaciations-** it presents a strong proof that at one point of time these land masses were assembled together , since the evidences of this glaciation are found in Brazil, Falkland island, South Africa, Indian peninsula as well as Australia. It is difficult to explain these extensive glaciations on the basis of existing distribution of landmass and water. According to Wegener at the time of Pangaea, the South Pole was situated near Durban of the present coast of south Africa.

(iv) **Similar Fossil** remains of terrestrial animals are found on both coasts of the Atlantic. This cannot be possible if the two landmasses were not joined as it quite impossible for these animals to swim across the Atlantic.

Note: Here the term 'terrestrial' is important. Had they been marine they would have swam across the ocean. But it is hardly possible for a terrestrial animal to swim across the ocean to die on the other coast.



(v) The migratory pattern of some animal species also hints towards the joined land mass. For example the entire lemming (a rodent) population crosses the North America and falls in the Atlantic. This is estimated that they have not forgotten their route, when the landmasses were joined, the might have travelled to Europe and central Asia.

Note: 3rd and 4th statements are incorrect because in 3rd statements 'Aquatic' animals are given. It should be terrestrial animals. In 4th statement the region should be equatorial and not polar.

Q.10) Continental drift theory is currently the most accepted theory to explain the shape of earth's surface and formation of landforms. Which of the following statements according to Plate Tectonic theory are correct?

1. The lithosphere is broken in fragments called plates and they are moving with respect to each other over Aesthenosphere.
2. The forces responsible for movement of plates are gravitational pull of the moon and earth's rotation.

Select the code from following:

a) 1 only
b) 2 only

c) Both 1 and 2
d) Neither 1 nor 2

Q.10) Solution (a)

Plate Tectonic Theory:

The term plate tectonics was first used by **Tuzo Wilson** of the University of Toronto but the theory of plate tectonics was first published by **W. J. Morgan** of the Princeton University in 1962. This theory is based on the concept of 'sea- floor spreading' advocated by Hess. It is an improvement over the Wegener's continental drift theory and has been considered as the most sophisticated and comprehensive theory about the drift of continents and expansion of sea floors.

According to this theory **the lithosphere is believed to have been broken into fragments which are in constant movement with respect to each other**. The movement of these plates is attributed to the convention currents being generated in upper mantle. The margins of the plates are the sites of considerable geologic activity such as sea floor spreading, volcanic eruptions, crustal deformation, mountain building and continental drift.

Q.11) Which of the following landforms are associated with Oceanic – Oceanic plate convergence?

1. Oceanic trench
2. Oceanic ridge
3. Volcanic island chain
4. Folding mountains

Select the code from following:

a) 1 and 2
b) 2,3 and 4
c) 1 and 3
d) All of the above

Q.11) Solution (c)

Note: Study the following table very carefully. If you can understand and remember the following table, you will be able to explain the formation of all the secondary reliefs.

Plate boundary		Plate movement	seafloor	Events observed	examples
Divergent plate boundaries	Ocean - ocean	apart	Forms by seafloor spreading	Ridge forms at spreading centre. Plate area increases. Many small volcanoes and earthquakes	Mid atlantic ridge, east pacific rise
	Continent -continent		New ocean basin may form as the continent split	Continent drifts apart, ocean may intrude. Formation of rift valleys and block mountains	East African rift.
Convergent plate boundary	Ocean - continent	together	Destroyed at subduction zones	Dense oceanic lithosphere plunges beneath less dense continental crust. Earthquake traces path of down moving plate as it descends into asthenosphere. A trench is formed. Subducted plate partially melts and magma rises to form continental volcanoes.	Western South america
	Ocean - ocean		Destroyed at	Denser crust plunges into	Aleutians

			subduction zone	lighter crust and is subducted forming a curved trench and a volcanic arc.	
	Continent-continent		**NA**	Collision between masses of gigantic continental lithosphere. Neither mass is subducted. Plate edges are compressed, folded and uplifted	Himalayas, alps
Transform plate boundary		Past each other	Neither created nor destroyed	A transform fault is formed where plates move past each other. Strong earthquakes along the fault	San Andreas fault.

Q.12) Which of the following are necessary conditions for generation of Tsunami waves?

1. Earthquake
2. Vertical displacement of water in ocean
3. Fast wind speed on the surface of the ocean

Select the code from following:

a) 1 only
b) 1 and 2
c) 1 and 3
d) All of the above

Q.12) Solution (b)

Tsunamis:

The seismic waves travelling through the ocean and sea water results into high sea waves which are known as tsunamis. 'Tsunami' is a Japanese term which has been universally adopted to describe a large seismically generated sea wave. These waves are responsible for causing considerable destruction in certain coastal areas where submarine earthquakes occur.

Pre – conditions for Tsunami:

For a Tsunami to occur, two conditions are required:

- There should be an earthquake from which energy can be transferred.
- There should be a vertical displacement of the water. i.e. during earthquake the crust should move vertically. That's why Tsunamis are originated near oceanic trenches where plates are being subducted. In Atlantic Ocean, a number of earthquakes occur on Mid – Oceanic ridge but since there is no sudden vertical movement, Tsunamis are not formed. Tsunamis can also be triggered if seamounts break. This can cause vertical displacement of water.

Q.13) Which of the following statements is/are correct regarding Reverse Faulting?

1. It occurs due to compression force.
2. There is net destruction of surface in case of Reverse faulting.

Select the code from following:

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.13) Solution (c)

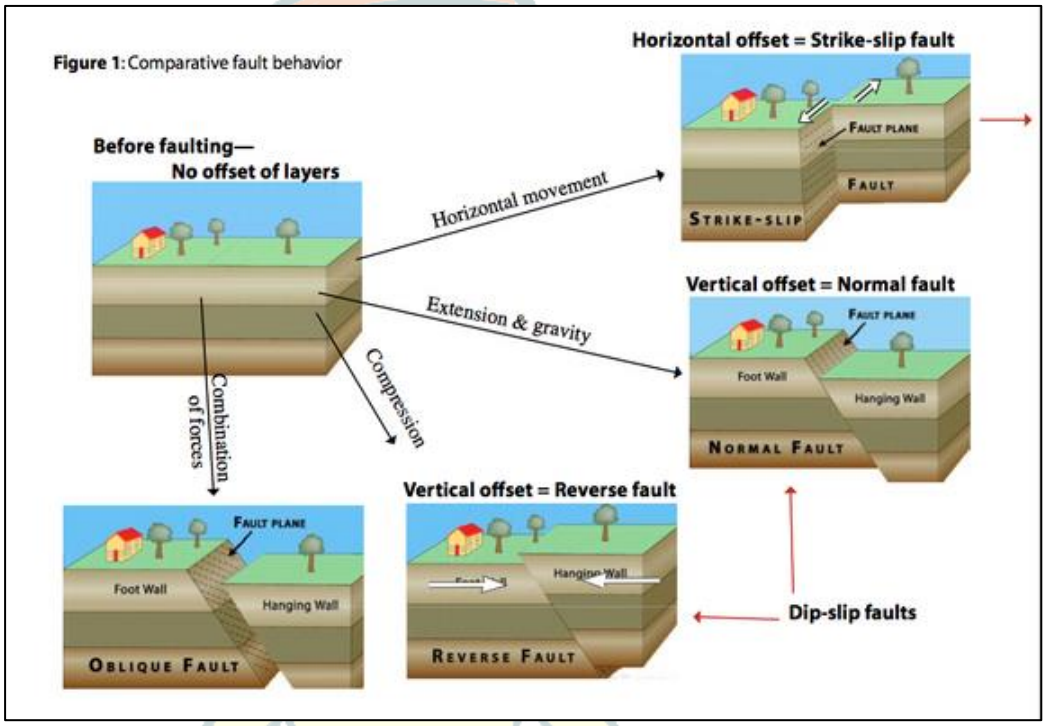
Faults:

A fault is a fracture in the earth's crust due to tension force. It can also occur due to compression in hard and brittle rocks.

- When there is tension the crust ruptures. One block is thrown upwards and the other downwards. The upthrown block is called **Horst** while the downthrown block is called **Graben**. The line along which the fault occurs is called strike. This fault is

called normal fault and is most common. In case of a normal fault, new surface is generated in the form of scarp.

- When there is compression, in case of hard rocks instead of folding, the faulting occurs. The block with hanging wall is thrown upwards while the one with footwall is thrown downwards. This is called a reverse fault. In case of a reverse fault there is net destruction of the surface.
- When the forces are acting parallel to each other, along the line of fault the blocks move past each other without being upthrown or downthrown. This is called lateral fault.



The landforms formed due to faulting of land are block mountains, rift valleys, step mountains, hinge faults, scissors fault etc.

Q.14) Which of the following landforms are formed by the erosional action of Glaciers?

1. Fjords
2. Areti
3. Cirque
4. V – shape Valley
5. Moraines

Select the code from following:

a) 1,2 and 3
b) 2,3 and 4
c) 2,3 and 5
d) All of the above

Q.14) Solution (a)

Erosional landforms of Glaciers

Cirque/Corrie

- Hollow basin cut into a mountain ridge.
- It has steep sided slope on three sides, an open end on one side and a flat bottom.
- When the ice melts, the cirque may develop into a tarn lake.

Glacial Trough

- Original stream-cut valley, further modified by glacial action.
- It is a 'U' Shaped Valley. It at mature stage of valley formation.
- Since glacial mass is heavy and slow moving, erosional activity is uniform – horizontally as well as vertically.
- A steep sided and flat bottomed valley results, which has a 'U' shaped profile.

Hanging Valley

- Formed when smaller tributaries are unable to cut as deeply as bigger ones and remain 'hanging' at higher levels than the main valley as discordant tributaries.
- A valley carved out by a small tributary glacier that joins with a valley carved out by a much larger glacier.

Arete

- Steep-sided, sharp-tipped summit with the glacial activity cutting into it from two

Horn

- Ridge that acquires a 'horn' shape when the glacial activity cuts it from more than two sides.

D-Fjord

- Steep-sided narrow entrance-like feature at the coast where the stream meets the coast.
- Fjords are common in Norway, Greenland and New Zealand.

THINK!

- Why fjords are very good fishing grounds?

Q.15) Match the following in correct sequence:

Land forms	Features
1. Rivers	A. Interlocking Spurs
2. Desert	B. Bergschrund
3. Glacier	C. Stacks
4. Karsts	D. Yardangs
	E. Stalagmite

1-2-3-4

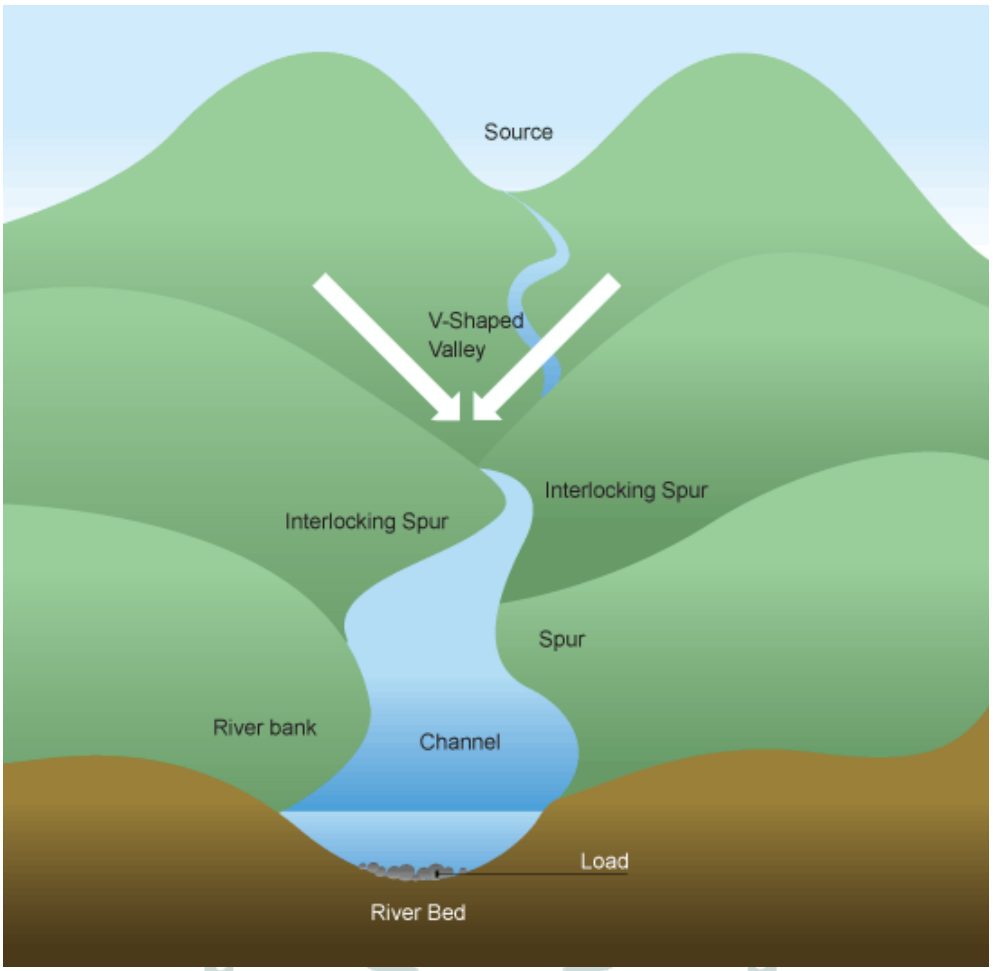
a) C-B-D-E
b) A-D-B-E
c) A-B-C-E
d) A-C-D-B

Q.15) Solution (b)

Interlocking Spurs:

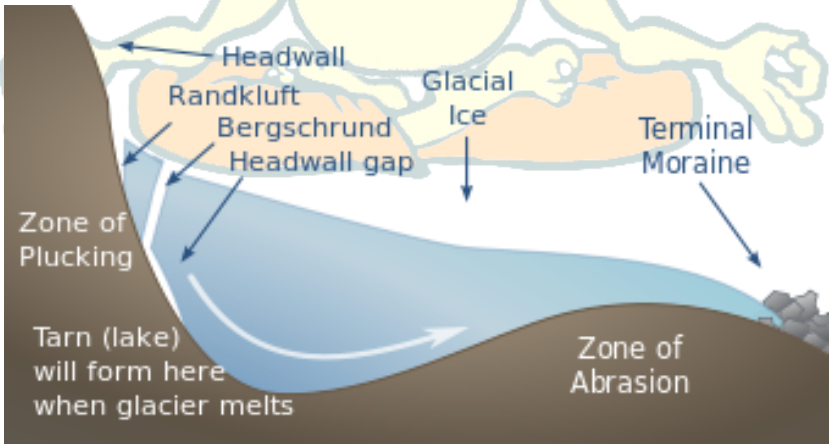
Spurs are ridges of hard rock, which a river is forced to wind around as it passes downstream in the upper course as is cannot erode the hard rock.

Interlocking spurs are formed when the river is forced to swing side to side around the spurs of hard rock which interlock as you look at the river.



Bergschrund

Bergschrund, (German: "mountain crevice"), a crevasse or series of crevasses often found near the head of a mountain glacier. The erosion of the rock beneath a bergschrund contributes to the formation of a cirque.



Stacks:

A stack or sea stack is a geological landform consisting of a steep and often vertical column or columns of rock in the sea near a coast, formed by wave erosion.

Stacks are formed over time by wind and water, processes of coastal geomorphology. They are formed when part of a headland is eroded by hydraulic action, which is the force of the sea or water crashing against the rock.

Yardang

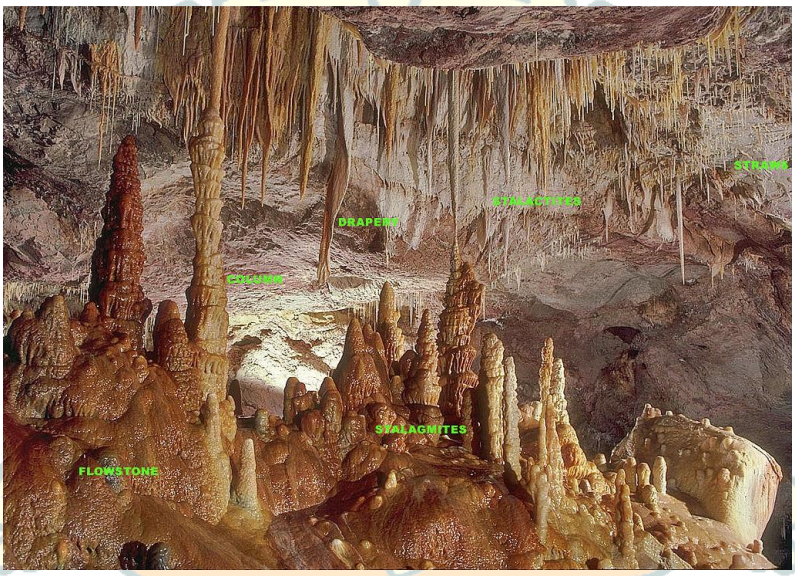
A yardang is a streamlined protuberance carved from bedrock or any consolidated or semiconsolidated material by the dual action of wind abrasion by dust and sand, and deflation which is the removal of loose material by wind turbulence.

Yardangs become elongated features typically three or more times longer than wide, and when viewed from above, resemble the hull of a boat. Facing the wind is a steep, blunt face that gradually gets lower and narrower toward the lee end.

Yardangs are formed by wind erosion, typically of an originally flat surface formed from areas of harder and softer material. The soft material is eroded and removed by the wind, and the harder material remains. The resulting pattern of yardangs is therefore a combination of the original rock distribution, and the fluid mechanics of the air flow and resulting pattern of erosion.

Stalagmite

A stalagmite is a type of rock formation that rises from the floor of a cave due to the accumulation of material deposited on the floor from ceiling drippings. Stalagmites may be composed of lava, minerals, mud, peat, pitch, sand, sinter and amberat (crystallized urine of pack rats).



Q.16) Consider the following:

1. Mesas and Buttas are associated with arid areas.
2. Peneplains are associated with humid conditions.
3. Dissected plateaux are associated with humid areas.

Which of the statements given above is/are correct?

a) 1 only

b) 2 only
c) 1 and 2 only
d) 1, 2 and 3

Q.16) Solution (d)

Mesas and Buttas are associated with arid areas, whereas Dissected plateaux are associated with humid areas.

Peneplains are associated with humid conditions, whereas Pediplains are associated with arid and semi-arid conditions.

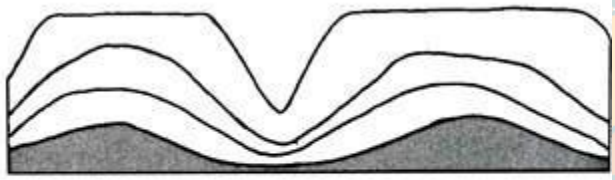


Fig. 24 Peneplain
In the formation of a peneplain in humid conditions the hills are both lowered and worn back to give an undulating lowland

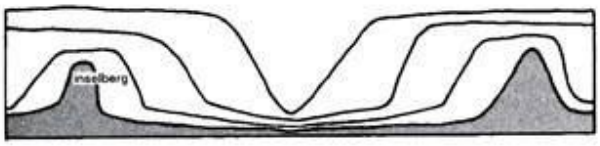


Fig. 25 Pediplain
In the formation of a pediplain in arid or semi-arid conditions the hills are worn back to form a gently sloping plain but some steep hills remain. These are called inselbergs

Do you know?

A plateau that is eroded and broken into numerous smaller pieces becomes a dissected plateau.

A dissected plateau is a plateau area that has been severely eroded so that the relief is sharp. Such an area may be referred to as mountainous, but dissected plateaus are distinguishable from orogenic mountain belts by the lack of folding, metamorphism, extensive faulting, or magmatic activity that accompanies orogeny.

THINK!

- Different landforms of wind and water erosion in Deserts

Q.17) Consider the below statements in regard to different seismic waves:

1. Earth quake are the zone of seismicity where surface waves are the most destructive.
2. P and S waves both forms shadow zones and shadow zone of P waves is larger than that of S wave.
3. Shadow zones forms due to varying refractive indexes of different layers of earth.

Which of the statements given above are correct?

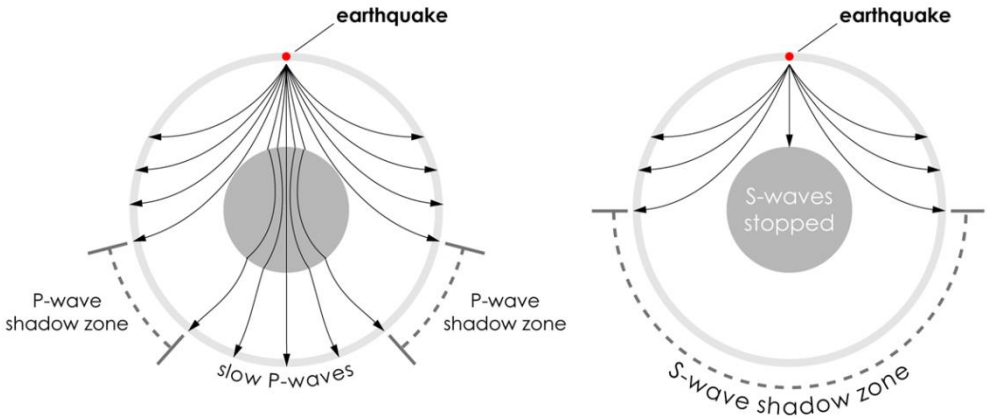
a) 1 and 2 only
b) 1 and 3 only
c) 2 and 3 only
d) 1, 2 and 3

Q.17) Solution (b)

P and S waves both forms shadow zones, however, shadow zone of S wave is larger than that of P wave. Hence, statement (2) is wrong.

P-waves move faster and are the first to arrive at the surface. These waves are of high frequency. They can travel in all mediums.

Statement (1) and (2) are correct. Surface Waves also called as long period waves. They are low frequency, long wavelength, and transverse vibration. These waves are responsible for most the destructive force of earthquake.



Q.18) Which of the following is/are the characteristic features of the convergent plate boundary?

1. Formation of zone of progressively deeper earthquakes.
2. Formation of chain of volcanic islands.
3. Shortening and thickening of the plates within the collision zone.

Choose the correct answer using the codes below:

a) 1 and 2 only
b) 2 and 3 only
c) 2 only
d) 1, 2 and 3

Q.18) Solution (d)

Do you know?

Effects that are found at convergent plate boundary (oceanic) include: a zone of progressively deeper earthquakes, an oceanic trench, a chain of volcanic islands, and the destruction of oceanic lithosphere.

Effects found at a convergent boundary between continental plates include: intense folding and faulting, a broad folded mountain range, shallow earthquake activity, shortening and thickening of the plates within the collision zone.

THINK!

- Plate Boundaries: Convergent, Divergent, and Transform Boundaries

Q.19) Which of the following statements is/are <u>not</u> correct?

1. Ash and cinder cones are built where eruptions are of the explosive type with a predominance of pyroclastic material.
2. The ash and cinder cones seldom attain heights in excess of a few hundred metres.

Choose the appropriate answer:

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.19) Solution (d)

Both the given statements are correct. However, since the question asks for 'not correct', answer is option (d).

On the basis of material ejected, the volcanoes may be classified into four major types: (i) basalt cones, (ii) basalt domes or shield, (iii) ash or cinder cones, and (iv) composite or strato cones.

(i) Basalt cones

Basalt cones are rare. They are likely to be low rather than high cones because of the fluidity of basaltic lava. The Rangitoo (New Zealand) and Skjaldbreit(Iceland) are the most suitable examples of basalt cone volcanoes.

(ii) Basalt domes or shield

The Hawaiian volcanoes are the excellent examples of basalt domes or shield volcanoes as are Mt. Etna and many of the volcanoes of Iceland. Basalt domes are formed where fluid basaltic lava is extruded. They often attain great heights (e.g., Mauna Loa has an altitude of 4,219 metres).

(iii) Ash or cinder cones

Ash and cinder cones are built where eruptions are of the explosive type with a predominance of pyroclastic material. Growth of an ash or cinder cone begins around a crater. The ash and cinder cones seldom attain heights in excess of a few hundred metres

(iv) Composite or strato cones

A strato volcano is characterized by alternating sheet of lava and pyroclastric material. Its structure attests to alternating periods of explosive and quiet eruptions. Lava intruded into fissures solidifies to form dykes (dikes), if injected between layers of fragmental ejecta it forms sills.

THINK!

- Different types of Volcanoes

Q.20) Which of the following pair of rocks do not lead to formation of caves in Karst Topography?

a) Shale and limestone
b) Limestone and sandstone
c) Shale and sandstone
d) None of the above

Q.20) Solution (c)

Limestone and chalk are sedimentary rocks of organic origin and in its pure state, limestone is made up of calcite or cacium carbonate.

Limestone is soluble in rain-water, which, with carbon-di-oxide from the air, forms a weak acid. A region with a large stretch of limestone therefore possesses a very distinct type of topography – Karst topography.

Karst regions have a bleak landscape. In areas where there are alternating beds of rocks (shales, sandstones, quartzites) with limestones or dolomites in between or in areas where limestones are dense, massive and occurring as thick beds, cave formation is prominent. Water percolates down either through the materials or through cracks and joints and moves horizontally along bedding planes. It is along these bedding planes that the limestone dissolves and long and narrow to wide gaps called caves result.

THINK!

- Characteristic features of a Karst Region

Q.21) What types of erosion cause the undercutting of a waterfall?

a) Abrasion and hydraulic action
b) Abrasion and attrition
c) Attrition and hydraulic action
d) Eskar and attrition

Q.21) Solution (a)

Abrasion and hydraulic action erode the soft rock so the hard rock is left as an overhang. Attrition breaks down the river's load.

Erosion involves the wearing away of rock and soil found along the river bed and banks. Erosion also involves the breaking down of the rock particles being carried downstream by the river.

The four main forms of river erosion

Hydraulic action - the force of the river against the banks can cause air to be trapped in cracks and crevices. The pressure weakens the banks and gradually wears it away.

Abrasion - rocks carried along by the river wear down the river bed and banks.

Attrition - rocks being carried by the river smash together and break into smaller, smoother and rounder particles.

Solution - soluble particles are dissolved into the river.

THINK!

- Difference between Abrasion and Attrition

Q.22) Consider the following statements about 'Balfour Declaration'

1. It stated that the British government supported the establishment in Palestine of a national home for the Jewish people
2. It was issued post 1948 Palestinian exodus

Select the correct statements

a) 1 Only
b) 2 Only
c) Both 1 and 2
d) Neither 1 nor 2

Q.22) Solution (a)

The Balfour Declaration was a public statement issued by the British government during World War I announcing support for the establishment of a "national home for the Jewish people" in Palestine, then an Ottoman region with a minority Jewish population (around 3–5% of the total).

Source: http://www.thehindu.com/news/international/100-years-on-uks-balfour-declaration-stirs-celebration-and-mourning-in-west-asia/article19976491.ece

Q.23) 'Global Financial Development Report' is published by

a) World Economic Forum
b) World Bank
c) World Trade Organization
d) None of the above

Q.23) Solution (b)

It is published by World Bank.

Global Financial Development Report 2017/2018: Bankers without Borders is the fourth in a World Bank series. It provides a unique contribution to financial sector policy debates, building on novel data, surveys, research, and wide-ranging country experience, with emphasis on emerging markets and developing economies.

The report's findings and policy recommendations are relevant for policy makers, staff of central banks, ministries of finance, and financial regulation agencies.

The report tracks financial systems in more than 200 economies before and during the global financial crisis.

Source: http://www.thehindu.com/business/international-banking-must-for-better-growth-prospectsworld-bank/article20002840.ece

Q.24) Which of the following is/are correctly matched?

1. Tholpavakoothu – Andhra Pradesh
2. Mamallapuram stone sculptures - Tamil Nadu
3. Ravanachhaya – Maharashtra

Select the correct statements

a) Only 2
b) 1 and 2
c) 2 and 3
d) 1, 2 and 3

Q.24) Solution (a)

Shadow Puppetry

- Tholpavakoothu – Kerala
- Ravanachhaya – Odisha
- Tholu Bommalata – Andhra Pradesh
- Togalu Gombeyatta – Karnataka

Mamallapuram stone sculptures - Tamil Nadu

Source: http://www.thehindu.com/entertainment/art/puppetry-in-odisha-who-is-pulling-the-strings/article20781988.ece

Q.25) New research has revealed that the oldest water in the ocean in the North Pacific has remained trapped in a shadow zone around 2 kilometres below the sea surface for over 1,000 years. Consider the following statements about this zone.

1. Oxygenation of the zone is very low
2. Marine life is restricted
3. The zone traps millennia old nutrients and carbon

Select the correct statements

a) 1 Only
b) 1 and 2
c) 1 and 3
d) 1, 2 and 3

Q.25) Solution (d)

It was found is that at around 1.2 miles (2km) below the surface of the Indian and Pacific Oceans there is a 'shadow zone' with barely any vertical movement that suspends ocean water in an area for centuries.

The research found that water at the bottom of the ocean, heated by geothermal energy deep within the planet, was unable to rise above1.5 miles (2.5km) below the surface.

Instead of travelling upwards, currents loop back on themselves horizontally, leaving the layer directly above untouched.

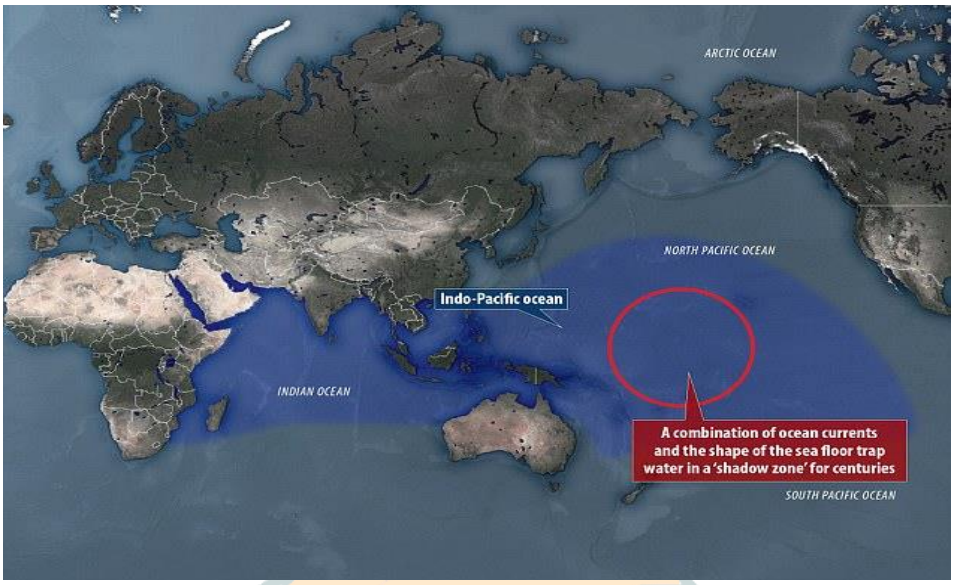
Carbon-14 dating had already told us the most ancient water lied in the deep North Pacific.

The lack of contact with the ocean's surface means oxygenation of the zone is very low. That means marine life is restricted, but not completely absent.

The 'shadow zone' covers an area 3,700 by 1,250 (6,000 by 2,000 km) where the North Pacific meets the Indian Ocean, between 0.6 and 1.5 miles (one and 2.5 km) below the surface

It could help understand the capacity of the oceans to absorb heat trapped by rising greenhouse gases.

When this isolated shadow zone traps millennia old ocean water it also traps nutrients and carbon.



Source: http://www.thehindu.com/sci-tech/science/what-is-the-pacific-shadow-zone/article20236733.ece

Q.26) 'Deen Dayal SPARSH Yojana' is associated with

a) Numismatics
b) Philately
c) Rural Digital Literacy
d) Empowerment of scheduled tribes based on sustainable S&T activities/applications

Q.26) Solution (b)

SPARSH - Scholarship for Promotion of Aptitude & Research in Stamps as a Hobby

It is a pan India Scholarship programme to children of Standard VI to IX having good academic record and also pursuing Philately as a hobby.

Launched by Ministry of Communication

Source: http://pib.nic.in/newsite/PrintRelease.aspx?relid=173212