Prelimsure Test-4 Detailed Answerkey

1.C

- Historically, vaccines have offered one of the most effective means of preventing infectious diseases— such as smallpox, polio, measles, and others—and saving lives. The RTS,S vaccine candidate is intended to complement existing measures to fight malaria, such as bed nets and indoor residual insecticide spraying.

2. B

- Out of the eight planets, mercury, venus, earth and mars are called as the inner planets as they lie between the sun and the belt of asteroids. The other four planets are called the outer planets. Alternatively, the first four are called Terrestrial, meaning earth-like as they are made up of rock and metals, and have relatively high densities.
- The remaining four are called Jovian or Gas Giant planets. Jovian means jupiter-like. Most of them are much larger than the terrestrial planets and have thick atmosphere, mostly of helium and hydrogen. All the planets were formed in the same period sometime about 4.6 billion years ago.

3. B

- Ayushmaan Bharat Vs. Rashtriya Swasthya Bima Yojana: The new scheme builds on the already existing Rashtriya Swasthya Bima Yojna (with the entitlement of up to Rs 30,000 per annum for diseases requiring hospitalization)
- Aim: To make path-breaking interventions to address health holistically, in **primary, secondary and tertiary care systems**. The funding of Rs. 5 lakh per family per year is available to the secondary and tertiary heallth care.
- Objective: Prevention + Promotion (Health & Wellness) Full proof mechanism while allowing States to accommodate the existing schemes, keeping the flavour of Digital India intact. It is implemented by the Ministry of Family Health and Welfare.

4. D

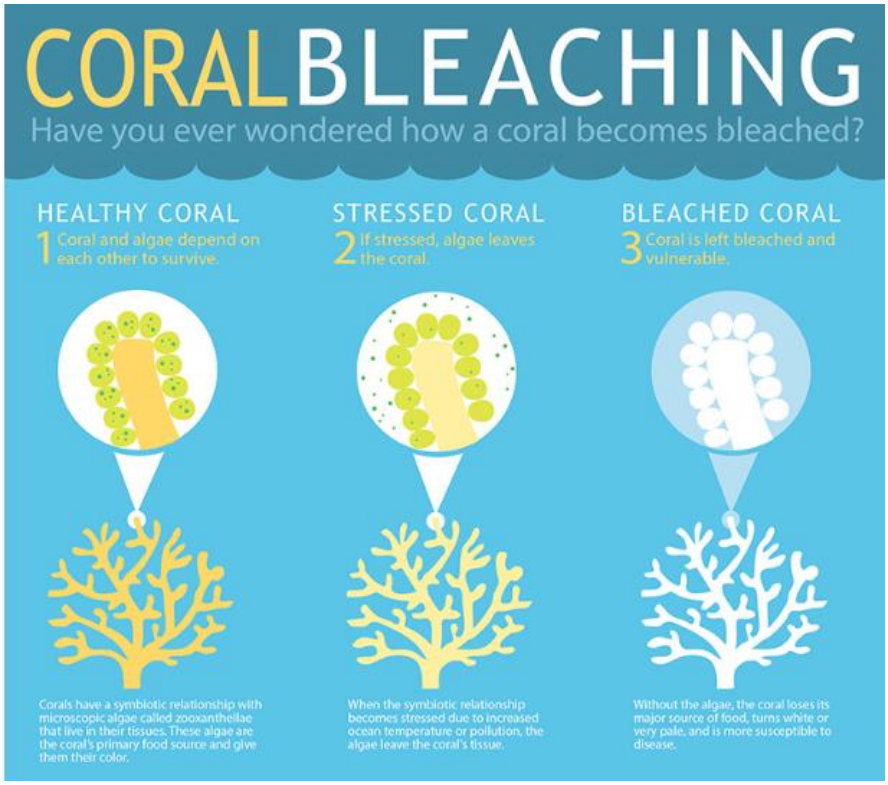
- National Crisis Management Committee is a committee set up by the Government of India in the wake of a natural calamity for effective coordination and implementation of relief measures and operations.
- National Crisis Management Committee is headed by the Cabinet Secretary.

5. D

- In the troposphere, the temperature generally decreases with altitude. The reason is that the troposphere's gases absorb very little of the incoming solar radiation. Instead, the ground absorbs this radiation and then heats the tropospheric air by conduction and convection.

6. C

- Coral bleaching is the process where the symbiotic algaes like zooxanthellae are removed from the corals through external factors like climate change, ocean acidification, surface runoff, pollution etc.
- Destruction of corals due to unsustainable fishing practises etc. do not amount to the process of coral bleaching.

- 

7. C
   - Question is non communicable disease.. So you must identify the major NCDs like Dabetic, Hypertension, heart diseases etc. once you identify the diseases you can eliminate the “increase of mosquitoes”. Because it results in increasing the communicable diseases.

8. A
   - The planet earth initially was a barren, rocky and hot object with a thin atmosphere of hydrogen and helium There was no atmosphere on early earth. Methane, carbon dioxide and ammonia released from molten mass covered the surface.
   - The UV rays from the sun broke up water into Hydrogen and Oxygen and the lighter H2 escaped. Oxygen combined with ammonia and methane to form water, CO2 and others.
   - The ozone layer was formed. As earth cooled, the water vapor fell as rain, to fill all the depressions and form oceans. Life appeared 500 million years after the formation of earth, i.e., almost four billion years back. Some scientists believe that life came from outer space.
   - The first non-cellular forms of life could have originated 3 billion years back. They would have been giant molecules (RNA, Protein, Polysaccharides, etc.). These capsules reproduced their molecules perhaps. The first cellular form of life did not possibly originate till about 2000 million years ago. These were probably single-cells. All life forms were in water environment only.

9. C
   - Here, identify the factors responsible for the monsoon winds and rain.
   - The feature represented in the first statement is land mass. Eg: Indian landmass and its heating causes the deflation of Monsoon towards India. So first statement is true.
   - Similarly second statement depicts the Jetstreams which are often called as the upper air circulation. So as jet streams directly affects the monsoon winds the second statement is true.

10. D

- Dead zones are areas of large bodies of water, typically in the ocean but also occasionally in lakes and even rivers, that do not have enough oxygen to support marine life.
- The cause of such "hypoxic" (lacking oxygen) conditions is usually eutrophication, an increase in chemical nutrients in the water, leading to excessive blooms of algae that deplete underwater oxygen levels.
- Dead zones are reversible if their causes are reduced or eliminated. For example, a huge dead zone in the Black Sea largely disappeared in the 1990s

11. A

- Regolith is a layer of loose, heterogeneous superficial deposits covering solid rock. It includes dust, soil, broken rock, and other related materials and is present on Earth and other terrestrial planets.
- Earth's regolith consists of soil, alluvium deposits, volcanic ash, water deposited salts etc.
- Humus is the organic component of soil, formed by the decomposition of leaves and other plant material by soil microorganisms. Humus significantly affects the bulk density of soil and contributes to its retention of moisture and nutrients.
- Marsh is a wetland that is dominated by herbaceous rather than woody plant species. Marshes can often be found at the edges of lakes and streams, where they form a transition between the aquatic and terrestrial ecosystems.

12.A

- A regulatory sandbox (RS) usually refers to live testing of new products or services in a controlled/test regulatory environment for which regulators may (or may not) permit certain regulatory relaxations for the limited purpose of the testing.
- The RS allows the regulator, the innovators, the financial service providers (as potential deployers of the technology) and the customers (as final users) to conduct field tests to collect evidence on the benefits and risks of new financial innovations, while carefully monitoring and containing their risks.
- It can provide a structured avenue for the regulator to engage with the ecosystem and to develop innovation-enabling or innovation-responsive regulations that facilitate delivery of relevant, low-cost financial products. The RS is potentially an important tool which enables more dynamic, evidence-based regulatory environments which learn from, and evolve with, emerging technologies.

13. B

- The 15th Finance Commission held a high level roundtable on 'Fiscal Relations across levels of government'.
- It was moderated by Shri N. K. Singh, Chairman of the Commission. The roundtable was organised in partnership with the World Bank, OECD and ADB. This is the culmination of significant works that all the three organizations have undertaken for the FC.

14. B

- Impact Bonds are **non-marketable** bonds where repayment is contingent on the outcomes of the project they fund.
- Unlike normal bonds, for Impact Bonds, repayment by the government is only triggered if certain pre-determined targets are achieved. ... If the targets are met, the government pays back the principal along with a return to the private investors
- https://www.business-standard.com/article/opinion/the-case-for-impact-bonds-in-india-119042900029_1.html

15. D

- The present composition of earth's atmosphere is chiefly contributed by nitrogen and oxygen. There are three stages in the evolution of the present atmosphere.
- The first stage is marked by the loss of primordial atmosphere.
- In the second stage, the hot interior of the earth contributed to the evolution of the atmosphere.
- Finally, the composition of the atmosphere was modified by the living world through the process of photosynthesis.
- The early atmosphere, with hydrogen and helium, is supposed to have been stripped off as a result of the solar winds. This happened not only in case of the earth, but also in all the terrestrial planets, which were supposed to have lost their primordial atmosphere through the impact of solar winds.
- During the cooling of the earth, gases and water vapour were released from the interior solid earth. This started the evolution of the present atmosphere. The early atmosphere largely contained water vapour, nitrogen, carbon dioxide, methane, ammonia and very little free oxygen.
- The process through which the gases were outpoured from the interior is called degassing. Continuous volcanic eruptions contributed water vapour and gases to the atmosphere. As the earth cooled, the water vapour released started getting condensed.

16. C

- 'Coalition for Disaster-Resilient Infrastructure' (CDRI) is an Indian initiative on the lines of Solar Alliance. The initiative has the support of the UN and World Bank apart from other multilateral development banks.
- It was launched by the Indian Prime Minister Narendra Modi at the 2019 UN Climate Action Summit. India has pledged Rs 480 crore for setting up of a secretariat in New Delhi for the new grouping.

17. A

- The Arms Trade Treaty is the first legally-binding instrument ever negotiated in the United Nations to establish common standards for the international transfer of conventional weapons. It does not have any such provision of a special force.

18. C

- Equatorial type of climate is located up to 5° to 10° latitudes on either side of the equator but at some places it extends up to 15°-25° latitudes mainly along the eastern margins of the continents.
- The equatorial region receives maximum amount of insola-tion which causes uniformly high temperature through-out the year as the average monthly temperature is always more than 18°C. Equatorial regions receive rainfall throughout the year and thus there is no dry season. Average annual rainfall exceeds 200cm to 250cm.

19. D

Direct Sources

- Deep earth mining and drilling reveals the nature of rocks deep down the surface. [Mponeng gold mine and TauTona gold mine in South Africa are deepest mines reaching to a depth of 3.9 km. And the deepest drilling is about 12 km deep
- Volcanic eruption forms another source of obtaining direct information.

Indirect Sources

- Depth: With depth, pressure and density increases and hence temperature. This is mainly due to gravitation.
- Meteors: Meteors and Earth are solar system objects that are born from the same nebular cloud. Thus they are likely to have a similar internal structure.
- Gravitation: The gravitational force (g) is not the same at different latitudes on the surface. It is greater near the poles and less at the equator. This is because of the distance from the center at the equator being greater than that at the poles.
- Magnetic field: The geodynamo effect helps scientists understand what's happening inside the Earth's core. Shifts in the magnetic field also provide clues to the inaccessible iron core. But their source remains a mystery.

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20. A

- Resilient Cities is the annual global platform for urban resilience and climate change adaptation. It is convened by the International Council for Local Environmental Initiatives (ICLEI).
- Resilient Cities Asia-Pacific aims to provide an Asian platform for urban resilience and climate change adaptation where partnerships are forged and concrete dialogues are happening, with the ultimate goal of identifying solutions and creating lasting impacts for cities in the region.
- The first three Resilient Cities Asia-Pacific (RCAP) Congress were held in Bangkok.
- It's convened and funded by ICLEI – Local Governments for Sustainability and co-hosted by the World Mayors Council on Climate Change and the City of Bonn.

21. B

- The Financial Action Task Force (FATF) is an inter-governmental body established in 1989 on the initiative of the G7.
- It is a "policy-making body" which works to generate the necessary political will to bring about national legislative and regulatory reforms in various areas.
- The FATF Secretariat is housed at the OECD headquarters in Paris. The objectives of the FATF are to (a) set standards and promote effective implementation of legal, regulatory and operational measures (b) for combating money laundering (c)terrorist financing and (d) other related threats to the integrity of the international financial system

22. C

- The strongest winds in a northern hemisphere tropical cyclone is located in the **eyewall and the right front quadrant of the tropical cyclone.** Severe damage is usually the result when the eyewall of a hurricane, typhoon or cyclone passes over land.

23. A

- **Abrupt release of energy along a fault causes earthquake waves.** A fault is a sharp break in the crustal rock layer. Rocks along a fault tend to move in opposite directions. But the friction exerted by the overlying rock strata prevents the movement of rock layer. With time pressure builds up.
- Under intense pressure, the rock layer, at certain point, overcomes the friction offered by the overlying layer and undergoes an abrupt movement generating shockwaves. This causes a release of energy, and the energy waves travel in all directions.
- The point where the energy is released is called the focus of an earthquake, alternatively, it is called the **hypocentre**. The energy waves travelling in different directions reach the surface. The point on the surface, nearest to the focus is called the epicentre. It is the first one to experience the waves. It is a point directly above the focus.

24. D

- Ocean currents flow thousands of meters below the surface in addition to the surface flow. These deep-ocean currents are driven by differences in the water's density, which is controlled by temperature and salinity. This process is known as thermohaline circulation.
- The density differences of the water causes pumping of surface water into the deep ocean which eventually forces the deep water to move horizontally until it can find an area on the world where it can rise back to the surface and close the current loop.
- Source: https://pmm.nasa.gov/education/videos/thermohaline-circulation-great-ocean-conveyor-belt

25. A

- The Army is in the process of procuring Spike-LR Anti-Tank Missiles from Israel and Igla-S Very Short Range Air Defence Systems (VSHORAD) from Russia through a set of new financial powers for emergency procurement sanctioned by the Defence Ministry.

26.D

- The Reserve Bank of India (RBI) has allowed foreign portfolio investors (FPIs) to invest in municipal bonds.
- They are debt securities issued by government or semi government institutions who need funding for civic projects.

27. D

- Islamabad is the capital city of Pakistan, and is federally administered as part of the Islamabad Capital Territory. It is located at about 33 latitude North, even above New Delhi.
- New Delhi serves as the capital of India and seat of all three branches of the Government of India. Its latitude is at about 28.6 North.
- Bangkok is the capital of Thailand located at a latitude of 13.7 North which is the only latitude below Tropic of Cancer.

28. B

- All natural earthquakes take place in the lithosphere (depth up to 200 km from the surface of the earth).
- An instrument called 'seismograph' records the waves reaching the surface. Earthquake waves are basically of two types — body waves and surface waves. Body waves are generated due to the release of energy at the focus and move in **all directions** travelling through the body of the earth. Hence, the name body waves. The body waves interact with the surface rocks and generate new set of waves called surface waves. These waves move along the surface.
- The velocity of waves changes as they travel through materials with different elasticity (stiffness) (Generally density with few exceptions). The more elastic the material is, the higher the velocity. Their direction also changes as they reflect or refract when coming across materials with different densities. There are two types of body waves. They are called P and S-waves

<u>Primary waves</u>

- Also called as the longitudinal or compressional waves. Particles of the medium vibrate along the direction of propagation of the wave. 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. Velocity of P waves in Solids > Liquids > Gases. Their velocity depends on shear strength or elasticity of the material.

<u>Secondary waves</u>

- Also called as transverse or distortional waves. It isAnalogous to water ripples or light waves. S-waves arrive at the surface with some time lag. A secondary wave cannot pass through liquids or gases. These waves are of high frequency waves.
- Travel at varying velocities (proportional to shear strength) through the solid part of the Earth's crust, mantleThe shadow zone of 'S' waves extends almost halfway around the globe from the earthquake's focus. The shadow zone for 'S' waves is an area that corresponds to an angle between 1030 and 1800. This observation led to the discovery of liquid outer core. Since S waves cannot travel through liquid, they do not pass through the liquid outer core.

29. B

- Drip irrigation involves dripping water onto the soil at very slow rates, these are applied only to the soil parts in which roots are grown whereas the sprinkler irrigation involves wetting the whole soil profile like the surface irrigation.
- Sprinkler or drip irrigation are preferred above surface irrigation on steeper or unevenly sloping lands as they require little or no land levelling. The sprinkler and drip irrigation involves very few land levelling instead these technologies irrigate the slopes by adjusting its machines and components.
- Source: http://www.fao.org/3/S8684E/s8684e08.htm

30. C

- Azores islands is an archipelago in the mid-Atlantic. The islands are characterized by dramatic landscapes, lake filled caldera etc.
- Hawaii is a state of the United States of America. It is the only state located in the Pacific Ocean and the only state composed entirely of islands.
- St. Helen Islands is a remote volcanic outpost in the South Atlantic Ocean.
- Agaléga are two outer islands of Mauritius located in the Indian Ocean, about 1,000 kilometres north of Mauritius island. It is news because of India's interest in the location.

31. A

- Precipitation is inversely related to salinity. Higher is the precipitation, lower is the proportion of salinity. The equatorial region records highest rainfall and that it is why it has low salinity in comparison to those which are near to tropics

32. C

- The Global Talent Competitive Index prepared by the INSEAD business school in partnership with Tata Communications and Adecco Group was released on the first day of the World Economic Forum (WEF) Annual Meeting 2019.
- The Global Talent Competitive Index measures how countries and cities grow, attract and retain talent, ranking 125 countries and 114 cities across all groups of income and levels of development.

33. A

- Crust is the outer thin layer with a total thickness normally between 30-50 km. The thickness of the crust varies under the oceanic and continental areas.Oceanic crust is thinner (5-30 km thick) as compared to the continental crust (50-70 km thick).
- The continental crust is thicker in the areas of major mountain systems. It is as much as 70 -100 km thick in the Himalayan region. It forms 5-10 percent of the earth's volume.

- The outer covering of the crust is of sedimentary material (granitic rocks) and below that lie crystalline, igneous and metamorphic rocks which are acidic in nature. The lower layer of the crust consists of basaltic and ultra-basic rocks.
- The continents are composed of lighter silicates—silica + aluminium (also called 'sial') while the oceans have the heavier silicates—silica + magnesium (also called 'sima').

34. A

- The mission of GCTF is to reduce the vulnerability of people to terrorism worldwide by preventing, combating and prosecuting terrorist acts and countering investment and recruitment to terrorist outfits.
- GCTF is an international forum consisting of 29 countries and the European Union. India is a member of GCTF

35. D

- Ocean salinity is defined as the total content of dissolved salts in seawater. It is calculated as the amount of salt dissolved in 1,000 gm of seawater. It is an important factor in determining the ocean current direction.
- The major factors that influence salinity in ocean waters are precipitation, evaporation, planetary winds, regular freezing or thawing of ice, influx of fresh water into the ocean etc.. Precipitation brings freshwater into the ocean, diluting its salt concentration. While evaporation increases salinity as it evaporates water from the surface.

36.A

- A National Gene Fund has been established by the Protection of Plant Varieties and Farmers' Rights Authority to receive the contributions from: The benefit sharing received in the prescribed manner from the breeder of a variety or an essentially derived variety registered under the Act, or the propagating material of such variety or essentially derived a variety
- The compensation deposited by breeders and The contribution from any National and International organizations and other sources. The Gene Fund is utilized for: The compensation payable to the farmer/community of farmers.
- The expenditure for supporting the conservation and sustainable use of genetic resources including in-situ and ex-situ collections and for strengthening the capability of the panchayat in carrying out such conservation and sustainable use, The expenditure of the schemes relating to benefit sharing.
- It has no overseeing powers related to research works.

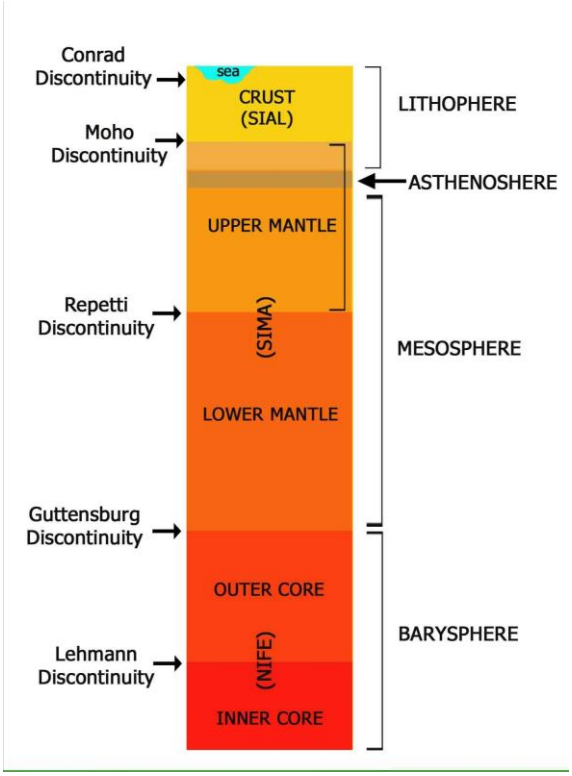
37. B

- Sea breeze, a local wind system characterized by a flow from sea to land during the day. Sea breezes alternate with land breezes along the coastal regions of oceans or large lakes in the absence of a strong large-scale wind system during periods of strong daytime heating or nighttime cooling.
- Those who live within 30 to 40 km (about 19 to 25 miles) of the coastline often experience the cooler 10- to 20-km- (about 6- to 12-mile-) per-hour winds of the sea breeze on a sunny afternoon only to find it turn into a sultry land breeze late at night.
- Since the surface flow of the sea breeze terminates over land, a region of low-level air convergence is produced. Locally, such convergence often induces the upward movement of air, fostering the development of clouds. Such clouds may produce showers that occur over land in the afternoon.
- https://www.britannica.com/science/sea-breeze

38.C

- Directorate General of Civil Aviation is an attached office of the Ministry of Civil Aviation. It is the regulatory body in the field of Civil Aviation primarily dealing with safety issues.
- The main functions of DGCA are Registration of aircraft, Licensing pilots, aircraft maintenance engineers, flight engineers Supervision of Institutes, clubs and schools engaged in in flying training in conducting the air crash investigations
- It serves as nodal agency for coordination with ICAO (International Civil Aviation organisation, a United Nations agency).

39. C



- The discontinuity between the hydrosphere and crust is termed as the Conrad Discontinuity. The discontinuity between the crust and mantle is called the Mohorovich Discontinuity or Moho discontinuity.
- The discontinuity between the upper mantle and the lower mantle is known as Repetti Discontinuity. The core is separated from the mantle by Guttenberg's Discontinuity.
- The discontinuity between the upper core and lower core is called as Lehmann Discontinuity.

40. C

- Latitude values indicate the angular distance between the Equator and points North or South of it on the surface of the Earth. A line connecting all the points with the same latitude value is called a line of latitude. This term is usually used to refer to the lines that represent values in whole degrees.
- The tilt of the earth's axis determines the sun angle. The Earth's axis of rotation is inclined 23 1/2 degrees from perpendicular. Earth's axis is tilted 66 1/2 degrees from the plane of the ecliptic - the plane the earth orbits the sun in.
- http://www.earthonlinemedia.com/ipg/outlines/lecture_earth_sun_relations.html

41. B

- The marginal cost of funds-based lending rate (MCLR) refers to the minimum interest rate of a bank below which it cannot lend, except in some cases allowed by the RBI.

- It is an internal benchmark or reference rate for the bank. Being an internal benchmark, the MCLR is expected to vary across banks. MCLR actually describes the method by which the minimum interest rate for loans is determined by a bank – on the basis of marginal cost or the additional or incremental cost of arranging one more rupee to the prospective borrower.

42. C

- Natural nitrogen fixation capacity of the soil can only be improved by the cultivation of crops that have the ability for natural nitrogen fixation capacity. These include the cultivation of pulses, legumes etc. Adding gypsum to the soil is an artificial process and it does not directly enhance the nitrogen fixation capacity of the soil.
- Gypsum is normally added to the soils having high soil alkalinity or salinity. The alkalinity is reduced by improving the soil aeration and water infiltration. As a result of increased water infiltration, the soluble salts will be washed away and the salinity of the soil will be reduced as well.

43. D

- The statements are interchanged
- In geology, Epeirogenic movement refers to upheavals or depressions of land exhibiting long wavelengths [undulations] and little folding. The broad central parts of continents are called cratons, and are subject to epeirogeny.
- The movement is caused by a set of forces acting along an Earth radius, such as those contributing to isostasy and faulting in the lithosphere. Epeirogenic or continent forming movements act along the radius of the earth; therefore, they are also called radial movements.
- Orogenic or the mountain-forming movements act tangentially to the earth's surface, as in plate tectonics. Tensions produces fissures (since this type of force acts away from a point in two directions) and compression produces folds (because this type of force acts towards a point from two or more directions).
- In the landforms so produced, the structurally identifiable units are difficult to recognise. In general, diastrophic forces which have uplifted lands have predominated over forces which have lowered them.

44. C

- Badlands are a type of dry terrain where softer sedimentary rocks and clay-rich soils have been extensively eroded by wind and water. They are characterized by steep slopes, incised meanders, minimal vegetation and high drainage density.
- Badlands is an arid terrain characterized by severe erosion of sedimentary rocks caused by agents like water, wind in the geological history of the Earth. For example, the Chambal badlands of India.

45. A

- Mass Movements transfer the mass of rock debris down the slopes under the direct influence of gravity. That means, air, water or ice do not carry debris with them from place to place but on the other hand, the debris may carry with it air, water or ice.
- The movements of mass may range from slow to rapid, affecting shallow to deep columns of materials and include creep, flow, slide and fall. Gravity exerts its force on all matter, both bedrock and the products of weathering.
- So, **weathering is not a pre-requisite** for mass movement though it aids mass movements. Mass movements are very active over weathered slopes rather than over unweathered materials.
- NCERT Fundamentals of Physical Geography

46. A

- Lake Victoria is one of the African Great Lakes. The lake was renamed Lake Victoria after Queen Victoria. It is the world's second largest fresh water lake by surface area after Lake Superior in North America
- It is bordered by the countries namely Tanzania, Kenya and Uganda.
- 

47. A

- Earthquakes and volcanic eruptions that cause the sea-floor to move abruptly resulting in sudden displacement of ocean water in the form of high vertical waves are called tsunamis.
- Normally, the seismic waves cause only one instantaneous vertical wave; but, after the initial disturbance, a series of after waves are created in the water that oscillate between high crest and low trough in order to restore the water level.
- The speed of wave in the ocean depends upon the depth of water. It is more in the shallow water than in the ocean deep. As a result of this, the impact of tsunami is less over the ocean and more near the coast where they cause large-scale devastations. Therefore, **a ship at sea is not much affected by the tsunami** and it is difficult to detect a tsunami in the deeper parts of the sea. It is so because over deep water the tsunami has very long wave-length and limited wave-height.
- Thus, a tsunami wave raises the ship only a metre or two and each rise and fall takes several minutes. As opposed to this, when a tsunami enters shallow water, its wave-length gets reduced and the period remains unchanged, which increases the wave height. Sometimes, this height can be up to 15m or more, which causes large-scale destruction along the shores.
- Thus, these are also called Shallow Water Waves. Tsunamis are frequently observed along the Pacific ring of fire, particularly along the coast of Alaska, Japan, Philippines, and other islands of Southeast Asia, Indonesia, Malaysia, Myanmar, Sri Lanka, and India etc.

48. B

- While India's life expectancy at birth is lower than the world's (69 years to 72), it scores higher than the global average in terms of access to healthcare during childbirth, and also has a much lower adolescent birth rate.

- China, the world's most populous country at 1.42 billion, has a population growth rate of 0.5% per year between 2010 and 2019, which is less than half of that in India or in the world. India accounts for over one-sixth of the world's population in 2019 (1.37 billion out of 7.71 billion) and has grown at a rate (1.2% per year between 2010 and 2019) that is just over the world growth rate according to State of the World Population 2019

49. A

- The surface ocean current brings new water to North Atlantic region from the South Atlantic via the Gulf Stream and the water returns to the South Atlantic via the North Atlantic Deep Water current.
- The continual influx of warm water from the tropical regions through the movement of ocean currents into the North Atlantic polar ocean keeps the regions around Iceland and southern Greenland mostly free of sea ice year round.

50. D

- There are differences of opinion among scientists about the exact mechanism of a tropical cyclone. However, some initial conditions for the emergence of a tropical cyclone are:
    1. Large and continuous supply of warm and moist air that can release enormous latent heat.
    2. Strong Coriolis force that can prevent filling of low pressure at the centre (absence of Coriolis force near the equator prohibits the formation of tropical cyclone between 0 -5 latitude).
    3. Unstable condition through the troposphere that creates local disturbances around which a cyclone develops.
    4. Finally, ***absence of strong vertical wind wedge***, which disturbs the vertical transport of latent heat

51. C

- The dew point is the temperature to which air must be cooled to become saturated with water vapor. When further cooled, the airborne water vapor will condense to form liquid water (dew). When air cools to its dew point through contact with a surface that is colder than the air, water will condense on the surface. When the temperature is below the freezing point of water, the dew point is called the frost point, as frost is formed rather than dew

52. C

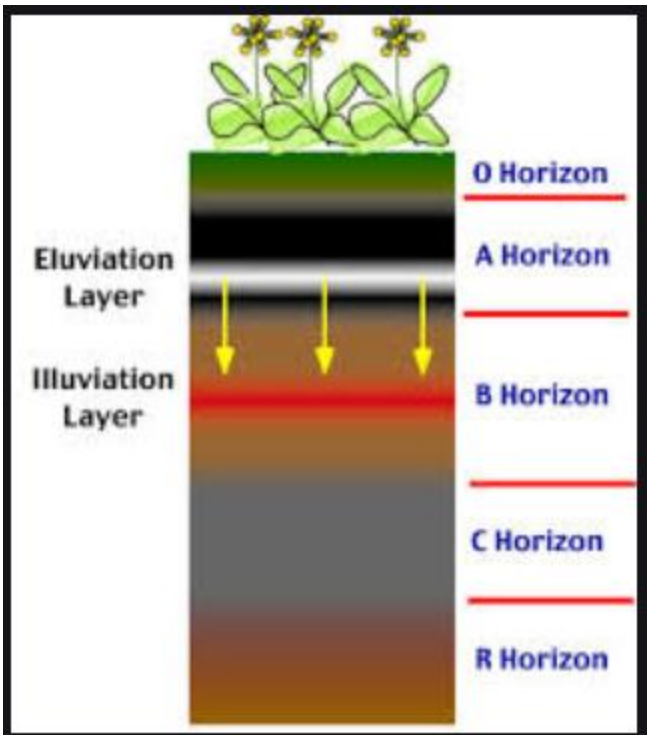
- EMISAT can measure the electromagnetic spectrum and to read the location of radar emitters both ground and naval.
- The Ka-band frequency that EMISAT is sensitive to allows it to scan through ice, rain, coastal zones, land masses, forests and wave heights relatively easily It has been developed by DRDO (DLRL Hyderabad) under Project KAUTILYA.

53. C

- Tropical cyclones are characterised by large pressure gradients.
- The centre of the cyclone is mostly a ***warm and low-pressure***, cloudless core known as the eye of the storm. Generally, the isobars are closely placed to each other showing high-pressure gradients. Normally, it varies between 14-17mb/100 km, but sometimes it can be as high as 60mb/100km. Expansion of the wind belt is about 10-150 km from the centre

54. B

- Eluviation is the transport of soil material from upper layers of soil to lower levels by downward precipitation of water across soil horizons. Illluviation is the process whereby material is displaced across a soil profile, from one layer to another one, by the action of rainwater.

- 

55. D
- Only two species of marine turtles display a unique mass nesting behavior.
- This behavior is known as an 'arribada'. Arribada- Spanish term meaning arrival; a mass nesting behavior.
- An arribada is a unique nesting phenomenon common to both the Olive ridley and the Kemp's ridley sea turtle.

56. A
- Drought is a complex phenomenon as it involves elements of meteorology like precipitation, evaporation, evapotranspiration, ground water, soil moisture, storage and surface run-off, agricultural practices, particularly the types of crops grown, socio-economic practices and ecological conditions.
- **Meteorological Drought** : It is a situation when there is a prolonged period of inadequate rainfall marked with mal-distribution of the same over time and space.
- **Agricultural Drought** : It is also known as soil moisture drought, characterised by low soil moisture that is necessary to support the crops, thereby resulting in crop failures. Moreover, if an area has more than 30 percent of its gross cropped area under irrigation, the area is excluded from the drought-prone category.
- **Hydrological Drought** : It results when the availability of water in different storages and reservoirs like aquifers, lakes, reservoirs, etc. falls below what the precipitation can replenish.
- **Ecological Drought** : When the productivity of a natural ecosystem fails due to shortage of water and as a consequence of ecological distress, damages are induced in the ecosystem

57. C
- **BOLD KURUKSHETRA** is The 12th edition of joint military exercise between India and Singapore

58. B
- Water is the most prominent agent of gradation in earth as the erosion b water can be observed through out the earth.

- Wind is an active agent of gradation mainly in the desert. It blows unchecked due to lack of vegetation. The sand and dust particles are carried over greater distance. These get deposited when the wind velocity reduces or when there is an obstruction in the path of the wind.

59. D

- The Reserve Bank of India (RBI) has extended the coverage of Ombudsman Scheme for Non-Banking Financial Companies (NBFCs), 2018 to eligible Non Deposit Taking NonBanking Financial Companies (NBFC-NDs).
- However, Non-Banking Financial Company-Infrastructure Finance Company (NBFCIFC), Core Investment Company (CIC), Infrastructure Debt Fund-Non-Banking Financial Company (IDF-NBFC) and NBFCs under liquidation are excluded from the ambit of the Scheme.

60. A

- Peneplain refers to an undulating featureless plain punctuated with low-lying residual hills of resistant rocks. It is considered to be an end product of an erosional cycle. Peneplain, gently undulating (wave like), almost featureless plain that, in principle, would be produced by fluvial erosion that would, in the course of geologic time, reduce the land almost to base level (sea level), leaving so little gradient that essentially no more erosion could occur.
- The depositional action of a stream is influenced by stream velocity and the volume of river load. The decrease in stream velocity reduces the transporting power of the streams which are forced to leave some load to settle down. Increase in river load is effected through accelerated rate of erosion in the source catchment areas consequent upon deforestation.
- Various landforms resulting from fluvial deposition are as follows:
    1. Alluvial fans - The deposited material acquires a conical shape and appears as a series of continuous fans.
    2. Alluvial cones
    3. Natural levees - These are narrow ridges of low height on both sides of a river, formed due to deposition action of the stream, appearing as natural embankments.
    4. Deltas - A delta is a tract of alluvium at the mouth of a river where it deposits more material than can be carried away. The river gets divided into distributaries which may further divide and rejoin to form a network of channels.

61. D

- Ambedkar and Untouchability
- While practising law in the Bombay High Court, he tried to promote education to untouchables and uplift them. His first organised attempt was his establishment of the central institution Bahishkrit Hitakarini Sabha, intended to promote education and socio-economic improvement, as well as the welfare of “outcastes”, at the time referred to as depressed classes. For the defence of Dalit rights, he started five periodicals –
    - Mooknayak (the leader of the dumb, 1920)
    - Bahishkrit Bharat (Ostracized India, 1924)
    - Samta (Equality, 1928)
    - Janata (The People, 1930)
    - Prabuddha Bharat (Enlightened India, 1956)

62. C

- During full or new moons—which occur when the Earth, sun, and moon are nearly in alignment—average tidal ranges are slightly larger. This occurs twice each month. The moon appears new (dark) when it is directly between the Earth and the sun. These are called spring tides.

- Seven days after a spring tide, the sun and moon are at right angles to each other. When this happens, the bulge of the ocean caused by the sun partially cancels out the bulge of the ocean caused by the moon. This produces moderate tides known as neap tides, meaning that high tides are a little lower and low tides are a little higher than average.

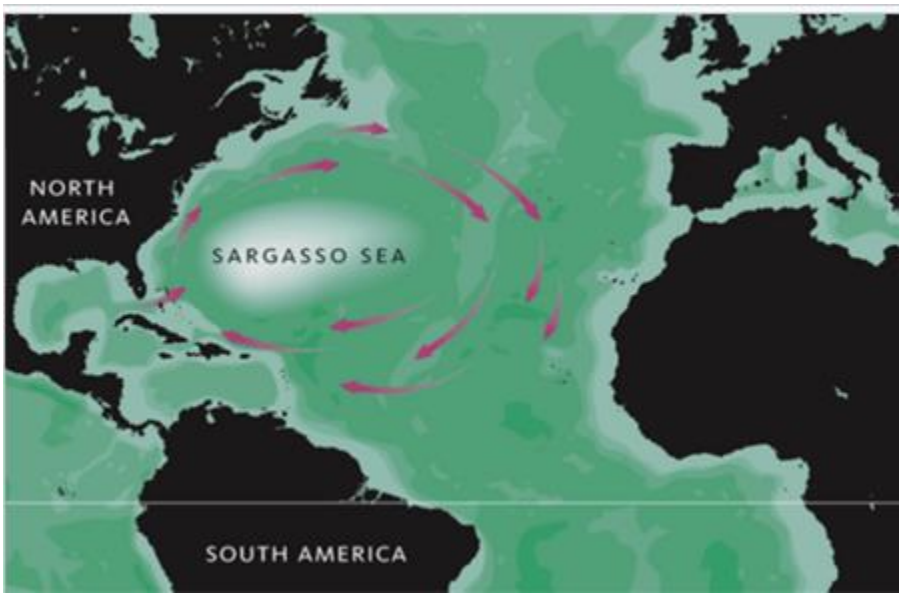
63. B

- The key is to realize that energy may or may not be in the form of heat. For example, when a gas is compressed, mechanical energy is given to the gas, the internal energy of the gas is augmented, and its temperature rises. This is an adiabatic temperature rise. Vice versa, when a gas is decompressed, its temperature drops adiabatically.

64. C

- Fold mountains belong to the group of youngest mountains of the earth.The presence of fossils suggest that the sedimentary rocks of these folded mountains were formed after accumulation and consolidation of silts and sediments in a marine environment.
- Fold mountains extend for great lengths whereas their width is considerably small. Generally, fold mountains have a concave slope on one side and a convex slope on the other.
- Fold mountains are found along continental margins facing oceans. Fold mountains are characterized by granite intrusions on a massive scale. Recurrent seismicity is a common feature in folded mountain belts .
- High heat flow often finds expression in volcanic activity.These mountains are by far the most widespread and also the most important.They also contain rich mineral resources such as tin, copper, gold. They are the loftiest mountains and they are generally concentrated along continental margins.

65. A

- Sargasso Sea is located in the middle of North Atlantic Ocean bounding the Great Antilles on the south, the Gulf stream on the west, and Bermuda on the north. These currents move around the Sargasso sea in a clockwise orientation. It is not bounded by coastline and is surrounded by strong ocean currents as well.
- It is distinguished from other parts of the Atlantic Ocean by its characteristic brown Sargassum seaweed. The presence of seaweed and plankton are a characteristic feature of the Sargasso Sea. However, the salinity in the sea is high like that of the tropical latitudes.
- 

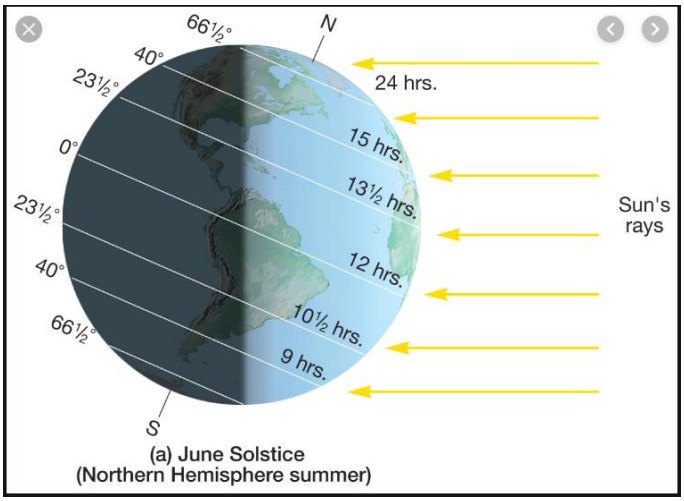
66. A

- Block mountains are created when large areas or blocks of earth are broken and displaced vertically.
- The uplifted blocks are termed as horsts and the lowered blocks are called graben. The Great African Rift Valley (valley floor is graben), The Rhine Valley and the Vosges mountain in Europe are examples.
- Block mountains are also called fault block mountains since they are formed due to faulting as a result of tensile and compressive forces. Block mountains are surrounded by faults on either side of the rift valleys or grabens.

There are two basic types.

- Tilted block mountains have one steep side contrasted by a gentle slope on the other side. Lifted block mountains have a flat top and extremely steep slopes.

67. B

- 

68. A

- The Strait of Hormuz is a strait between the Persian Gulf and the Gulf of Oman. It provides the only sea passage from the Persian Gulf to the open ocean and is one of the world's most strategically important choke points.
- Question was asked because it's often seen in the news.

69. B

- An ideal source region of air mass must possess the following essential conditions:
    - There must be extensive and homogeneous earth's surface so that it may possess uniform temperature and moisture conditions. The source region should be either land surface or ocean surface because irregular topography and surface comprised of both land and water cannot have uniform temperature and moisture conditions.
    - There should not be convergence of air, rather there should be divergence of air flow so that the air may stay over the region for longer period of time and thus the air may attain the physical properties of the region. It is thus, apparent that anticyclonic areas characterised by high barometric pressure and low pressure gradients are most ideal regions for the development of air masses.
    - Atmospheric conditions should be stable for considerable long period of time so that the air may attain the characteristics of the surface.

70. A

- A plateau is a flat-topped tableland. Plateaus occur in every continent and take up a third of the Earth's land.
- They are one of the four major landforms, along with mountains, plains, and hills. Plateaus, like mountains may be young or old. The Deccan plateau in India is one of the oldest plateaus.
- Valleys form when river water cuts through the plateau. The Columbia Plateau, between the Cascade and Rocky mountains in the northwestern United States, is cut through by the Columbia River.
- Sometimes, a plateau is so eroded that it is broken up into smaller raised sections called outlier. Many outlier plateaus are composed of very old, dense rock formations. Iron ore and coal are often found in plateau outliers. Plateaus are very useful because they are rich in mineral deposits. As a result, many of the mining areas in the world are located in the plateau areas.
- Plateaus are not very useful from the point of view of agriculture. The hard rocks on plateaus cannot form fertile soil but agricultural activities are promoted where lava soils have developed. It is difficult to dig wells and canals in plateaus. This hampers irrigation

71. A

- Check dams are built as permanent concrete structures or with stones, Bamboo and wooden planks as a temporary measure. Check dams gain more popularity due to the concerns raised around large dams.
- Check dams facilitate infiltration of water into the soil. Thus they will control runoff and accelerates recharging.
- Check dams at suitable intervals are constructed to avoid gully formation and to control soil erosion and recharge ground water.
- It also serves to trap sediments and pollutants, fortifies local biodiversity and helps in improving the overall quality of the water.

72. D

- A heat wave is a period of abnormally high temperatures-more than the normal maximum temperature that occurs during the summer season.
- Heat wave is considered if maximum temperature of a station reaches at least 40°C or more for Plains, 37°C or more for coastal stations and at least 30°C or more for Hilly regions.
- There has been a high number of sunstroke/heat stroke cases in Andhra Pradesh which is reeling under heat wave conditions.
- The Andhra Pradesh State Disaster Management Authority has been implanting a heat wave action plan to mitigate and response to the impact of heat waves.

73. B

- Most lakes have at least one natural outflow in the form of a river or stream, which maintain a lake's average level by allowing the drainage of excess water. Other lakes are found in endorheic basins. Some lakes do not have a natural outflow and lose water solely by evaporation or underground seepage or both. They are termed endorheic lakes.
- Lakes may exist temporarily filling up the small depressions of undulating ground after a heavy shower. In this kind of lakes, Evaporation > Precipitation. Example: Small lakes of deserts.

74. D

- Normally, temperature decreases with increase in elevation. It is called the normal lapse rate. At times, the situations are reversed and the normal lapse rate is inverted. It is called Inversion of temperature. Inversion is usually of short duration but quite common nonetheless.

- A long winter night with clear skies and still air is an ideal situation for inversion. The heat of the day is radiated off during the night, and by early morning hours, the earth is cooler than the air above. Over polar areas, a temperature inversion is normal throughout the year.

75. D

- In 1962, the Election Commission in collaboration with the Law Ministry, the National Physical Laboratory of India and the National Research Development Corporation made an agreement with Mysore Paints and Varnish Ltd. to manufacture ink that couldn't be wiped off easily.
- Mysore Paints was founded in 1937 by Maharaja Krishnaraja Wadiyar IV. The company is the sole supplier of indelible ink for civic body, Assembly and Parliamentary polls. It also supplies ink to about 25 countries. Indelible ink remains bright for about 10 days, after which it starts fading. It is known to contain silver nitrate and is manufactured in secrecy.
- https://www.thehindu.com/opinion/op-ed/what-is-indelible-ink/article26600648.ece

76. C

- Evaporation is more prevalent over the oceans than precipitation, while over the land, precipitation routinely exceeds evaporation. Most of the water that evaporates from the oceans falls back into the oceans as precipitation
- Evaporation rates are higher at higher temperatures because as temperature increases, the amount of energy necessary for evaporation decreases. In sunny, warm weather the loss of water by evaporation is greater than in cloudy and cool weather.
- Due to high latent heat of vaporization of water (2.5 kJ g− 1 at 0°C and 2.4 kJ g− 1 at 40°C), evaporation carries off a significant amount of heat energy from the surface, thereby effectively cooling it.

77. C

- Lakes are only temporary features of the earth's crust; they will eventually be eliminated by the double process of draining and silting up. The process of lake elimination may not be completed within our span of life, it takes place relatively quickly in terms of geological time.
- Lakes can be formed as a result of erosion. Karst lakes and wind deflated lakes are examples.
- Deposition also gives life to lakes at times. Oxbow lakes and lagoons are examples of the same

78. B

- The mid-ocean ridge system is the most extensive chain of mountains on earth, but more than 90% of this mountain range lies in the deep ocean. They normally lie above the sea floor because of the mantle upwelling from the divergent plate boundaries.
- The formation of ocean ridges can be attributed to the result of mantle convection. It is the slow, churning motion of Earth's mantle. Convection currents carry heat from the lower mantle and core to the lithosphere. These are common in divergent plate boundaries and not in the subduction or convergent plate boundaries.

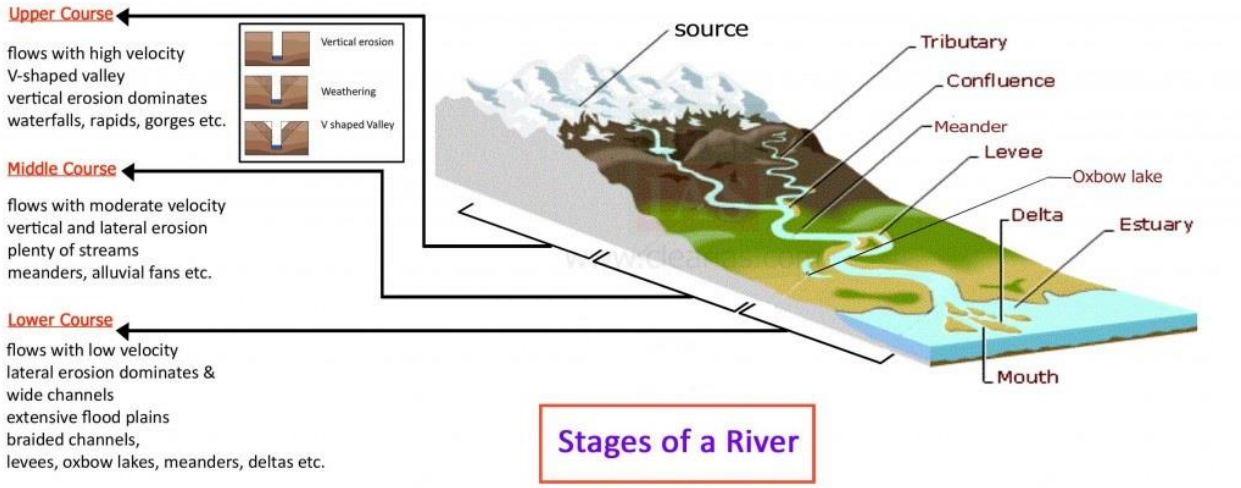
79. B

- Nirbhay is a long range, all-weather, **subsonic cruise missile** designed and developed in India by the Defence Research and Development Organisation (DRDO). The missile can be launched from multiple platforms and is capable of carrying conventional and nuclear warheads.
- It is a two-stage missile powered by Solid rocket motor booster. It is capable of carrying warheads of up to 300kg at a speed of 0.6 to 0.7 Mach (sub-sonic). It has an operational range of 1000 km. The Nirbhay cruise missile is an Indian version of the American Tomahawk.

80. B

- Based on place and time taken in cooling of the molten matter, igneous rocks can be divided into Plutonic and Volcanic rocks.
- Plutonic rocks forms when the molten matter is not able to reach the surface and instead cools down very slowly at great depths. Slow cooling allows big-sized crystals (large grains) to be formed. Granite is a typical example. These rocks appear on the surface only after being uplifted and denuded.
- Volcanic rocks are formed by rapid cooling of the lava thrown out during volcanic eruptions. Rapid cooling prevents crystallization, as a result such rocks are fine-grained. Basalt is a typical example. The Deccan traps in the peninsular region is of basaltic origin. Basic rocks contain a greater proportion of basic oxides, e.g. of iron, aluminium or magnesium, and are thus denser and darker in colour.

81. A

- 

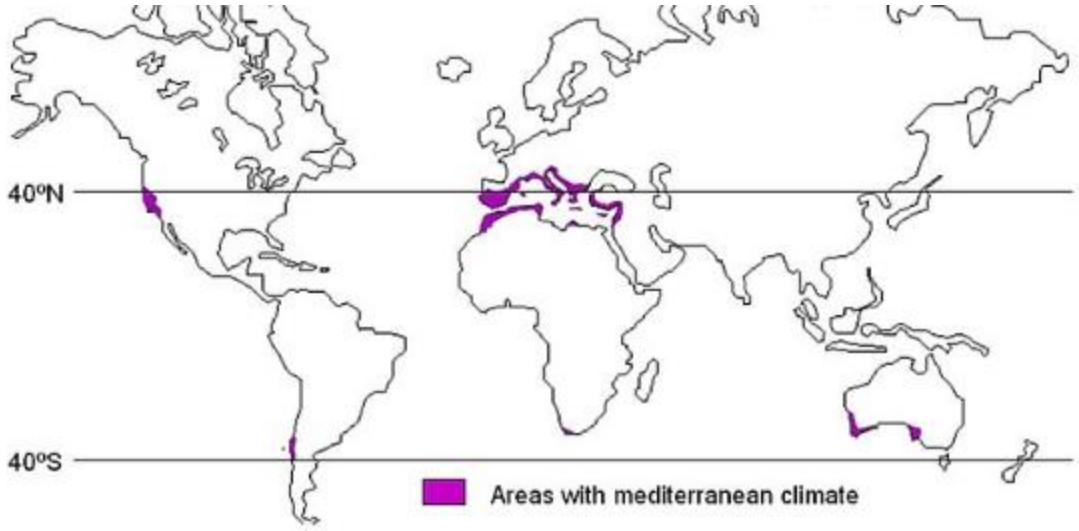
82. B

Acidic rocks	Basic rocks
• High content of silica—upto 80 per cent	• Poor in silica; magnesia content (40 per cent)

• Due to the excess of silicon, acidic magma cools fast	• Due to low silica content, the parent material of such rocks cools slowly
• High Volcanic mountains are formed of this type of rock. Mt Fuji, Japan	• Forms plateaus. Deccan Traps
• Lesser content of heavier minerals like iron and magnesium and normally contain quartz and feldspar. Hence they are lighter in colour	• Presence of heavy elements imparts to these rocks a dark colour.
• Granite, quartz, feldspar etc.	• Basalt, gabbro, dolerite etc..
• Add rocks are hard, compact, massive and resistant to weathering.	• Not being very hard, these rocks are weathered relatively easily.

83. B

- Mediterranean Climate has dry summers that are hot or warm as well as winters that are cool or mild with moderate or high rainfall. It includes the climate of much of the land near the Mediterranean Sea.



- In addition to the Western Australia region, the places like Chile, California etc. experiences the Meditteranean climate as well.

84. D

- The word metamorphic means 'change of form'. Form under the action of pressure, volume and temperature (PVT) changes. Metamorphism occurs when rocks are forced down to lower levels by tectonic processes or when molten magma rising through the crust comes in contact with the crustal rocks.
- Metamorphism is a process by which already consolidated rocks undergo recrystallization and reorganization of materials within original rocks. In the process of metamorphism in some rocks grains or minerals get arranged in layers or lines. Such an arrangement is called foliation or lineation.
- Sometimes minerals or materials of different groups are arranged into alternating thin to thick layers. Such a structure is called banding.
- Gneissoid, slate, schist, marble, quartzite etc. are some examples of metamorphic rocks.

Some Examples of Metamorphism

Granite —Pressure→ Gneiss
Clay, Shale —Pressure→ Schist
Sandstone —Heat→ Quartzite
Clay, Shale —Heat→ Slate —Heat→ Phyllite
Coal —Heat→ Anthracite, Graphite
Limestone —Heat→ Marble

85. C

- The velocity and direction of the wind are the net result of the wind generating forces. The winds in the upper atmosphere, 2 - 3 km above the surface, are free from frictional effect of the surface and are controlled mainly by the pressure gradient and the Coriolis force. When isobars are straight and when there is no friction, the

pressure gradient force is balanced by the Coriolis force and the resultant wind blows parallel to the isobar. This wind is known as the geostrophic wind

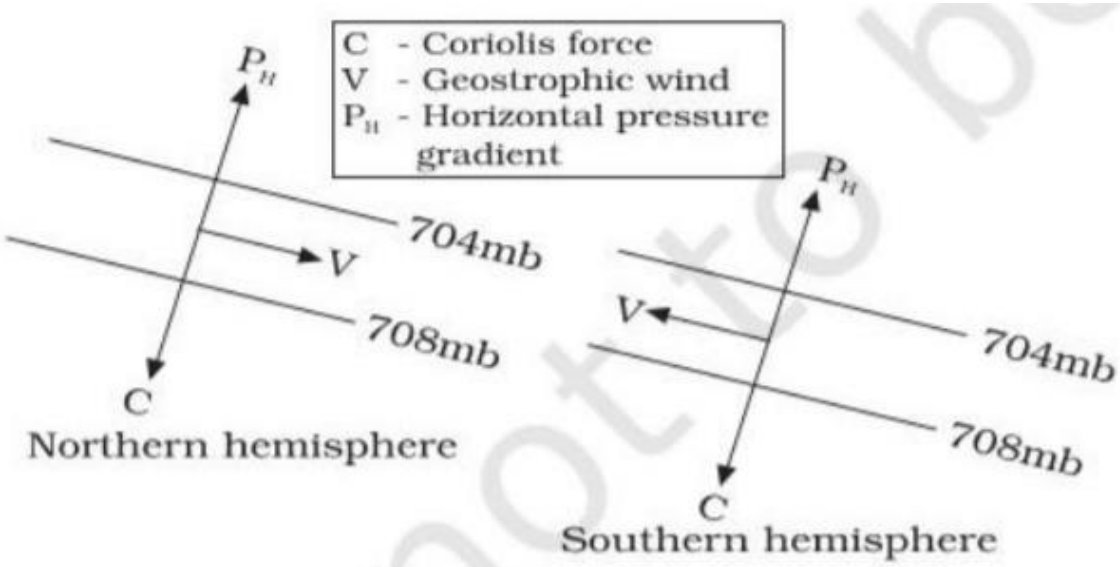


Figure 10.4 : Geostropic Wind

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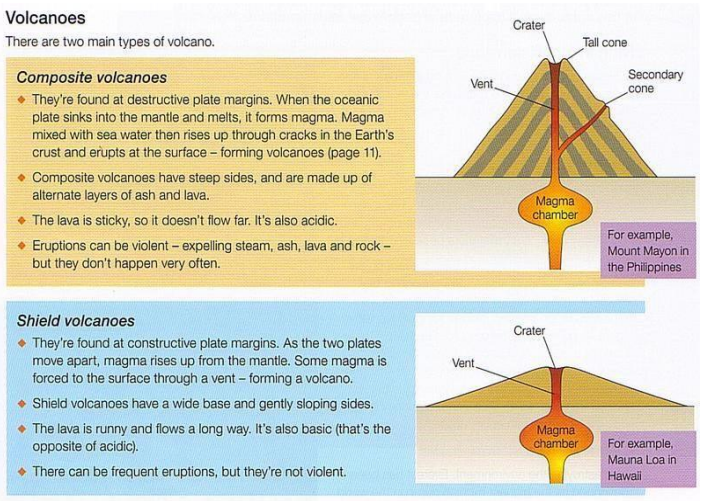
86. D

- The Battle of Kangla Tongbi, considered one of the fiercest battles of World War II, was fought by Ordnance personnel of 221 Advance Ordnance Depot (AOD).
- Japanese forces had planned a three-pronged offensive to capture Imphal and the surrounding areas. In their attempt to extend their line of communication to Imphal, the 33rd Japanese Division cut in behind the 17th Indian Division at Tiddim (Mynmar) and establishing themselves firmly on the main Kohima – Manipur highway, started advancing towards Kangla Tongbi. Here at Kangla Tongbi, a small but determined detachment of 221 AOD put up stiff resistance against the advancing Japanese forces.

87. C



88. C

- **Outcomes of Jallianwala bagh Massacre:**
- Considered the 'The Butcher of Amritsar' in the aftermath of the massacre, General Dyer was removed from command and exiled to Britain.
- Rabindranath Tagore and Mahatma Gandhi, as a sign of condemnation, renounced their British Knighthood and Kaiser-i-Hind medal respectively.
- In 1922, the infamous Rowlatt Act was repealed by the British

89. C

- The drainage pattern was already present before a period of uplift and folding that formed the present structure. As the uplift took place, the rivers were able to cut down at approximately the same rate and so maintain their courses. This process is called antecedence and the drainage system thus developed is called antecedent drainage.
- Many of the Himalayan rivers have antecedent origin i.e. these rivers existed even before the Himalayan ranges were uplifted. These rivers originate in the Tibetan side beyond the mountain ranges of Himalayas. The Indus, Satluj, Alaknanda, Gandak, Kosi, Brahmaputra all have an antecedent origin. Since these rivers are antecedent, they run transverse to the mountain ranges cutting deep V-shaped, steep-sided valleys (deep gorges).

90. C

- Phytoplankton require more nutrients for its survival as they have a greater need for the vertical mixing of the water column that restocks depleted nutrients.
- The ocean has warmed since the 1950s and it has become increasingly stratified, which cuts off nutrient recycling.
- When the warm water is located above the cold water, it tends to become stratified. The warm water remains on the top in general and generally mixing do not take place as a result the productivity of phytoplanktons reduces.
- Abnormal warming of the ocean surface is not logical. It cannot increase the growth of phytoplanktons generally.

91.B

- IEPF is a fund where unclaimed dividend, refunded application money, matured company deposits and debentures, as well as the interest on them, is used, provided it is not claimed within seven years.
- It is a fund set up under the Ministry of Corporate Affairs to help promote investor awareness and protection of investor interests.
- IEPF Authority has been set up under the Ministry of Corporate Affairs, Government of India as a statutory body under Companies Act 2013 to administer the IEPF with the objective of promoting Investor's Education, Awareness and Protection.

92. B

- Statement 1 is true because bay of bengal has more frequent cyclone events as it is an enclosed sea
- Second statement is false as there will be cyclones in the Arabian Sea
- Third statement must be eliminated at a single glance as it does not have any logical or scientific backing

93. D

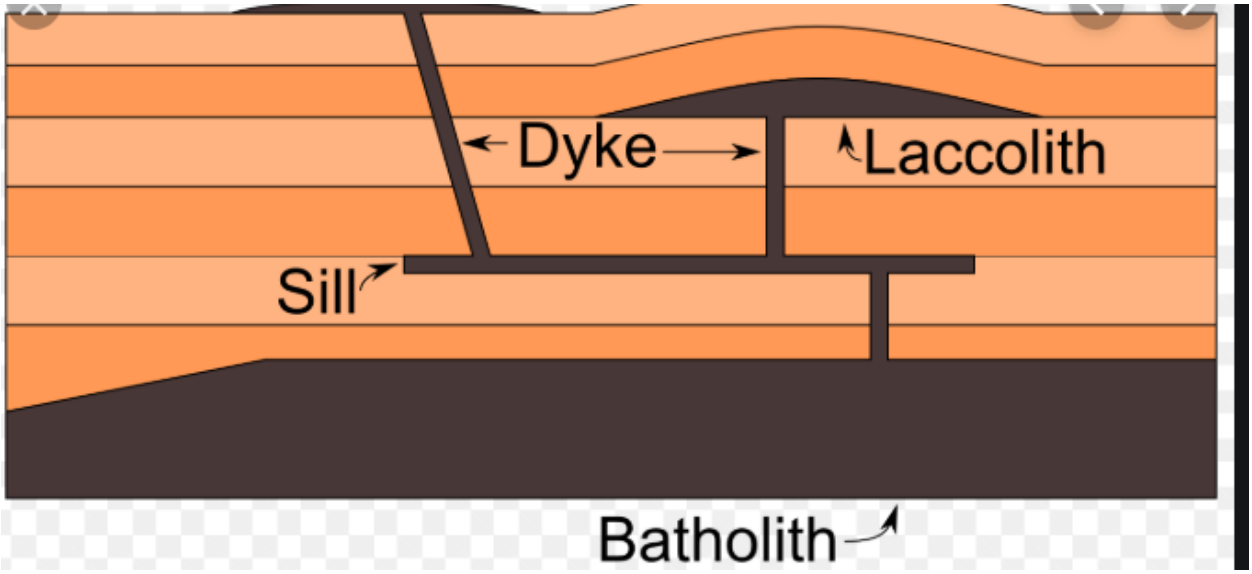
- Armenia is a landlocked country located in the South Caucusus mountains. It is surrounded by the countries like Georgia, Iran, Azerbaijan etc.
- Uzbekistan is a Central Asian country and is a doublly landlocked country as well.

- Similarly, Afghanistan is also a landlocked country and there is little acess for the country to Indian Ocean except through Iran or Pakistan.

94.C

- DTAB is highest statutory decision-making body on technical matters related to drugs in the country. It was constituted as per the Drugs and Cosmetics Act, 1940.
- It is part of Central Drugs Standard Control Organization (CDSCO) in the Ministry of Health and Family Welfare.

95. A

- 

96. D

- Abyssal Plains is an underwater plain on the deep ocean floor, usually found at depths between 3,000 metres and 6,000 metres. It cover more than 50% of the Earth's surface.
- Cold Ocean currents generally play active role in the formation of deserts due to its desiccating effect. The dryness is caused due to the presence of such cold currents. The desert like Atacma are formed due to factors like Humboldt current.
- Cold ocean water is denser and this is why it sinks into the bottom which causes the formation of ocean currents in general from equator to the poles.
- Among the Oceans, one of the lowest extensive continental shelf is found in the Pacific Ocean. The shelves are narrow where high mountains are very close and parallel to the coast. The presence of Rockies and Andes mountains cause it to be less extensive in nature in Pacific Ocean.

97. B

- Earth Day is an annual event celebrated around the world on April 22 to demonstrate support for environmental protection. First celebrated in 1970, it now includes events coordinated globally by the Earth Day Network in more than 193 countries
- On Earth Day 2016, the landmark Paris Agreement was signed by the United States, China, and some 120 other countries. This signing satisfied a key requirement for the entry into force of the historic draft climate protection treaty adopted by consensus of the 195 nations present at the 2015 United Nations Climate Change Conference in Paris.
- Not to confuse it with earth hour

98. C

- Five basic factors control the formation of soils: (i) parent material; (ii) topography; (iii) climate; (iv) biological activity; (v) time. In fact soil forming factors act in union and affect the action of one another.

99. C

- Black Sea is located in Eurasia, surrounded by Europe.The countries share a border with the Black Sea includes Romania, Turkey, Bulgaria, Ukraine, Russia, and Georgia.
- Tyrrhenian Sea is a marginal sea located inside the Meditteranean Sea.. It borders the western coast of Italy. The islands of Sicily, Sardinia etc. lie on this sea.
- Adriatic Sea is a body of water separating the Italian Peninsula from the Balkan peninsula which includes the countries like Croatia, Bosnia etc.
- 

100. C

- Lumbering and its associated timber, paper and pulp industries are the most important economic activities in the Laurentian climatic region.
- The occurrence of trees in almost pure stands and the predominance of only a handful of species enhance the commercial value of the forests.
- To export the timber from this region, availability of modern means of transport is a necessity as well. Laurentian regions are blessed with such facilities. The extremely high density of trees are often found in the tropical rainforest which is one of the factors that inhibit the commercial lumbering in such forests.
- The Laurentian region has only moderately dense softwood trees in the habitat.