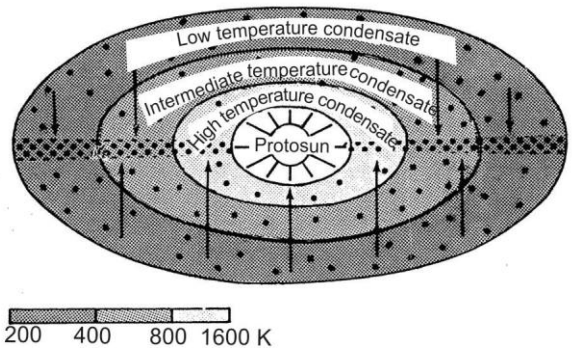
Inhomogeneous Accretion Model can best explain the evolution of crust. Discuss.

This model assumes that there was a hot solar nebula . The temperature in the nebula was constantly falling. With the fall in temperature, the various compounds of the solar nebula condensed and accreted, i.e., solid particles collided to form planetary bodies in the disc around the Sun. This progressive condensation and accretion resulted in planetary growth. The zoned structure of the Earth with an iron core surrounded by a silicate mantle, may have been produced by sequential condensation and accretion of the Earth from the cooling solar nebula.



Section across Solar Nebula.

The last compounds to condense produced a thin layer of planetary surface, rich in alkaline and other volatile elements, which formed the first crust.

However, if the crust evolved in this manner, i.e., by inhomogenous accretion, the non-volatile elements like Uranium, Thorium and Rare Earth Elements (REE) should have been concentrated in the core and lower mantle. Instead, they are concentrated in the crust. This concentration may have been the result of magmatic transfer from within the Earth, producing a crust of magmatic origin and concentrated REE in the crust.

Give an account of the Origin of atmosphere. How has that been diferent from origin of the earth?

The atmosphere was not present when the Earth took its birth some 4.5 b. y. ago. Earth's original atmosphere probably formed along with the planet. Scientists theorise that the Sun and all the planets formed from a cloud of gas and dust about 4.5 billion years ago. The cloud collapsed into a central body, which formed the Sun and ten rings. The rings eventually became the nine planets. One ring did not form a planet.

It is likely that high-energy radiation from the young Sun, called the solar wind, scattered into space most of the gases that had originally collected around the closest to the Sun, including Earth. Some of the more distant planets, such as Jupiter and Saturn, have retained their first atmospheres.

After the solar wind scattered Earth's original atmosphere, a new atmosphere formed from gases, such as hydrogen, methane, and water vapour that were trapped inside the Earth when it formed. Most of these gases escaped during volcanic eruptions. In fact, escaping gases are still adding to the atmosphere today.

One abundant gas of this primitive atmosphere was water vapour. This water vapour produced rains that lasted for millions of years. These rains filled in the low places on the Earth and formed the primitive ocean. Escaping hydrogen was lost into space. Other gases, such as carbon dioxide and sulphur dioxide, were created by chemical reaction and remained in the new atmosphere. This primitive atmosphere was very different from the Earth's present atmosphere.

The living organisms that evolved on the Earth were probably responsible for the change from the primitive atmosphere to the present atmosphere. Bacteria, among the first living organisms on the Earth, developed two processes that were fundamental to life. At first, they used ammonia from the primitive atmosphere to make the chemical compounds necessary for life. Later, the bacteria used sunlight as a source of energy to make their own food. These bacteria, called cyanobacteria, made their food through the process of photosynthesis. During photosynthesis, water and carbon dioxide are combined chemically to make sugar.

Photosynthesis also releases oxygen as a by product. Other life forms needed this oxygen to survive. Today green plants, rather than cyanobacteria, produce most of the oxygen in the atmosphere.

Of the gases that were released into the primitive atmosphere, some, especially oxygen and carbon dioxide, dissolved in the ocean. In water, carbon dioxide reacts with rocks, forming calcium carbonate. By about 600 million years ago, enough oxygen had dissolved in the ocean to allow animal life to evolve there. Many of these early life forms had shells of calcium carbonate. Most of the carbon dioxide in the Earth's atmosphere was used by these animals to form their shells. Only a trace of carbon dioxide remains in the atmosphere today.

With the removal of carbon dioxide from the primitive atmosphere, nitrogen became the most abundant gas. Oxygen, from photosynthesis, soon became the second most abundant gas. As oxygen increased, the sulphur dioxide in the primitive atmosphere was oxidized to sulphuric acid. The sulphuric acid then washed out of the atmosphere as "acid rain."

Discuss the origin of sea water and the balance that it maintains in its composition.

The enormous volume of oceanic water on the earth actually came from the interior of the earth by out gassing of the more volatile materials from mantle through the crust and on to the surface.

The Earth acquired many volatile materials that were responsible for the formation of its atmosphere and oceans kept some of the materials while it released some and let it go, escape into the universe.

Vast amounts of water were locked within the hydrous silicate minerals that were outgassed from the mantle through the crust by way of cracks on to the earth's surface gradually filling the depression.

The total amount of dissolved material in the ocean waters is called salinity. The major constituents of sea water is chloride, sodium, sulphate, magnesium, calcium, potassium, b romaine and others.

The entire process and mechanism of input and output of various materials from the various sources and its extraction is called salt budget. The principle of conservation of salt asserts that the total amount of dissolved salts in ocean is constant and balanced.

Discuss the objectives and principles of environmental education. Describe the basic concerns of formal and non-formal environmental education in India. 15

The branch of education that deals with teaching and learning about the relationships between living organisms and their non-living natural and human-built ENVIRONMENT. This area of education primarily deals with the human role in ecological systems. In the broadest sense, environmental education allows human culture to flourish in diverse environmental conditions. It will include:

- raising general awareness of environmental issues and the for a responsible approach to these issues;
- raising awareness on how the activities of individuals and other institutions/organizations operate in respect to the environmental effects;
- imparting skills/knowledge to measure the environmental effects;
- imparting skills/knowledge to avoid or remediate our impact the environment;
- in all this, giving an awareness of the holistic context of environmental problems.

Needs of Environmental Educations

Because environmental issues are complex and involve aspects of scientific, cultural and political expertise, environmental education is ideally interdisciplinary. The earth sciences, biology, meteorology, geography, economics and sociology are all important, but not exhaustive, transdisciplinary elements of environmental education programmes.

Improving Environmental Education

Concerns of formal environmental education

1. making education on environmental and development available to people of all ages;
2. including environment and development concepts in all educational programmes;
3. involving children in local and regional studies of environmental health;
4. setting up training programmes to help school and university graduates attain sustainable livelihoods;
5. encouraging all sectors of society to train people in environmental management.
6. providing locally recruited and trained environmental technicians to give communities the services they require;
7. working with the media, entertainment and advertising industries to stimulate public debate on the environment;
8. Bringing the understanding and experience of indigenous peoples into education and training programmes.

Concerns in non formal environmental education

Imbibing environmental ethics as part of family education values and ethoes

Use of and knowledge of local wisdom in environmental education.

"Geography is a contested and multiparadigmatic discipline with a strong eurocentricity that has only recently been challenged." Comment. 10

What is meant by contested discipline?

What is meant by multi paradigmatic discipline?

What is meant by Eurocentricity.

European concept of contestation and multi paradigm.

- Determinism
- Possibilism
- Regional Concept
- Quantification
- Behavioural
- Radical

Dark Ages or Early Middle Ages, the early medieval period of western European history—specifically, the time (476–800 ce) when there was no Roman (or Holy Roman) emperor in the West or, more generally, the period between about 500 and 1000, which was marked by frequent warfare and a virtual disappearance of urban life. The name of the period refers to the movement of so-called barbarian peoples—including the Huns, Goths, Vandals, Bulgars, Alani, Suebi, and Franks—into what had been the Western Roman Empire. The term “Dark Ages” is now rarely used by historians because of the value judgment it implies.

The Earth was considered like a disc and its centre was believed to be at Jerusalem.

- Heaven was also indicated on the world map.
- Religious episode was given place in Geography.
- Besides human being, there was an imaginary belief of demon living over the Earth.
- Maps were decorative.

What has been challenged and how has it been challenged

Concept of Knowledge

Concept of Disaster

Distortions and Ignoring of Contributions

Changing of Names and nomenclature distortion-Singapore, Malaysia, India,

Mostly challenged by India then comprising Afghanistan to Bali islands

The contributions to Indian geography came largely from astronomers and astro-physicists like Varahmihira, Brahmagupta, Aryabhatta, Bhaskaracharya, Battila, Vtpala, Vijaynandi, etc.

1. determinism challenged by
2. Varahamihira had claimed for the first time perhaps that there should be a force that might be keeping bodies stuck to the earth, and also keeping heavenly bodies in their

determined. Thus the concept of the existence of some tractive force (force of gravity) that governs the falling of objects to the earth and their remaining stationary after having once fallen; as also determining the positions which heavenly bodies occupy, was recognised.

3. Brahamgupta estimated the circumference of the earth. Besides, he also formulated ideas about gravity and gravitation.
4. Aryabhatta was born in Kerala, but lived in Kusumpapura, which was later identified as Patliputra (modern Patna). He was also the earliest to discover that the orbits of the planets around the Sun are ellipses. He made an accurate approximation of the Earth's circumference and diameter, and also discovered how the lunar eclipse and solar eclipse happen for the first time. He is the first known astronomer to have used a continuous system of counting solar days.

Interpretation of Dark Ages

The period of 4th to 6th Century is considered as the Classical period in the History of India. The whole of North India was united by the end of 6th century under the rule of Gupta Empire. This period has been called the Golden Age of India and was marked by extensive achievements in Science, Technology, Engineering, Art, Dialectics, Literature, Mathematics, Astronomy and Philosophy.

The period of 7th to 12th Century is called as Late Classical period after the decline of Gupta Empire. This period produced some of India's finest art, considered the epitome of classical development, and the development of the main spiritual and philosophical systems which continued to be in Hinduism, Buddhism and Jainism. (Brihadeshwar Temple built by RajaRajeswara Chola in the 12th Century). Incidentally, most of the major contributions are missing from Indian texts, Government contributions and even from school text books.

Most of the concept taken from India and repackaged

1. Grid pattern
2. City administration
3. Disaster management
4. Agriculture
5. Only reflecting European Society
6. Environmental Management
7. Even colony and how to expand colonies

Why Indian Geographers contribution is not very well recognized in the world.

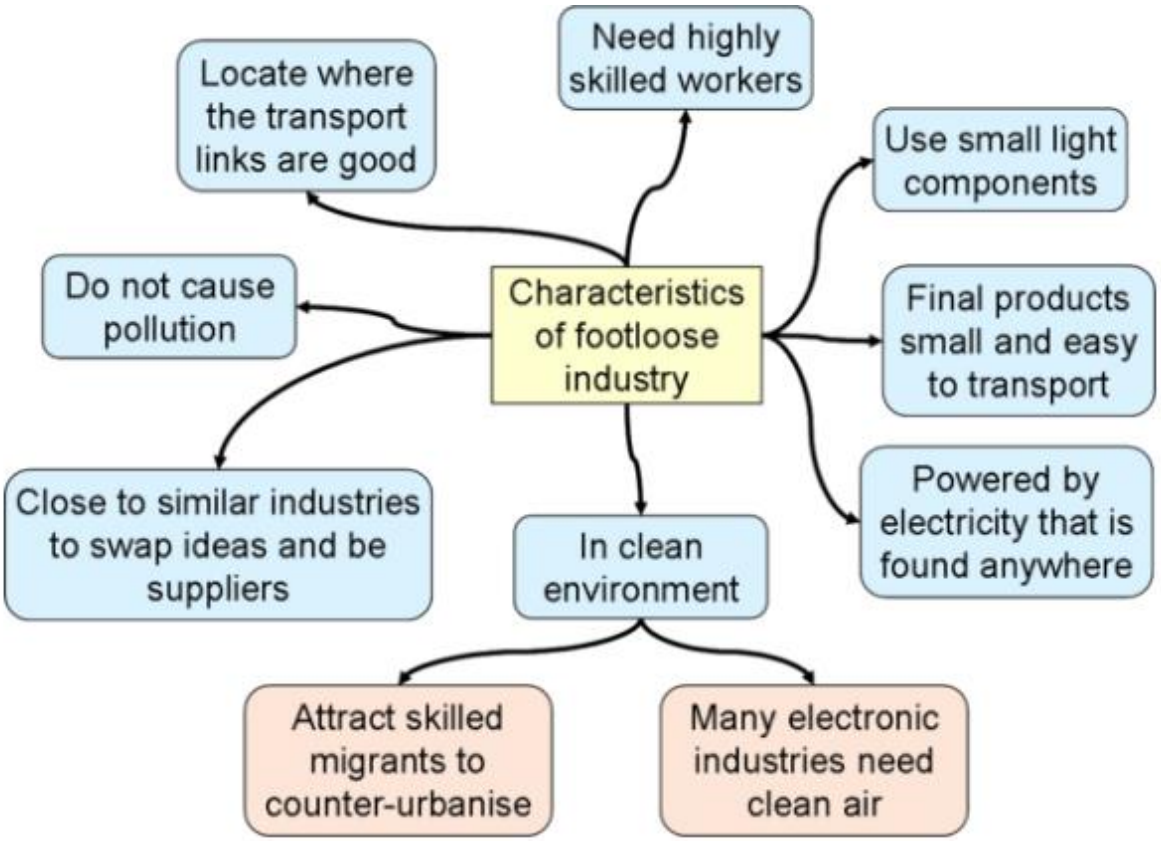
1. Colonial mindset of the Indian people.
2. Elimination of the contributions of India to knowledge world by the apathy of the previous Governments.
3. Inability of India to transform itself from state to nation.
4.

Discuss the degree of importance of transportation costs as a factor of industrial location with respect to "footloose industries".

Meaning of footloose Industry

Industries which do not seem either to be tied to any special kind of location or to have any overriding location requirement. "Footloose industry is a general term for an industry that can be placed and located at any location without effect from factors such as resources or transport. These industries often have spatially fixed costs, which means that the costs of the products do not change despite where the product is assembled" Footloose industries can also refer to the processing of products that are neither weight-gaining, nor weight-losing, and face significant transportation costs. An example of a footloose processing industry is honey. The weight of the raw honey and wax, is the same as the finishing product. So whether the honey is processed near the source of the raw materials or at the location of the final product demand, the transportation costs are the same.

IT Industry is a footloose industry. It can be replaced anytime and anywhere by anybody irrespective.



Digital Economy can be established anywhere.

Locations next to expressway and transport corridors would suggest that transport is the most important factor in deciding their location. Since they use or assemble parts of no great weight or bulk made by other industries, transport to market is more significant than raw material assembly.

The wealthiest and most concentrated market in the country is Greater London. Being near to here is a great advantage. At the same time, there are motorway connections to the rest of Britain, and a high-speed rail link follows the M4 corridor between London and South Wales. Closeness to the Channel Tunnel is also important for access to EU markets. They also benefit from nearness to London's three main airports for international business links.

Labour and skill is a key locational factor. The availability of highly skilled research scientists and engineers is very important. The presence of several universities has helped to provide a pool of graduates, and universities offer research facilities as well. The long-established presence of aerospace research in Bristol area, undertaken by companies such as Rolls-Royce and British Aerospace, has been a further attraction for some companies. Another important consideration is where these specialist workers prefer to live.

Future footloose industries

Areas of pleasant countryside are close enough to be accessible at weekends, they are near to airports for holidays abroad, and everywhere is within easy reach of net as well as for big sporting events, exhibitions and shopping and shows.

Explain the concepts of "megalopolis" and exopolis" with regard to the growth of cities indicating whether the two can and do overlap. 10

The word megalopolis or conurbation originated from two words – 'Continuous' and 'urban area'. "Conurbation means continuous urban development over a considerable area." First of all the word conurbation has been used in 1915 by P. Geddes. He explained the continuous urban area of more than two urban centres which may have a separate territorial units. Conurbation highlights the characteristics of neighbouring towns as a city region, agglomerated town, constellation of towns, millionaire cities, besides urban agglomeration, urban aggregate or complex, urbanized area, metropolitan area and aggregates of local authority areas.

Type of Conurbation

Two types of conurbation may be identified:

1. Polycentric (or polynuclear), have resulted from the fusion of a number of distinct towns and cities, Examples include the Pittsburgh district, the western side of Lake Erie, the Lille—Roubaix—Tourcoing traingle in north-east France, the Ruhr coalfield (Germany) and Upper Silesia in Poland (around Katowice).
2. Monocentric(or uninuclear), which have resulted from the expansion of a single major city. Examples include London, Paris, Buenos Aires, Sydney and Chicago.

In general, polycentric conurbations are characteristics of ‘old’ countries (like those in Europe) and monocentric conurbations are characteristic of ‘new’ countries (such as those in the Americas, Africa and Australia).

Exocity is a form of decentralised urban and suburban growth,and peripheralisation of urban core of the city, and where centrality is nearly ubiquitous. It is widely used as a label for catch all label for suburban growth.

It has a concentration of business, shopping, and entertainment outside a traditional urban area in what had recently been a residential suburb or semi-rural community.

Most exocities develop at or near existing or planned freeway intersections, and are especially likely to develop near major airports.

Exocities consist of mid-rise office towers (with some skyscrapers) surrounded by massive surface parking lots and meticulously manicured lawns. Instead of a traditional street grid, their street networks are hierarchical, consisting of winding parkways (often lacking sidewalks) that feed into arterial roads or freeway ramps.

Write a note on "forward and backward linkages" in Perroux's thesis of economic growth and regional development. 10

The concept of a growth poles was developed by the French regional economist, Perroux, in 1955. There are two cornerstones on which Perroux bases his theory: Schumpterian theory of development, and theory of inter-industry linkages and industrial interdependence.

Inter-industry linkages can be of two types—forward linkages and backward linkage. In the case of a backward linkage an industry encourages investment in the earlier stages of production by expanding its demand for inputs (which are the outputs of industries in the earlier stages of production). In the case of a forward linkage, an industry encourages investment in the subsequent stages of production either by transmitting innovation or effects of innovations forward. One possibility is that as a result of innovations, costs of production in the industry decline. This could lead to a fall in the price of its output. If this happens, the demand for this industry's output by those industries which use its output, will increase. In addition to this possibility, there are many other ways in which innovations or effects of innovations can be transmitted forward. All these factors imply industrial interdependence.

The central idea of the growth poles theory is that economic development, or growth, is not uniform over an entire region, but instead takes place around a specific pole (or cluster). This pole is often characterized by core (key) industries around which linked industries develop, mainly through direct and indirect effects.

Citing examples from Asia and Europe, comment upon the contexts within which pronatalist population policies are advanced. What could be the implications of these policies on women's workforce participation?

Meaning of pronatalist population policies

Where and under what circumstances pro natalist policies were advanced.

A half-century ago six countries – Czechia, Estonia, Hungary, Japan, Latvia and Ukraine, 5% of the world's population – reported fertility rates slightly below replacement level. Today a record high of 83 countries, representing about half of the world's population, report below-replacement level rates. By 2050 more than 130 countries, or about two-thirds of the world's population, are projected to have fertility rates below replacement level.

In many developed countries significant numbers of women remain childless. The percentage of childless woman aged 40 to 44 years in the United States, for example, doubled from 1976 to 2006, reaching over one-fifth of women. In 2010 no less than one-fifth of women aged 40 to 44 years were childless in Austria, Germany, Japan, Spain and the United Kingdom. Reasons for not having children vary, often encompassing personal, financial, political and environmental considerations.

Pronatalist incentives may encourage some couples to have additional children or start families earlier than planned. Such measures by and large tend to be costly, the impact modest at best, and insufficient at increasing fertility rates above replacement levels. Powerful forces overwhelm pronatalist policies, especially economic uncertainty related to automation and the decline of good jobs and the high costs of having children.

Examples-

Sweden- Sweden has had a highly developed population policy oriented towards sustaining the birth rate, which is one of the lowest in the world. In the Swedish policy, however, considerations of individual welfare and personal freedom have always taken precedence over pro-natalist aims whenever the two were in conflict. Voluntary parenthood is encouraged, abortion laws have been relaxed and sex education in schools forms an important part of the educational programme.

Russia

France In France, The Code de la Famille of 1939 outlines the various measures adopted in pursuance of the pro-natalist policy. Though there are no set demographic goals, the purpose of the Code is to encourage family formation and child-bearing, and several positive measures, have been outlined for this purpose. Family allowances are granted to those with two or more children, with a higher allowance for the third child and subsequent children Families with only one wage-earner receive allowances beginning with the first child, and the allowance per child is higher. Pre-natal and maternity allowances are paid and married couples receive Government loans, tax reductions and rebates on the costs of public services. The Government subsidises school canteens, boarding schools, vacation camps and day nurseries.

Romania Hungary and Romania are two European countries with definite pronatalist policies. Hungary relies on economic incentives that would reduce the private costs on children. There are numerous incentives for childbearing including monthly payment for children, generous maternity

leave to mothers, a birth bonus, sick leave for child care, subsidies on purchases meant for children, partial down payment for a house depending on the number of children planned, guaranteed job security for mothers, etc. Restrictions on legal abortion have been placed since 1974. However, at the same time, access to modern methods of contraception has been improved and their use has been encouraged. Romania offers an example of a pronatalist policy that attempts to raise fertility by placing limits on both abortion and contraception, with modern contraceptives being available only for medical reasons. Hungary does not depend on incentives for childbearing to any great extent.

Japan The case of Japan is rather unique, in the sense that she has now reversed her anti-natalist policy, though it was never explicitly announced to be so, but was implemented with several programmes having demographic implications, such as the Eugenics Protection Law of 1948. Which made abortion easily available, and Government- sponsored programmes for the promotion of contraception since October 1951 designed to curb the increasing number of abortions.

Iran Purpose

Impact on Womens workforce participation.

Lot of children to look after

Explain the unusual intensity of dust storms and thunder storms across India in the pre-monsoon period of year

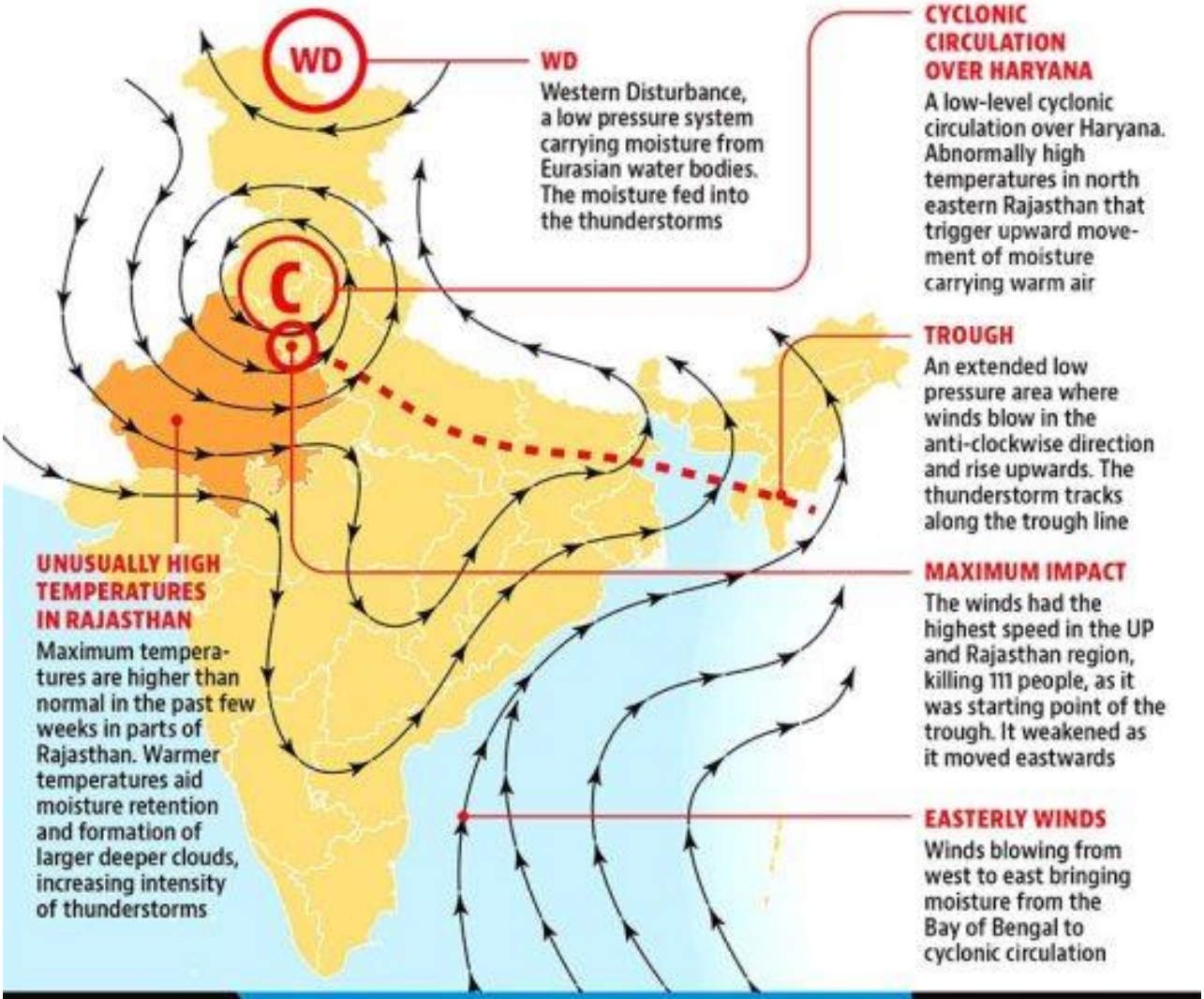
The northern Indian plains have witnessed a series of thunderstorms and dust storms with differential severity.

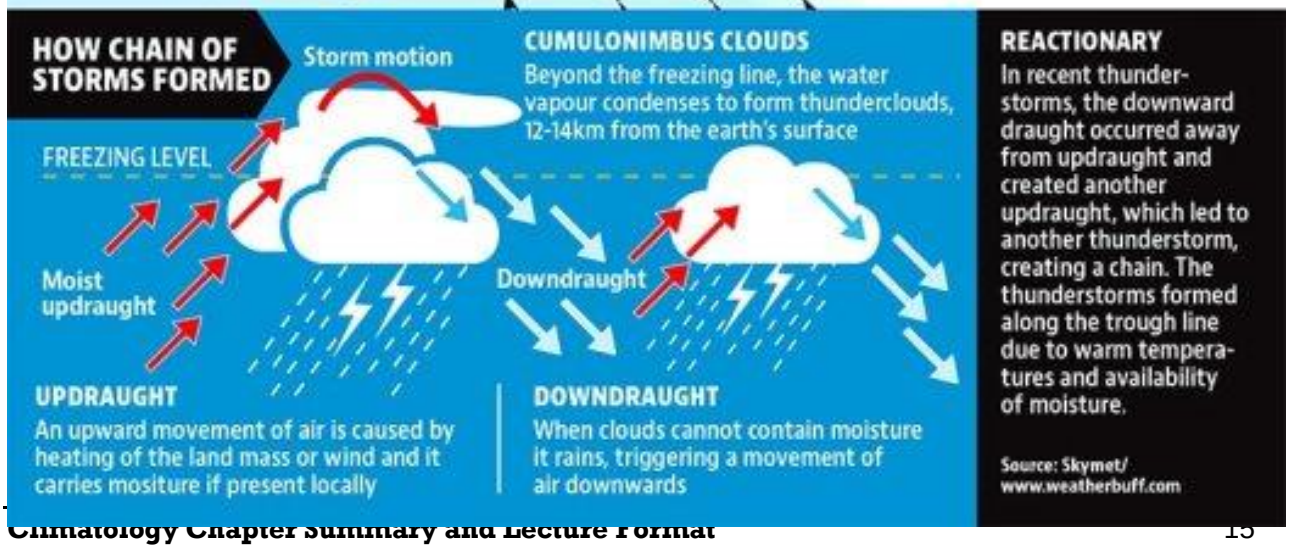
Even though storms are common for North and north western region of India occurring in the months of April to June, but they are generally accompanied with little or no rain. But this time it was heavy rain, hails and strong winds which increased the intensity and impact of the storm

Reasons behind the phenomena

WHAT LED TO THE THUNDERSTORM?

The culmination of moisture from western disturbances and easterly winds with unusually high temperature led to the thunderstorm, leading to devastation in parts of northern India. Thunderstorms are usual in pre-monsoon period





REACTIONARY

In recent thunderstorms, the downward draught occurred away from updraught and created another updraught, which led to another thunderstorm, creating a chain. The thunderstorms formed along the trough line due to warm temperatures and availability of moisture.

Source: Skymet/ www.weatherbuff.com

Causes of Generation of these thunderstorms

1. Very hot conditions

Temperatures of over 40 degree Celsius have been observed in northwest, central and east and north peninsular India. Maximum temperature was upto 8 degrees celsius above normal. This led to an intense heat wave. Interaction of hot air near the surface with colder winds from the western disturbances gave rise to intense and widespread storms

2. Western Disturbances (WD)

While the western disturbances normally peak between December and February, a greater number of active WD have been observed in spring and summer months. Instead of the normal 2-3 active WD seen during the month of April and May, over the past month and a half at least 10 separate active WDs have been observed.

3. Cyclonic circulations

In the build-up of the massive storms at the beginning of May, five separate cyclonic circulations were observed across the country

4. Existence of a Troughs

This is where moisture laden winds from the Bay of Bengal met hot and dry air from central and western India. These winds also came in contact with the cold front that develops due to active WDs.The confluence of these different winds culminated in intense and widespread storms across the Indo-Gangetic plain.

5. Movement of Easterly winds into India.

Easterly winds from the Bay of Bengal carry moisture and is associated with pre-monsoon thunderstorms in the eastern coast. But this usually happens in the winter months. In 2018, the easterlies have continued well into May and have interacted with the WDs owing to the east-west trough.

6. Anomalies at sea surface

The anomalies in sea surface temperatures (i.e 1-2 degree warmer waters) over the Bay of Bengal and the Arabian sea have spurred greater moisture transfer than usual by the easterly and westerly winds (respectively) causing the spate of storms.

Keeping the recent developments in view, how can the energy crisis of India be circumvented by harnessing non-conventional energy resources? (10 marks)

Non conventional energy sources

In the short term obviously most of the energy requirements will continue to be met from conventional sources. In the long run, however, these resources will get depleted and new, and unconventional, energy sources will have to be developed in their place. These alternate sources are generally renewable and non-polluting in nature. However it is necessary to further develop the technologies for these new sources and to reduce the cost of generation.

- Animal Power
- Renewable Ocean Energy
- Ocean Thermal Energy Conversion:
- Wave energy:
- Tidal power:

Biofuels

Biodiesel:

Jatropha, energy cultivation

Algae oil

Biogas

Biomass

Even in the short term, non-conventional sources are important for meeting the small and decentralised energy requirements of the rural areas. They can supplement conventional energy sources in meeting domestic and institutional energy requirements in the urban areas. They can also help in environmental preservation.

1. **They will impart sustainability to India's energy scenario.** Algae biofuel can decrease the need for fossil fuels, and expensive foreign oil, it can reduce carbon footprint, and make environment healthier by decreasing the climate change impact.
2. It will increase energy use efficiency in India through the use of
3. Minimise transmission and distribution loss.
4. They will decentralise power generation
5. They will help utilise energy resources hitherto left unutilised.
6. Meet peak power demand through pumped storage.
7. Add to the power supply to the grid
8. May aid in increasing self reliance at community level.
9. Saving in fuel cost
10. Biomass converted to vegetable oils can be used as a substitute/supplement for diesel. While calorific value and ignition quality are good, the viscosity and carbon residue are very high.

(c) Critically assess the vanishing ethnic linguistic plurality of India. (15 marks)

Linguistic pluralism usually refers to the condition that exists when a community or country officially recognizes more than one language. For example, the Indian constitution recognizes fifteen national languages. Linguistic pluralism is common: most of the two hundred or so countries of the world use more than one of the five thousand or so languages spoken on Earth.

India is perhaps the richest language hub on the earth. Exhibiting a baffling range of linguistic diversity, India is a home to more than 350 languages that can be grouped under just five families. India can boast of being the home for a number of dominant languages of the world, and a large number of small languages that are in the brink of extinction. Seeing the language plurality of India, we can say that no single state in India is homogeneous in terms of language. Also, the dominant language of a given region might be a case of linguistic minority in another region.

Hindi written in Devanagri script is the official language of India. Due to the popular spread of English among the masses during the British regime, after Independence, English continues to be the official language of the country to this day. There are four classical languages in India namely Sanskrit, Tamil, Kannada and Telugu each of which has a rich literary tradition that has been flourishing since historic times. While English is the judicial language of India, the proceedings in the parliament need to be done either in English or in Hindi unless a person can't express himself in any of these two languages. Special permission is to be sought from the speaker to address in mother tongue. All laws and enactments of the democracy are made in English.

Most Indian languages have their own distinct alphabetical system except Kashmiri, Punjabi, Sindhi and Urdu which make use of the altered versions of the Arabic script. Though Hindi and Urdu have originated from the same source, they make use of Devnagri and Persian-Arabic scripts respectively.

Presenting a rich tradition of its own, each of the languages of India has immensely contributed to weave the fabric of the national culture in India.

Linguistic plurality has been **India's double edged sword of linguistic plurality, which is proving itself to be more of a liability than an asset. As a linguiphile, it's rather hard** to see any way out of the mess that India is in.

Reasons for diminished ethnic linguistic plurality

The rise of English is the primary determinant factor that has lead to loss of ethnic linguistic plurality. The rise of English as the lingua franca has been because of many factors

It is true that imposition of a non-native language as the prestige language and the language of all commerce leads to a country's own citizens without knowledge of that language to become marginalized, second-class citizens.

It reduces their productivity in the society, leads to under-utilization of their capabilities, and leaves a vast pool of talented and intelligent citizenry unused and wasted.

It also causes this stupid association of intelligence and capability with knowledge of English, as if it is not possible to be smart in any language but English.

As long as knowledge of English is mandatory for access to higher education and well-paying jobs, English will continue to be a prestige language. And unless there is a common national language (it is clear that it would be unfair to declare Hindi or Tamil as the common language; but some language has to be the common language), some language will take over that role, and that language, for Indians, is English.

Coupled with it the colonial and slave mindset of the people that makes them think low about their own language, the utter disregard for their mother tongue guided by their own inability to defend their own mother tongue and allow its fall, plot its fall and demean it in the eyes of the world had been factors aided by a new paradigm of linguistics called Hinglish or any such mixture.

Examine the driving forces of changing urban morphology of million-plus cities of India with suitable examples. (20 marks)

The Indian urban morphology particularly of the million plus cities has shown a remarkable change in its morphology particularly after 1991.

Overall certain changes which have been discernible in the changing urban morphology have been –

1. Decline of the CBD, increase in the area of the city, expansion of the sprawl
2. Shift towards service activities and accompanying Changes in retail business location, shopping plazas and buying behaviour.
3. Emergence of a new form of residential segregation, and Changes in the nature of residential patterning, based on income.
4. Changing perception about aesthetics and aesthetic induced city planning as exemplified in Ambi valley, Lavasa, Greater NOIDA.
5. Growing gentrification trends and displacement of inner city residents.
6. Increasing tendency of the city to be polynodal/polycentric.
7. A changing lifestyle of the population is gradually bringing about changes in the office-home relationship and its pattern.
8. A completely new form of intraurban residential mobility ostensibly stimulated by new Mass Rapid Transport System such as Metro of Delhi.
9. The increasing shrinkage of State's physical space.

Several processes stood out in the liberalisation, phase, post 1991

- gentrification or the gradual takeover of land for use by the upper middle and middle classes is generally associated with a displacement of poor communities by rich outsiders. When wealthier people move into a neighbourhood, there is an increase in rents and property values and changes in the neighbourhood's character and culture.
- in formalization, that is, process of incremental expansion of the informal economy responding to the needs of both the poor and the middle class. It is the process by which informal economic activities and informal housing gain access to existing spaces in the city and its fringes.
- Globalisation is a term used to describe a complex of related processes that has served to increase the interconnectedness of social life in the modern world. Globalisation in India has led to economic restructuring and global linkages of select regions in the countries. In the process as countries compete, cities too have begun to complete with each other. Globalisation with its accompanying attitude, cosmopolitanisation with its concomitant urbane outlook has brought about significant changes in the overall urban morphology. Of course, morphological changes have been accompanied by a host of other factors.

Discuss the emerging geo-political scenario of Indian Ocean realm. (15 marks)

India's engagement with the maritime based globalisation order is an inevitable reality that has powerd its economic growth and development to commendable heights. Even as the country grew by impressive growth rates there have been several challenges and pressures that have affected this growth. The geoplitical scenario in the Indian Ocean has been changing in the light of all the developments.

The predominant security predicament that India has contended has been the largely land-based symmetrical and asymmetrical threats that it has faced in the northwest with Pakistan and northeast with China.

Changing nature of Maritime Threats

- India faces a perilous vulnerability of its littoral and the Exclusive Economic Zone fraught with a wide-spectrum of maritime asymmetric as asymmetric threats of increasing incidence of piracy, maritime terrorism, narcotics and light, small arms smuggling – This has been the dense maritime domain of both of native and alien maritime activity with little governance and regulation;
- India's second maritime – littoral challenge and nightmare is the security of India's littoral and the security of Sea Lanes of Communication (SLOCs) that abounds the Indian peninsula. Shipping in this domain ranges from fishing trawlers to supertankers and super-container ships. The intense shipping and poaching of foreign trawlers in India's littorals and the EEZ have wrecked the delicate environmental balance of the diversified and rich marine life and resources of the Arabian Sea-Indian Ocean-Bay of Bengal areas.
- India's third maritime – littoral challenge and threat is the established nexus between organised crime in the hinterland with terror groups in the proximity of India's borders and boundaries with Sri Lanka, Myanmar, Bangladesh and importantly from Pakistan (the recent Mumbai terror attacks) have a evidently revealed. The crime syndicates have used the external linkages in the sea-smuggling of narcotics, small arms, explosives to be used in the various criminal are the staging points for the long chain of links in the smuggling process.
- India's fourth peril in its maritime-littoral corridors is the trafficking of weapons of mass destructions in its components, subassemblies etc. Earlier such merchandise have often been in maritime transit connecting Pakistan from China and North Korea.
- India's fifth clear and present danger is the daunting weakness in the Maritime domain awareness due to the vast littoral territory and the dense populations in these areas.
- **China's threat in indian ocean region**

  China is rapidly increasing its naval presence in Indian Ocean region although it proposes only new facilities and denies intentions to increase military power in this region.

  Chinese have signed an agreement to set up a naval facility in the Seychelles with Djibouti, with Somalia, and has a substantial role to play in Maldives, and in Northern Arabian Sea. However, the most significant Chinese move have been to establish facilities at the Gwadar deep sea port in Pakistan, obviously for collaboration between the armed forces of China and Pakistan as China forces can operate from here to help Pakistan at short notice. These

give China a strategic reach in this important part of the Indian Ocean. Moreover, a naval base of China can be a part of power projection

China is beginning to adopt a firm policy to have a number of military bases in Indian Ocean, though asserts its peaceful intentions and its pledge of not sending Chinese soldiers against any foreign country except under UN peace keeping flag but it also asserts its right to go war for securing its strategic interests anywhere

China's status as a world power clearly gives it a leading role in South Asia, a position India cannot accept The Chinese, however, are extremely cautious here because China's military power is focused on Asia- pacific. It would not like countries like India to come under the US umbrella and join US alliances.

- Indian response

The world has responded to Indian Ocean Maritime threst in several ways including renaming Pacific region as Indo Pacific region, through malabar exercise comprising of US, Japan India and Australia. India has reponded to its maritime threats in several ways including having a strategic tie up with Oman, Strengthening northern Arabian Sea through Chah Bahar and through a restructured approach towards new maritime relationship with Seychelles, Maldives, and Oman.

Explain the changing river courses and their impacts on the riparian population in India with suitable example. (10 marks)

River courses are likely to shift in both mountainous areas as well as plains and are a natural phenomena.

The Kosi river in north Bihar is notorious for the meandering behaviour of its east-to-west course. In the past 250 years, the Kosi has moved westwards by more than 100 km

Bihar has a history of rivers changing course because of its terrain. The Ganga has been changing its course over the years and last year, a new 500-acre tract came into existence between Maner and Mokama. Ownership of this tract became a bone of contention between some landlords in the area

The Brahmaputra has a huge volume of water and is quite unmanageable. It keeps changing course and a major shift has been observed in the North-East since the 1960s

The Rupnarayan river in West Bengal joins the Hooghly after completing a 240-km course. It carries huge silt deposits and may be forcing the Hooghly to shift course

Areas of Uttarakhand, which are near the foothills, are at risk because the Ganga can change course

The Sone river in central India has been notorious for changing course, as is evident from several old beds on its east. In modern times this tendency has been checked with the anicut at Dehri, and now more so with the Indrapuri barrage

Natural causes such as earthquakes, landslides, hurricanes—can change a river's course as well. Compounded by anthropocentric factors such as temperature changes.

As a result of many external changes, floods are increasing in frequency and intensity. It's not possible to ascribe a single event such as the current floods in Bihar and Assam to human-induced climate change, but there is a trend.

The riparian states get affected to a large extent by the left over silt as well as by erosion of the land with consequent loss of fertility. The Kosi, for example, brings unfertile soil with it from the higher reaches.

The fast-flowing rivers are prone to silting up as they surge down the hills and spread out on the plains, allowing sand and suspended matter to deposit in their slower, wider depths. Over time, the deposits create resistance, forcing the river to move to an area of lower resistance. This is called changing course.
In the process of receding, the river leaves behind marshy land as has been evident with Gandak near Sonepur.

The attendant loss of fertility and flood necessitates a resettlement of population.

Peri-urbanization has created enormous environmental problems. Discuss their causes and consequences with reference to the National Capital Region (N.C.R.) of India. (15 marks)

Meaning

Peri-urbanisation is a process of development of Peri-urban areas which are also called rurban space, outskirts or the hinterland). It can be described as the landscape interface between town and country, or also as the rural—urban transition zone where urban and rural uses mix and often clash. Peri-urbanisation relates to those processes of dispersive urban growth that creates hybrid landscapes of fragmented urban and rural characteristics. The land use includes

1. Roads, especially motorways and bypasses
2. Waste transfer stations, recycling facilities and landfill sites
3. Park and ride sites
4. Airports
5. Large hospitals
6. Power, water and sewerage facilities
7. Factories
8. Large out-of-town shopping facilities, e.g. large supermarkets

These activities and their relocation do pose varied problems which are the cause of environmental problems in the NCR region.

Peri-urban areas is often used for dumping garbage and sewage of the city, for the relocation of city's slums and location of industries emitting noxious gases and generating chemical effluents. It is a zone of haphazard industrial and residential development. This happens when the rural people lured by attractive prices sell their land to developers who are primarily concerned with profits, do not

really develop the lands before they are sold, and the people who buy land from them have to wait for decades to obtain basic urban amenities. This causes undue use of land, unregulated allocation for polluting industrial units uncontrolled and sometimes dangerous pollutants as well.

Peri-urban areas lack most of the civic services that are found in the city proper. Primary urban facilities, such as water supply, sewerage, etc. are, for the most part, Peri-urban areas manage to live without most of the services as they can obtain water from hand pumps, tube wells or ordinary wells and septic tanks can be used as an alternative to sewage system. Besides, people are able to adjust themselves to the poor quality of local medical, educational, postal and transport facilities.

These areas also become the site of dumping of entire of urban waste creating mounds as is seen in Ghaziabad, which sometime may collapse and often spews up lot of particulate material in the air.

Start-ups may play important role in giving fillip to economic growth in India. Illustrate with examples. (15 marks)

Meaning of footloose Industry

What are the start-ups and how do they function?

In what way start ups promote industrial growth

1. Promote footloose Industry
   - Any type activity
   - Not dependent on the location
   - Service oriented, idea oriented
   - Not dependent on raw material
   - Technology like Internet has increased the reach.
   - Based on efforts, energy and knowledge
   - Suited to Tier II cities can start anywhere
2. How will they impact spatial make up of India.
   - The traditional industrial regions and clusters will remain but with new innovations.
   - Clustering will be prevented
   - Dispersal on a wide scale with new and innovative activity
   - Changing work culture in future where it will be work anytime, work from everywhere, use any devise rather than office, where the start-ups can create their own ladder, and customise their work…All of this future work culture will lead to more and more decentralisation.
3. Innovation
4. Involvement of talent
5. Identification of many new backward linkages and forward linkages
6. Greater amount of spatial integration